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All Inputs, Tools and Techniques and Outputs listed in this manual are from the *PMBOK® Guide,*5th edition.

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Conventions Used in This Study Guide

- **Exam Tip -** pay particular attention to these exam tips. They outline critical elements you need to know to help you be successful on the exam
- **Brain Dump -** every time you see the following symbol on a manual page or next to a formula, it indicates a formula that you need to memorize for specific questions on the exam:

- This guide focuses on the elements needed to pass the exam. As such, it is not a 'how to' guide. There are plenty of books on project management and its specialties upon which the reader can avail themselves. That being said, this guide contains a number of footnoted references that may be very useful to the project practitioner and are strongly recommended for further study after the reader has passed the PMP exam(!)

About the Author

Richard Perrin (PMP CSM CSP ACP MBB) has worked in the aerospace, finance/brokerage, healthcare, energy, telecommunications, insurance industries and state/federal government for over 30 years. His efforts as a Director of Development for a telco startup helped his company garner the IEC Infovision Award for most innovative AIN product in 1998.

Working primarily for Fortune 100 and Global 10 companies as a Program/Project Manager, he has managed multi-million dollar, international infrastructure deployments, consulted in the creation of PMOs, functioned as proposal manager, developed workflows and business process focusing on the implementation of lean business process and quality practices for the publishing and telecom industries, as well as the public sector. He has served as a mentor and trainer, delivering formal instruction in CMM/CMMI, configuration management, requirements elaboration, project risk management and project management tools & techniques. For the last four years he has devoted his efforts to delivering coaching and training on Agile/Scrum processes across the United States. His book, *Real World Project Management* was published by John Wiley & Sons and released in January of 2008. He was a presenter at the March, 2010 Scrum Gathering in Orlando, Florida on the subject of Scrum and Lean Six Sigma. Most recently, he was selected by the Project Management Institute as an internal reviewer/contributor for the PMBOK® Guide, 5th Edition.

How to Use This Guide – READ THIS FIRST!!

Using this guide correctly will help insure you pass the PMP exam on your first attempt. Do the following:

- Review each chapter thoroughly. Then read through the corresponding chapter in the *PMBOK® Guide.* **Pay particular attention to the outputs for each Knowledge Area and the processes that feed into each Knowledge Area*. Memorize all Exam Tips and Critical Notes.***
- Take the chapter quiz, marking your answers on a separate sheet of paper. If you scored better than 80% you have a good gasp of the material. If not, mark the chapter for review on your second pass through the manual.
- Go through the remaining chapters using the same approach. When you have completed the guide you will then review the chapters in which you scored below 80%
- Retake the chapter quizzes in which you scored below 80%.
- When you have passed all quizzes at the 80% level, take the post-test; it is a full blown PMP exam simulation. Give yourself 4 hours to take the sim – if you score better than 80%, you are ready to sit for the exam.
- If you score less than 80%, *call the test center where you will be sitting for the exam and reschedule the test!* You can do so for up to 48 hours prior to the exam without forfeiting the exam fee.
- If you need additional testing material, sign up for practice tests at: http://iwebprep.com/Default.aspx

Chapter 1 :PMP®
Examination Overview

Section Objectives

- Exam Questions
- Exam-Taking Tips
- Maintaining the *PMP®* Certification

Exam Overview

	PMP	PMP %
Initiating	26	13%
Planning	48	24%
Executing	60	30%
Monitoring and Controlling	50	25%
Closing	16	8%
Total	200	100.0%
Passing		
Time Limit	4 hours	

PMP® Examination Overview

- The PMI certification examination consists of 200 multiple-choice questions, each question consisting of only four possible answers. The questions that you will see on your specific exam are selected from a bank of over 13,000 questions. There is no way to predetermine what the specific selection mix of questions will be.
- Unlike the GMAT, The PMI exam is non-adaptive. You may select questions for review and move on to other questions, returning to those questions that gave you difficulty, without penalty.
- The PMI examination is four hours and once begun, the clock will tick until four hours are complete, or the test taker submits the exam for grading prior to the completion of four hours.
- Make sure you answer all questions - no credit will be given for unanswered questions. In this case an unanswered question is the same as an incorrect answer.
- There are 25 'pretest' questions on the exam that carry no credit. You are only graded on 175 questions out of the 200 questions presented; however you will not know which questions are experimental and which questions you are being graded on.
- As of this writing there is no definitive passing score for the exam - for each of the sections outlined above you will be graded either a) Proficient, b) Moderately Proficient, or c) Below Proficient. According to the PMI Certification Department, the following is In effect:
  - **"**There are not a minimum or maximum number of domains or chapters in which candidate needs to demonstrate proficiency in order to pass the exam. The pass/fail rate is determined based on overall performance, not on how many questions were answered right or wrong in a particular domain or chapter. Each of the domains or chapters has a different number of questions within them that are relative to each other but not equal to each other. That means itis possible to score *Below Proficiency* in one of the domains and yet still pass the examination. It all depends on how many items were present in the domains that were failed. "[1]

[1] Helen Welsh, Certification Department, Project Management Institute

Examination Question Types

Questions on the *PMP®* certification exam are designed to test your analytical abilities, application experience, and general project management knowledge. The types of questions you will see on the exam will fall into the following general categories:

- **Situational:** A scenario or situation will be presented to you in which must analyze the question and choose the best answer based on your experience, analysis, and knowledge. Many test takers state that the predominant percentages of questions on the exam are situational.
- **More than one right answer:** Frequently, a test question will have two or more correct answers; however there will always be one answer that is more correct than the others. In this situation it is usually simple to eliminate at least two of the answers. Focus your attention on what the project manager needs to do next.
- **Extraneous information:** PMI is famous for the wordy multi-paragraph question, loaded with misdirection (red herrings) and nonessential information that has nothing to do with the actual question. When encountering such questions for the first time, read the answer set and the final paragraph first - this is usually the place where the actual question is contained.
- **Something you never heard of:** Don't be surprised to see a question containing something you have never seen before. The field of project management changes on a daily basis and the tools and techniques used by the project manager are expanding seemingly at a geometric rate. Take your best guess and move on.
- **Mathematical:** Expect to see anywhere from 5 to 10 questions involving formula computations. Earned value, PERT or questions involving standard deviation are typical computation questions.
- **Diagrams:** You may be asked to interpret a graph or construct a precedence diagram from instructions. On the computer at the test center, there may be a button on the screen that you can push that will bring up a graphic or some other diagram. Take advantage of all information provided.
- **Correct answer to a different question:** You will sometimes see answers that may be correct statements by themselves, but do not answer the question.
- **A new approach to a known topic:** You will frequently see questions that will present a different point of view or skew to a known topic. These questions will test concepts but using language that is different from what you studied for the exam. Thus it is critical that the concepts be understood ahead of simple rote memorization of project management knowledge.
- **Double negatives:** A number of questions are designed to be deliberately confusing ("which of the following would NOT be the least likely choice to make..."), which is another way of saying; "what would be your most likely choice".
- **Recall:** There will be a few fairly short questions that test your inventory of certain project management facts and knowledge areas.

Critical Note: Make sure you do a careful and thorough read of each question - *many of the answers to exam questions turn on a single word*. If you skim over or miss that key word, you will get the question wrong. *Read all questions carefully*. Answer what is asked!

Preparing for the Exam

PMP® exam is four hours and 200 questions - this means that you have approximately 1 minute and 12 seconds to answer each question. In order to ensure an optimal testing experience there are specific stress relievers you can employ that will help you get through the test with a minimum of angst. Consider the following as part of your test taking strategy:

Arrive Early. Consider traffic and time of day when making your way to the exam center. You don't want to arrive in a rushed or stressed state before the exam begins. ***It is strongly recommended that you scope out the exam facility a week or two before the actual examination, if at all possible***. You want to know what to expect walking through the door of the test facility. You will be under constant video monitoring and observation for the entire duration of the exam.

Rest Up. Take the evening off from studying the night before the exam - if you don't know the material by this point, cramming into late hours the evening before the test will simply multiply your stress level by a factor of two or three. It is most important that you be rested with a good night's sleep under your belt on the day of the exam. If you can, schedule the test for early afternoon instead of early morning.

Consider Earplugs. There may be some distracting noises in the examination room such as a fan, or test-taker for a different exam tapping a pencil on a desk. Bring earplugs just in case.

Dress in Layers. Frequently exam rooms are air conditioned to a point where they are too cold for many people. Therefore it is recommended that you dress in layers and remove layers or add layers as necessary to maintain your own individual comfort level.

Bring Food and Drink. If you get thirsty or need a nutritional boost during the exam, make sure you bring bottled water, bottled juices, or any snacks you will need for the four-hour test. If you have to leave the room to use a water fountain or go to a vending machine, the test clock will still be ticking.

Do the Brain Dump! Prior to the start of the exam and during the 15 minute tutorial you will have time to write on scratch paper all the formulas you will need for the test. While many of us pride ourselves on our airtight memories, rest assured that if exam panic sets in, all that you thought you had memorized will fly out of your head in an instant. Do yourself a favor and write down these formulas in an unstressed state prior to the actual start of the exam - this will pay dividends many times over while you are taking the exam. Some past test takers have actually reported that examination proctors upon handing scratch paper to the test-taker will state, "don't forget your brain dump".

Formulate a Plan. Have a strategy in mind prior to taking the test. If you know you will need to stand up and stretch after 90 minutes, allocate time in your strategy to do just that. The idea is that you want to pace yourself for your own maximum comfort and effectiveness on exam day. One effective plan involves the following approach:

- Go through the entire exam and answer the questions you can answer very quickly - within 20 to 30 seconds. Mark all other questions for review. You can frequently answer 80 questions in 45 minutes using this approach.
- Now approach all the 'marked for review' questions on the second pass - these questions will take you a little longer to answer but only because they require more thought. You can answer another 70 questions in the next hour and 15 minutes using this approach. Sometimes other questions and answers will jog your memory on a question you marked for review.
- You will now be left with your 50 most difficult questions on the third pass for which you have a full two hours to ponder the answers. Having this much time to approach your toughest questions is a real stress reliever and a major confidence builder for the exam.

Breathe! Students of yoga have utilized this technique for years. While in a stressed state, the simplest and most effective way to calm your system is by deep controlled breathing. This will produce a calming effect on your mind as well as your body, and can even lower blood pressure. If you feel a moment of

panic during the exam, sit back in your chair, close your eyes and breathe deeply and slowly for 15 to 20 seconds.

Useful Exam Tips

Think Like PMI! When you are answering questions for the exam, unless stated otherwise, assume the following is true:

- You are the customer if procuring services from an external vendor unless stated otherwise
- As the project manager you are in control of the budget, the timeline, and the resources
- The project is of sufficient size to warrant the use of a project management plan and all subsidiary plans
- You are following the formal processes as outlined by PMI, even if you don't use them in real life
- You have access to historical information and that formal project management processes are followed in your organization

The exam does not test memorization. Being a quiz kid with an eidetic memory will not help you pass the *PMP®* examination. You could memorize the *PMBOK® Guide*, 5th edition cover to cover and easily fail the exam. The *PMP®* exam tests your experience as a project manager as well as your understanding of project management concepts, and your ability to correctly analyze situations that occur on projects. ***While some memorization is required it is not the focal point of the examination.***
Answer all questions. You do not get any credit for an unanswered question. If you are completely stumped by a question there are only four possible answer alternatives. You have at least a 25% chance of getting it right. If you can eliminate at least two apparently incorrect answers your chances have improved to 50-50. *Always answer a question even if time is running out.*
Fill in the blanks. With a fill-in-the-blanks type of question, sometimes the correct answer is not grammatically correct. Don't let that stop you from filling in the correct answer.
Software calculator. You will be provided with an online, basic calculator that performs the following functions: add, subtract, multiply, and divide. A TI-83 graphing calculator with sophisticated integral and derivative calculus functions will not be allowed in the exam room.
Look for sweeping generalizations. Frequently you will see broad generalizations and questions using terms such as; "MUST, NEVER, AWAYS, COMPLETELY" or other absolutes. When referring to the project manager's actions, these terms are almost always wrong. Make sure you understand PMI's point of view first before attempting to answer questions containing these terms.
NEXT, BEST, WORST, LEAST, MOST, FIRST, LAST. On a number of exam questions you will be asked what is the BEST or FIRST action you should take regarding a specific situation. When we see questions like this, it is a tipoff that there is usually more than one correct answer. Read these questions carefully and understand what is being asked.
Cheerleader answers. There are a fair number of question responses that are what we call 'cheerleader' answers. Statements such as "quality is really important" or "scope verification is really time consuming" are answer choices that are guaranteed incorrect. Also keep an eye out for answers in which there is some type of emotional response to a situation. Project managers manage projects with data and fact. "Touchy-feely" answers can usually be eliminated immediately from consideration.
Use the whole exam time. Allow yourself the full four hours to complete the exam unless the following situation applies: you have answered all the questions and double-checked the answers. Studies have

shown that over-thinking answers on an examination will frequently cause test takers to second-guess themselves. More often than not, they will change correct answers to incorrect answers. Your first instinct on a difficult question will generally be correct. If you have used the three-pass method, double-checked your answers, and 30 minutes on the exam remains, your best strategy may simply be to submit your answers for grading.

Know PMI's recurring themes for the exam. The following themes need to be well understood to increase your chance of passing the exam the first time:

- The project manager puts the interests of the project ahead of his/her own self-interest
- The project manager is assigned during the Initiating phase of the project
- Organizations have a Project Management Office (PMO), that has clearly defined authority over the implementation of project processes
- The WBS is the foundation for all project management planning
- Stakeholders are engaged throughout the project
- Planning is a key element in all projects
- All roles and responsibilities are clearly defined and documented for the project
- Due to the uniqueness of the project, the project manager focuses on risk identification and risk management
- Project management plans are agreed, realistic and signed off by all relevant stakeholders
- The Project manager is responsible for realistically assessing all time, budget and quality constraints and resolves any issues with the management *prior to* the start of project work
- Continuous process improvement on the project is one of the key responsibilities of the project manager
- The project manager determines the quality metrics to be used on the project
- The project management plan is the key document by which the project is managed
- Projects are continually re-estimated throughout the life of the project so that an accurate budget and timeline may be forecasted
- Progressive elaboration is a key concept used by the project manager to tighten estimates as the project moves forward
- The project manager has authority. The PM can reject changes to scope and control the project budget and timeline for the benefit of the customer
- The PM protects the project from unnecessary changes
- In the event that scope changes must be made, the PM will ensure that a thorough impact assessment will be performed assessing changes to time, budget, resources, risks, quality, and customer satisfaction
- Project managers spend 90% of their time communicating with stakeholders to ensure everyone connected with the project knows what is going on
- Project managers proactively seek out additional risks, problems, and other changes to prevent future problems with the project
- Project managers have a fundamental understanding of contract language
- Project managers ensure organizational policies are followed for the duration of the project
- When closing a project, the project manager archives all project records
- Projects are not considered complete until final acceptance has been received from the customer and the PM releases resources upon project completion

Maintaining the PMP Certification

Maintaining the PMP Certification requires the credential holder to document 60 Professional Development Units (PDUs) every three years. This can be accomplished in many ways, including, but not limited to the following:

- Attend a PMI chapter meeting: 1.5 PDU
- Any PM training from a PMI Registered Education Provider (REP): 1 PDU per hour of training
- Any PM course offered by an accredited College or University: 1 PDU per hour of training
- Self study
- Speaking, lecturing or publishing articles on any aspect of project management

Consult the PMI website at www.pmi.org for a comprehensive listing.

CRITICAL NOTE:

Starting August 31, 2011, the exam section concerning Ethics and Professional and Social Responsibility will no longer be tested as a separate entity apart from the five process groups, but will be subsumed within each process group. This means that questions regarding ethics can appear in the Initiating, Planning, Executing, Monitoring and Controlling and Closing process groups.

In Summary…

- In this section we covered:
  - What types of questions to expect on the test
  - Study and test-taking tips
  - Requirements necessary to maintain certification

Chapter 2 : Project Life Cycle and Organization

Project Management Defined Organizational Influences and Project Life Cycle

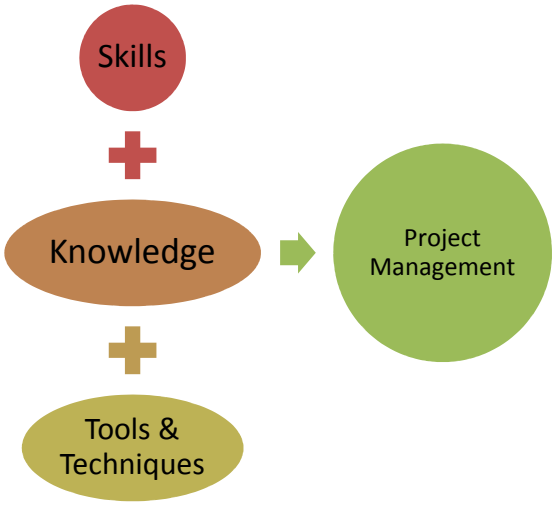
Section Objectives

- What Is a Project and What Is Project Management?
- The Project Management Life Cycle vs. the Project Life Cycle
- Portfolio Management, Program Management, Project Management, and Organizational Project Management
- Project Management, Operations Management, and Organizational Strategy
- Business Value
- Organizational Influences on Project Management
- Project Stakeholders and Governance
- Project Team
- Project Lifecycle

Definition of Project Management

According to PMI, project management is:

- The application of knowledge, skills, tools, and techniques to project activities to meet project requirements
- project management is accomplished through the appropriate application and integration of the 47 logically grouped project management processes comprising the five process groups



The five process groups are, in order:

- **Initiating**
- **Planning**
- **Executing**
- **Monitoring and Controlling**
- **Closing**

Critical Note: Many organizations implementing the PMI Project framework in their organizations make the mistake of thinking that the five process groups constitute project phases. They do not. According to PMI: "**The Process Groups are not project life cycle phases**"[2]

What Is a Project?

- A Project:
  - A time-scoped/time-boxed activity
  - Has a beginning, middle and an end
  - Creates a unique product, service or result
  - A 'progressive elaboration'

- Operations:
  - Endures for the lifetime of the product, process or service
  - Can be incrementally improved or enhanced over operational lifetime
  - Enhancements/improvement typically done as a series of smaller projects

[2] *PMBOK® Guide*, 5th edition, p 52

A project as defined by PMI states the following:

"A Project is a temporary endeavor undertaken to create a unique product, service, or result."
The project is completed when the objectives have been reached from the customer's perspective, when the project is terminated because its objectives cannot be met, or if the need for the project no longer exists.

The term 'temporary' refers to the execution of the project and not to the *product* of the project, which is usually created to deliver a lasting or sustained outcome. An example of this type of project would be a national coast-to-coast railroad system or a national monument.

The term 'unique' means you are doing something that is without like or equal. This does not mean that every aspect of the project is unique. A project may contain repeating elements such as processes or infrastructural elements.

Operations endure for the lifetime of the *product. Operations* address assembly-line type processes that are both predictable and repeatable. *Many projects contain repeatable elements that resemble operational processes.*

Point of view is also very important to consider when identifying an operational process or a project. To the customer the work effort may be a project, however to the performing organization the work effort may be purely operational and something they do all the time.

There are distinct similarities between projects and operations:

1. Both are performed by individuals
2. Both are subject to constraints including resources, schedule, risk and others
3. Both are planned, executed and controlled
4. Both are designed to meet organizational and/or strategic objectives

The key differences between projects and operations:

1. The project ends at some point, whereas operations continues for the lifetime of the product
2. The project may contain a number of unknown, unpredictable elements, whereas operational elements are both predictable and repeatable

Projects continually evaluate risk, whereas operational processes are usually designed to minimize or eliminate risk. (Operational elements are both predictable and repeatable

Project Constraints

There can literally be hundreds of constraints on a project. Constraints are limiting factors that set up boundaries for the project. These boundaries may be necessary for the successful completion of the project, however sometimes boundaries and constraints may severely impact project optimization and ultimately customer satisfaction.

As of the printing of the *PMBOK® Guide*, 5th edition, PMI has abandoned the pure triple constraint model from previous years (cost-schedule-scope) in favor of a more inclusive definition that focuses on the following key constraints (*PMBOK® Guide*, 5th edition, p. 6):

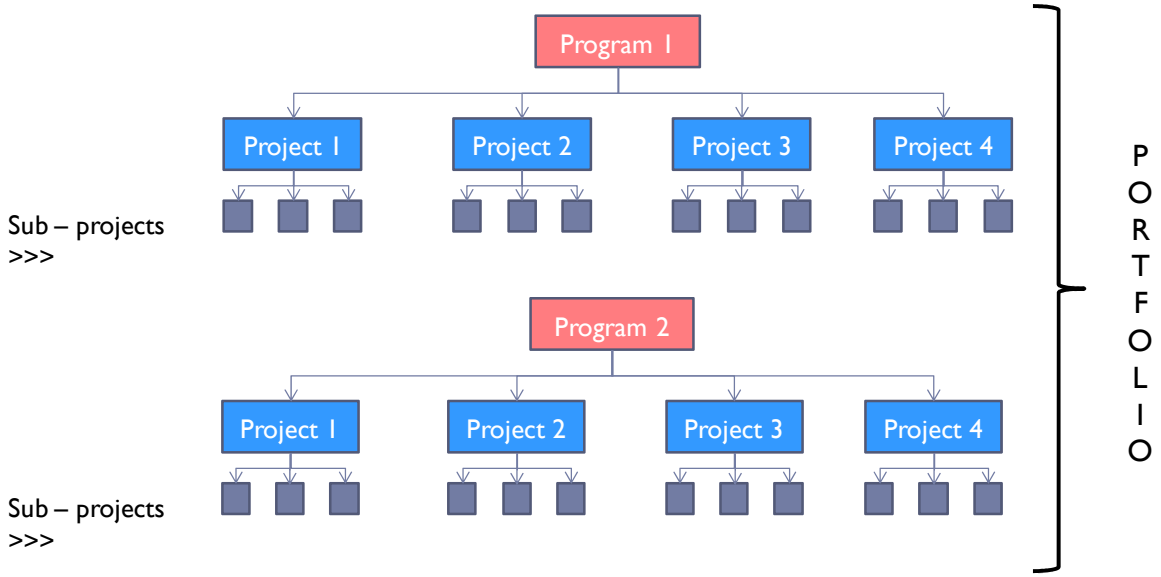
- Scope
- Quality
- Schedule
- Budget
- Resources
- Risk

All of the constraints have an impact on customer satisfaction. The project manager is responsible for balancing all the constraints on the project to drive the highest levels of customer satisfaction. Different constraints may come into play at different times in the project, and each of these constraints needs to be evaluated in terms of ultimate customer satisfaction and the needs of the project.

What Are Programs, Portfolios and Sub-Projects?

- A Portfolio:
  - A portfolio is a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives.
  - The projects or programs in the portfolio may not necessarily be interdependent or directly related

- A Program:
  - A program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually
- A Project:
  - A means of achieving the organization's strategic plan
  - Progressively elaborated
- A Subproject: Smaller portion of an overall project



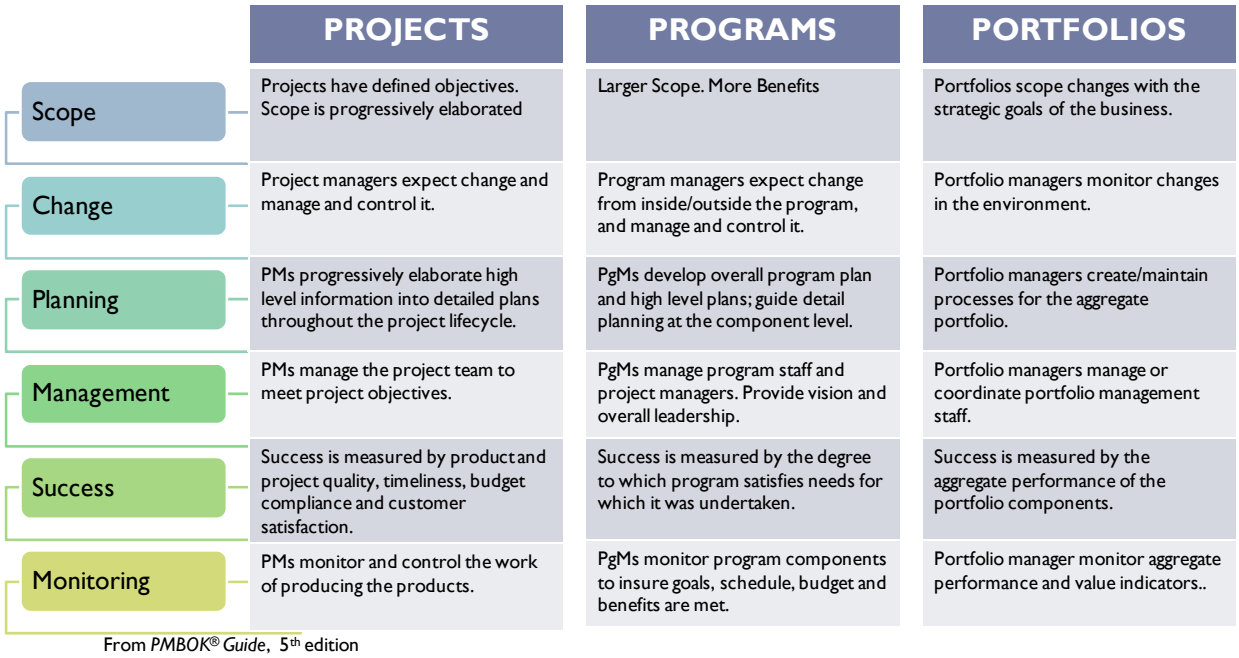
A Program is a group of related projects. The purpose in managing a group of projects in this manner is to derive economies of scale, decrease risk and potentially create synergies for improved resource utilization, as well as reduce costs. Programs can also address administrative functions as well as ongoing operational functions.

A Portfolio can include a combination of projects and programs designed to meet the strategic objectives of the organization. The individual projects/programs may not be related to each other from a management perspective. For example, a financial organization may have a portfolio of individual products all relating to wealth building. It may have a different portfolio of products related to risk avoidance/mitigation. Each of the products within these portfolios may have been created through the execution of an individual project or a program. The portfolio helps to group these products in a manner that makes marketing and sales of these products more efficient and comprehensible to the organization's customers.

Subprojects are created by subdividing a larger project into smaller, more manageable pieces or components. This may be useful if the project follows a phase-gate approach to execution in which specific subprojects are completed within each project phase.

Process Comparisons

The following diagram displays the differences between portfolios, programs and projects:



	PROJECTS	PROGRAMS	PORTFOLIOS
Scope	Projects have defined objectives. Scope is progressively elaborated	Larger Scope. More Benefits	Portfolios scope changes with the strategic goals of the business.
Change	Project managers expect change and manage and control it.	Program managers expect change from inside/outside the program, and manage and control it.	Portfolio managers monitor changes in the environment.
Planning	PMs progressively elaborate high level information into detailed plans throughout the project lifecycle.	PgMs develop overall program plan and high level plans; guide detail planning at the component level.	Portfolio managers create/maintain processes for the aggregate portfolio.
Management	PMs manage the project team to meet project objectives.	PgMs manage program staff and project managers. Provide vision and overall leadership.	Portfolio managers manage or coordinate portfolio management staff.
Success	Success is measured by product and project quality, timeliness, budget compliance and customer satisfaction.	Success is measured by the degree to which program satisfies needs for which it was undertaken.	Success is measured by the aggregate performance of the portfolio components.
Monitoring	PMs monitor and control the work of producing the products.	PgMs monitor program components to insure goals, schedule, budget and benefits are met.	Portfolio manager monitor aggregate performance and value indicators..

From *PMBOK® Guide*, 5th edition

The PMO

The purpose of the PMO - Project Management Office - is to centralize the management of projects across the organization. Typically the PMO will provide one or all of the following for a project:

- Methods and procedures, templates, methodologies and policies for managing projects
- Guidance and training to the organization on project management concepts, principles, and how to manage projects within the organization
- A resource pool of project managers for various organizational initiatives

Depending on your organizational structure the PMO may play the following roles in your organization:

- Audit compliance with Project policies, standards, and procedures companywide
- Help to provide project resources
- Cancel projects
- Provide templates and standardized forms for project use
- Offer coaching, training and mentoring for project managers
- Serve as a centralized communications conduit for projects
- Manage dependencies between projects, programs, or portfolios
- Function as a stakeholder

Types of PMOs

- **Supportive:** provides support in the form of on-demand expertise, templates, best practices, access to information and expertise on other projects.
- **Controlling:** requires that support be used. Requirements might include adoption of specific methodologies, templates, forms, conformance to governance, and application of other PMO controlled sets of rules.
- **Directive:** "takes over" the projects by providing the project management experience and resources to manage the project

PMI defines three types of PMO's for the organization; supportive, controlling, and directive, all briefly defined above. The idea of the PMO is to integrate data and information from corporate strategic project and evaluate how the high-level strategic objectives are being fulfilled. Thus, the PMO is a liaison between the organization's portfolios, programs, projects and the corporate measurement system.

One of the key functions of the PMO is to support project managers which can include any or all of the following:

- Managing shared resources across projects administered by the PMO
- Identifying/developing project management methodology, best practices, and standards
- Coaching mentoring, training, and oversight
- Monitoring compliance with project management standards, policies, procedures, and templates via a project audit
- Developing/managing project policies, procedures, templates, and shared documentation
- Coordinating communication across projects

Project Management, Operations Management and Organizational Strategy

While operations management is outside the scope of formal project management, projects can intersect with operations at various points in the product lifecycle, for example:

- At each closeout phase in the project
- Developing a new product, upgrading a product, or expanding outputs
- Improving operations of the product development process
- Until the end of the product lifecycle

Operational stakeholders may impact/be impacted by the project and are best included in the stakeholder register, and their influence can be addressed as part of the risk management plan.

Organizations and Project Management

Organizations utilize governance to establish strategic direction, guide the pursuits of the business and align with business objectives. Therefore, if there is a change in the business environment, project objectives need to be re-aligned.

While many organizations implement projects to achieve specific goals, there are some organizations whose work is project-based. These organizations are known as PBO's or project based organizations. The general characteristics of a PBO are outlined below:

- Can exist in functional, matrix, or projectized organizations
- Can diminish hierarchy and bureaucracy inside the organization because work is measured by result rather than by position or politics
- PBO's can reference the entire company, a multi-firm consortium, or a network

The link between project management and organizational governance can be summarized in the following statement; the project may be judged on the basis of how well the delivered product or service supports organizational governance. Therefore it is critical that the project manager be knowledgeable about organizational governance policies that relate to the product or service as well as sustainability requirements as they relate to project deliverables.

Ultimately, the organizational strategy should provide guidance and direction to the project management process. If the project manager observes that the goals of a project are in conflict with established organizational strategy, it is the project manager's job to document and identify these conflicts as early in the project lifecycle as possible

Business Value

PMI defines business value as the "entire value of the business; the total sum of all tangible and intangible elements". [3] Therefore, successful business value realization is a combination of strategic planning and effective management. Bridging the gap between organizational strategy and successful business value realization requires the use of portfolio, program, and project management techniques:

- Portfolio management aligns projects programs and/or operations to the organizational strategy
- Program management aligns multiple project for optimize and/or integrated cost, schedule, effort, and benefits
- Project management enables the organization to apply knowledge, processes, skills, and tools to enhance the likelihood of success over a wide range of projects. Projects are means of achieving organizational strategy and objectives

[3] PMBOK Guide, 5th edition, p. 15

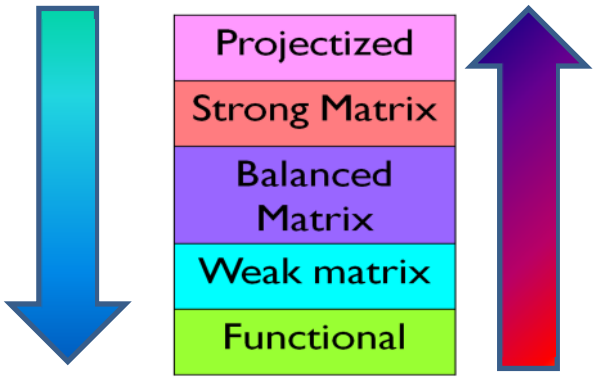
The Project Manager's Role

The project manager is assigned by the organization to achieve the project objectives. Depending upon the organizational structure, the project manager may report to a functional manager or an operations manager. In other situations the project manager may report to a program manager or a portfolio manager who is responsible for enterprise-wide projects and programs.

While the project manager is responsible for applying the correct tools and techniques to ensure the success of the project, effective project management requires that the project manager also possess the following characteristics:

1. **Knowledge.** What the project manager knows about project management
2. **Performance.** What the Project manager is able to accomplish while applying project management knowledge
3. **Personal.** How the project manager behaves when performing project related activities. The personal effectiveness of the project manager consists of personality characteristics, leadership ability, problem solving skills, attitude, and the ability to guide the project team while achieving project objectives and balancing project constraints

Organizational Influences on Project Management



Different types of organizational structures will have a positive or negative effect on the effectiveness of project management in your organization.

There are three fundamental organizational structures that you need to know for the exam:

- Functional
- Matrix (Weak, Balanced, Strong)
- Projectized

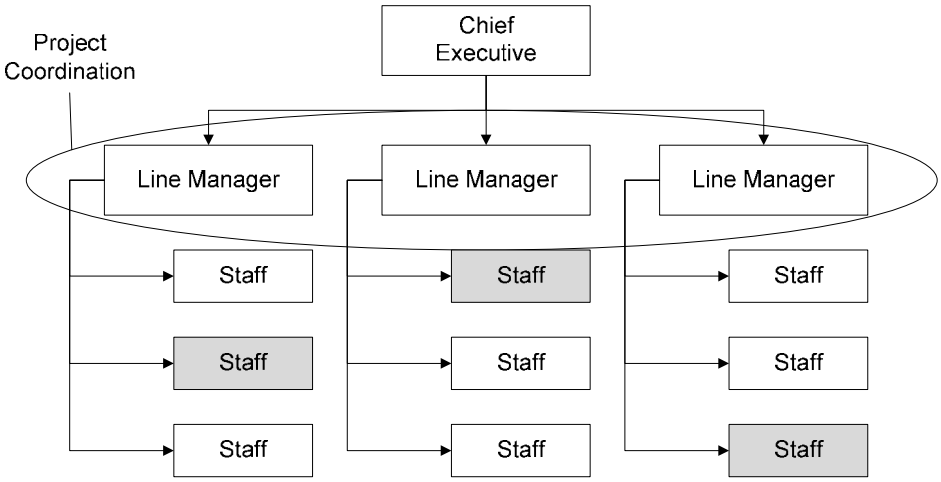
The influence of functional organizations in which project resources report to line managers or senior managers, impact the project manager's ability to influence the successful execution of the project.

In a Projectized organization project manager has ultimate authority over time, schedule, resources, and every other aspect of the project.

In a matrix organization project manager shares responsibility to a greater or lesser degree with line managers or senior managers when it comes to managing project elements such as budget, timeline, resource availability, communications and others.

An organization that uses a combination of organizational structures is called a "composite organization".

Functional Organizations



Gray boxes correspond to staff performing project activities

Drawing based on *PMBOK® Guide*, 5th edition, p. 29

In this organization type, the project manager has little to no authority on the project. Usually the project manager is part time and is often referenced as a 'project expediter' or 'project coordinator'. The functional hierarchy is that all the team resources report to a functional or line manager. The project manager has little or no input into performance reviews of the project team and frequently must approach functional managers 'hat in hand' to make the best case they can for project resources.

- **Exam Tip:**
  - **Project** _____is an assistant that cannot make or enforce decisions
  - **Project** _____have some decision making authority

Each of these designations can be found in a weak matrix organization as well[4]

[4] "Weak matrices maintain many of the characteristics of a functional organization, and the project manager role is more of a coordinator or expediter…" *PMBOK® Guide*, 5th edition p. 23

Functional Advantages and Disadvantages

- **Advantages**
  - Clearly defined career paths
  - Familiar structure
  - Direct supervisor reporting structure
  - Employees are experts

- **Disadvantages**
  - Employee's job difficult to change
  - Much contention for resources and project priority
  - Performance reviews and promotions are functional manager responsibility
  - PM has little or no authority
  - PM usually part time - no clearly defined career path for the PM

You'll notice from looking at the list above that with the functional approach to managing projects, the disadvantages clearly outnumber the advantages.

As the project manager in this type of environment, ensure that you have a very clear understanding of the structural hierarchy of the organization and that you work within the bounds of the tools that the organization has left at your disposal (generally few to none).

The Matrixed Organization

The matrixed organization was developed in the 1970s to attempt to combine the advantages of both the functional and the Projectized organization while minimizing the disadvantages. There are three types of matrixed organizations that PMI has defined:

- **Weak matrix.** Similar to the functional organization in that project resources report directly to functional managers
- **Balanced matrix.** With this organization type, project power and influence is shared between the project manager and the functional manager
- **Strong matrix.** Here most of the project authority is similar to the projectized organization in that the project manager has almost complete control of project resources, budget, timeline, quality, and customer satisfaction

Exam Tip: you may see the term 'tight matrix' on an exam question. A tight matrix simply means that the offices for the project team are co-located in the same room.

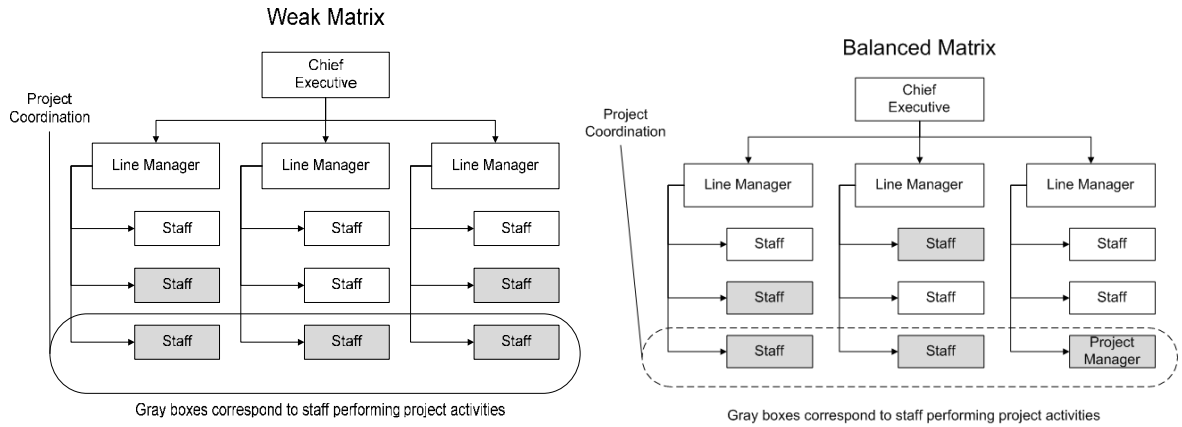
Matrixed Advantages and Disadvantages

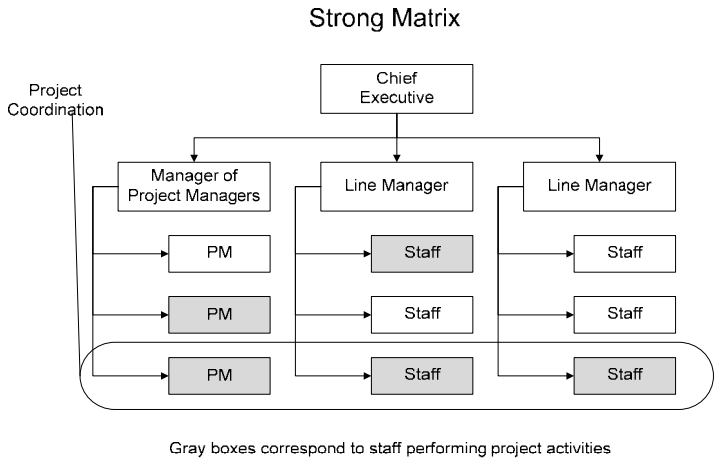
- **Advantages:**
  - Objectives remain visible
  - Increased support from functional managers

- Increased control by project manager
- Improved flexibility
- Job remains after project is complete
- Multiple inputs on team members' performance

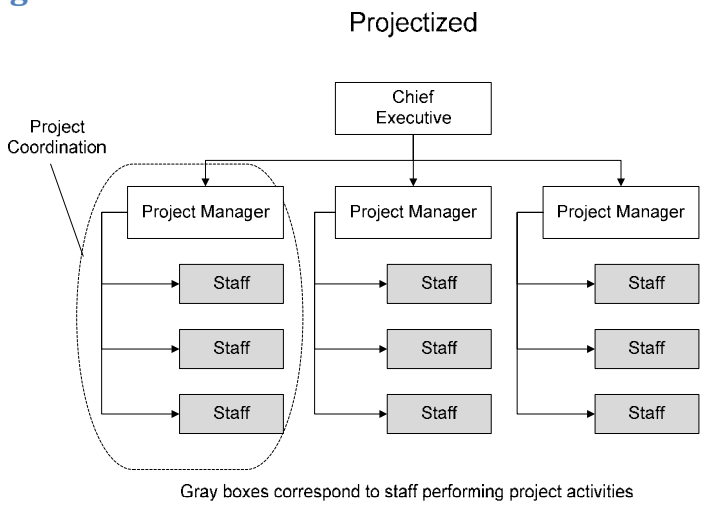
- **Disadvantages:**
  - Multiple bosses
  - Adds complexity
  - Additional policies and procedures are necessary
  - Different priorities or objectives may exist

Notice that in a matrix environment, the advantages outnumber the disadvantages. As with the other organizational types, you may be asked questions on the exam regarding the advantages and disadvantages of working in one of the matrixed environments. Some graphical examples of matrix organizations appear below (Drawings based on *PMBOK® Guide*, 5th edition, pp. 23-24):





Projectized Organizations



The projectized organization is one that derives its primary income from delivering projects. In this organization, the project manager has ultimate authority over the project, including the timeline, the budget, the resources, the scope, the quality and, ultimately, customer satisfaction.

In this environment the project resources are dedicated 100% to working on projects and focused on the project at hand. This approach is effective when the project is very high priority and requires the dedicated focus of everyone on the team. Typically, very large and complex projects are executed in a projectized environment.

Projectized Advantages and Disadvantages

- Advantages:
  - Dedicated project focus
  - Project loyalty
  - Efficient project organization
  - Efficient project communication
- Disadvantages:
  - Job is gone once project is complete
  - Resources are siloed rather than shared
  - Job functions and facilities can be duplicated

For the exam, the above outlined advantages and disadvantages need to be understood, as exam questions may make oblique references to the Projectized (or any other) organization type.

Example:

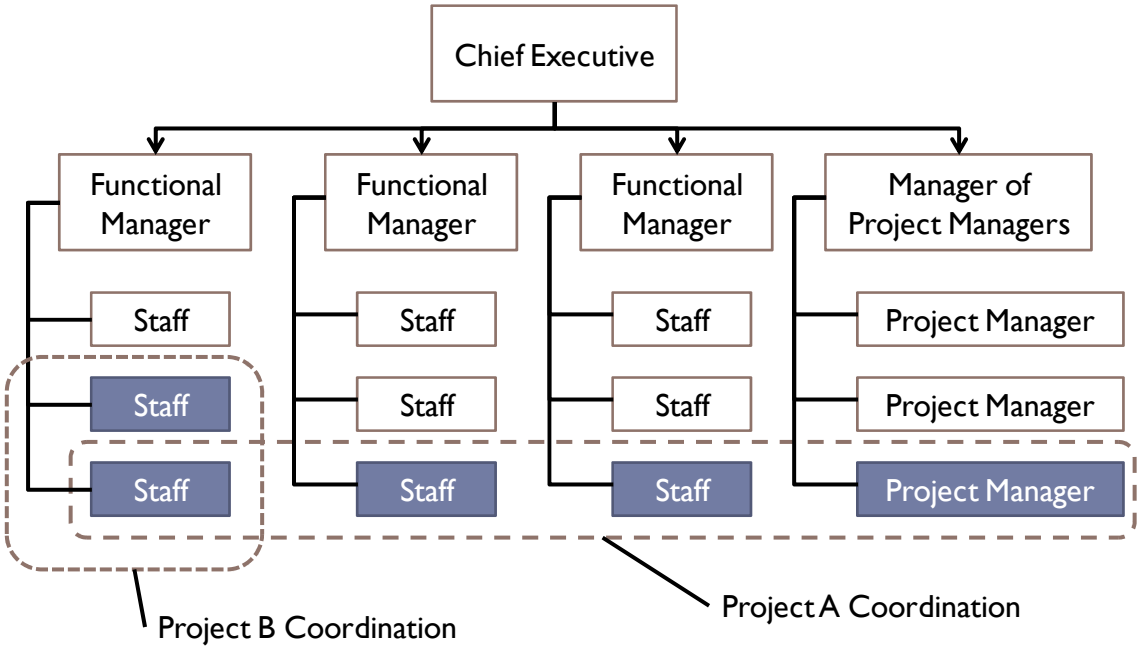
You are a project manager in which you have ultimate authority over the project, including the budget, the timeline, and the resources. While this dedicated focus serves the needs of the project, there may be a disadvantage in approaching a project in this way. Which of the following would be the BIGGEST disadvantage using this approach?

a. As the project manager, you get all the pressure
b. Line managers may not respect your authority

c. Your job may be gone once the project ends
d. Negotiating conflicting stakeholder needs is more difficult

A clear reading of the question describes a projectized organization type. Based on your understanding of the Projectized organization, you also understand the disadvantages of executing a project in this organizational environment.

Composite Organizations



The composite organization consists of elements of functional, matrix, and projectized organizations in that a project can be approached using any one of the three aforementioned methods. Depending on the complexity of the project, the organization may use all three approaches on the same project.

Since projects can include strategic, middle management, and operational levels, the project manager may interact with all three levels depending on:

- Strategic importance of the project
- Ability of stakeholders to exert influence on the project
- Degree of project management maturity
- Project management systems
- Organizational communications

This interaction can determine project characteristics including; project managers level of authority, resource availability, who controls the project budget, project manager's role, and project team composition.

What Is Your Organizational Structure?

Organization structure / Project characteristics	Functional	Matrixed Organizations			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
Project Manager's Authority	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Resource Availability	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
Who controls the project budget	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
Project Manager's Role	Part-time	Part-time	Full-time	Full-time	Full-time
Project Management Administrative Staff	Part-time	Part-time	Part-time	Full-time	Full-time

Drawing based on *PMBOK® Guide*, 5th edition, p. 22

The chart above summarizes the functional, matrix and projectized organizations.

Exam Tip: For the purposes of the exam assume that you are working in a strong matrix environment unless the question explicitly (or implicitly) states otherwise.

For the exam, you would do well to commit the above chart to memory.

Organizational Process Assets

Organizational process assets include plans, processes, policies, procedures, and knowledge bases used by the performing organization to execute projects. These assets can include formal plans, informal plans, lessons learned, historical information, completed schedules risk data and earned value data. Organizational process assets are inputs to most planning processes. By process group, organizational process assets may include the following:

- Initiating and planning:
  - Guidelines and criteria for tailoring organizational standard processes to project needs
  - Internal organizational standards such as policies, product and project life cycles, and quality policies and procedures
  - Templates (E. G. Risk register, work breakdown structure, network diagrams, etc.)
- Executing, Monitoring and Controlling:
  - Change control procedures, how standards, policies, plans and procedures will be modified, and how changes will be approved and validated
  - Financial controls
  - Issue and defect management procedures
  - Organizational communications requirements
  - Prioritizing, approving, and issuing work authorizations

    - Risk control procedures
    - Standardized guidelines which can include work instructions, proposal evaluation criteria, and performance measurement criteria
- Closing:
    - Project closure guidelines or requirements

Exam Tip: all of the above can be contained in the corporate knowledge base

Enterprise Environmental Factors

Enterprise Environmental Factors (EEF) are a recurring input to over 20 of the processes primarily in the Planning Process Group. These elements refer to conditions not under control of the project team that influence, constrain or direct the project. Their influence may have a positive or negative effect on the project's outcome. The key elements involving enterprise environmental factors include:

- Organizational culture and structure
- Government and industry standards
- Existing human resources
- Personnel administration
- **Company work authorization system***
- Marketplace conditions
- Stakeholder risk tolerances
- Commercial databases
- ____– _____ e.g., an automated tool suite, such as a scheduling software tool, a configuration management system, an information collection and distribution system, or web interfaces to other online automated systems).

***Exam Tip:** A work authorization system is designed to ensure that work is approved before it begins, and to ensure the work is done at the right time and in the correct sequence. Use of a work authorization system also helps to prevent scope creep as well as goldplating.

Understanding Stakeholder Needs

A stakeholder:

1. Anyone who is positively or negatively impacted by the project
2. Anyone who can exert influence over the project's objectives and outcomes.

Typical key stakeholders can include, but are not limited to:

- **Project manager**
- **Customer/user**
- **Performing organization**
- **Project team members**

- **Project management team**
- **Sponsor**
- **Functional/Senior Manager**
- **Operations**
- **Business partners**
- **Influencers**
- **PMO**
- **The public**

To iterate, a project stakeholder is anyone who can be positively or negatively impacted by the results of the project. As such, it is the job of the project manager to balance stakeholder needs while delivering the project's product. The project manager may have to deal with the following when addressing stakeholder needs:

- Conflicting stakeholder needs or interests
- Stakeholder disagreement regarding the product of the project
- Different communication needs from stakeholder to stakeholder
- Varying levels of stakeholder influence

It is the project manager's responsibility to identify all potential stakeholders on a project and make sure that they are treated as members of the project team. Failure to do so can sink your project late in the game. Taking the effort to determine stakeholder likes, dislikes, hot buttons, critical needs and influence can pay huge dividends for your project as it progresses.

Stakeholder identification is also a continuous process in that different stakeholders may be impacted at various phases of the project. Testing resources will have more of an impact or influence later in your project than they will near the beginning of your project when an initial high level design is being created.

Project Governance

Project governance is an oversight function that encompasses the project lifecycle. It provides the project manager and the project team with structure, processes, and decision-making models and tools for managing the project. It includes a framework for making project decisions, defining roles and responsibilities, and accountabilities for project success and determines the effectiveness of the project manager. The PMO may play some decisive role in project governance, and the governance framework may include any or all of the following elements:

- Deliverable acceptance criteria
- Escalation process for resolving issues during the project
- Relationship between the project team, organizational groups, and external stakeholders
- Project org chart
- Processes for project communications
- Decision making processes for the project

- Aligning project governance and organizational strategy
- Project lifecycle approach
- Process for phase reviews
- Process for review and approval of project changes (I. E. Budget, scope, quality, schedule)
- Process for aligning internal stakeholders with Project process requirement

The Project Team

The project team includes the project manager and the resources who act together performing the work of the project to achieve its objectives. The project team can include but is not limited to the following:

- Project Management Staff: team members to perform project management activities
- Project Staff: team members to carry out the work of the project
- Supporting Experts: subject matter experts needed to help develop or execute the project management plan
- User or Customer Representatives: members who will accept deliverables or the product of the project
- Sellers: contracted organizations that provide components or services for the project
- Business Partners or Business Partner Members: external companies that have a relationship with the enterprise providing specialized skills or roles for the project

The composition of the project team will vary based on factors relating to organizational culture, scope, or location. The relationship between the project manager and the team can vary depending on the authority of the project manager; the project manager may be the team's line manager or may have little or no direct organizational authority over the team members. Basic team compositions consist of one of the following:

- Dedicated: team members are assigned to work full-time on the project. In this case the project team is usually co-located and reports directly to the project manager
- Part-Time: team members are assigned to projects to accomplish temporary additional work. As a result, the functional manager usually maintain control over the team members and the resources allocated to the project. In this case, part-time team members may be assigned more than one project at a time

Exam Tip: dedicated and part-time project team members can exist in any of the organizational structures: functional, matrix, projectized, or composite.

The Project Life Cycle

- "The project life cycle can be determined or shaped by the unique aspects of the organization...While every project has a definite start and a definite end, the specific deliverables and activities...will vary widely with the project"[5]
- The ***phases*** of a software project life cycle will differ from a construction project life cycle or a pharmaceutical drug development life cycle

Project life cycles are as unique as the industries they serve. Projects are generally broken into phases which are used to control project execution and ensure its success. Within an organization it is not uncommon to find established policies that standardize projects around a specific methodology or project approach. Other organizations may allow the project team to organize around the most appropriate approach for their individual project. Regardless of the approach taken by the organization there is no standard project life cycle that fits all organizations. It is truly a case of 'one size fits none'.

Organizational governance across the project life cycle must provide a consistent method for controlling the project and ensuring success. The phase structure provides a formal basis for such control. At the completion of each phase, a management review or 'decision gate' is executed to determine whether the project can continue, needs further adjustments, or should be canceled.

Thus a phase-end review can achieve two goals for the project:

- Authorization to close the current project phase
- Authorization to initiate the subsequent project phase

Implementing a project phase structure in a project can deliver the following benefits:

- Breaking down the work into smaller chunks enables more accurate budget and timeline estimates
- A phase structure can help prevent scope creep

Phase-to-Phase Relationships

As of this writing, PMI has elaborated two fundamental phase-to-phase relationships are contained within the project life cycle. These phases are described as follows:

- *Sequential Relationship*. This describes the traditional finish-to-start relationship. Phase 1 must be completed before phase 2 can begin. Traditional construction projects frequently use the sequential phase relationship when constructing a house or an office building.
- *Overlapping Relationship.* In this case, a subsequent phase can begin before the previous phase has completed. Stated differently, phase 2 can start before phase 1 is done. This technique allows for schedule compression called fast tracking, and overall reduction of the timeline of the project. This approach can increase risk and rework - interdependencies between the phases must be managed diligently to avoid risk and rework.

[5] *PMBOK® Guide,* 5th edition. P. 38

Graphic representations of the two types are shown below:

Sequential:

Overlapping:

Project Lifecycle Concepts

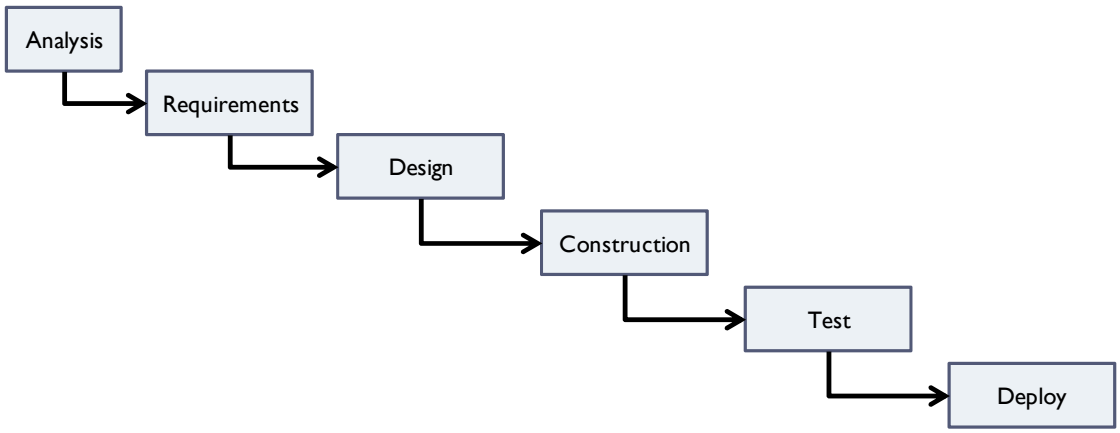
PMI has identified three distinct lifecycle concepts in the fifth edition of the PMBOK *Guide*®:

- **Predictive**
- **Iterative**
- **Adaptive**

A description of each type follows below.

Predictive

A predictive lifecycle is also known as a 'plan driven' or 'waterfall' approach to delivering the scope of the project. In this approach, the scope, time, and cost required to deliver that scope are determined as early in the project lifecycle as possible. As a result the project can proceed to a series of sequential or overlapping phases with each phase focusing on delivering a subset of the project's deliverables. The work in each phase is different in preceding or subsequent phases, therefore, the skill sets required of the project team may vary from phase to phase. The following graphic represents a typical waterfall implementation:



Iterative

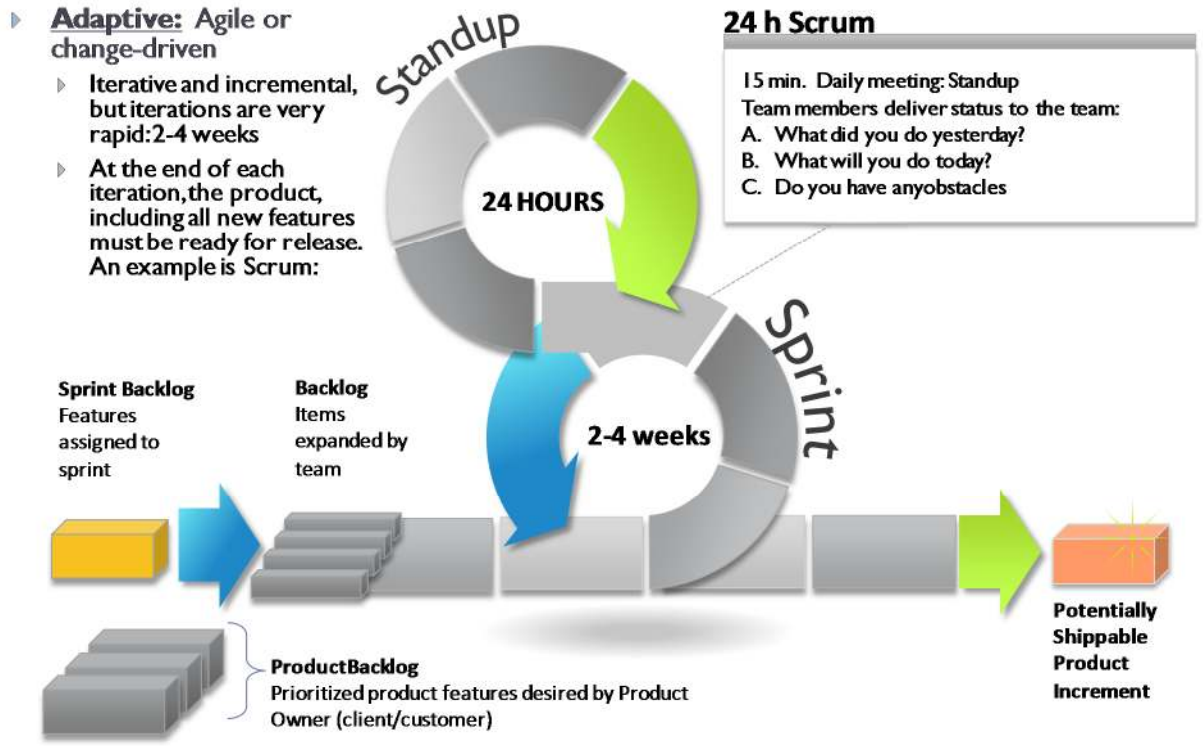
With an iterative or incremental lifecycle, project phases are intentionally repeated as the team's understanding of the product increases. The product is developed through a series of repeated cycles while the product incrementally grows at the completion of each iteration. Each iteration incrementally builds on the deliverables from the previous iterations until the exit criteria for the project are met. As a result, the work required for a given set of deliverables may vary in duration and effort. This approach is similar to PMI's concept of rolling wave planning: the immediate work for the current iteration is highly detailed, whereas work plans for an iteration several increments into the future may only be developed at a high level.

Adaptive

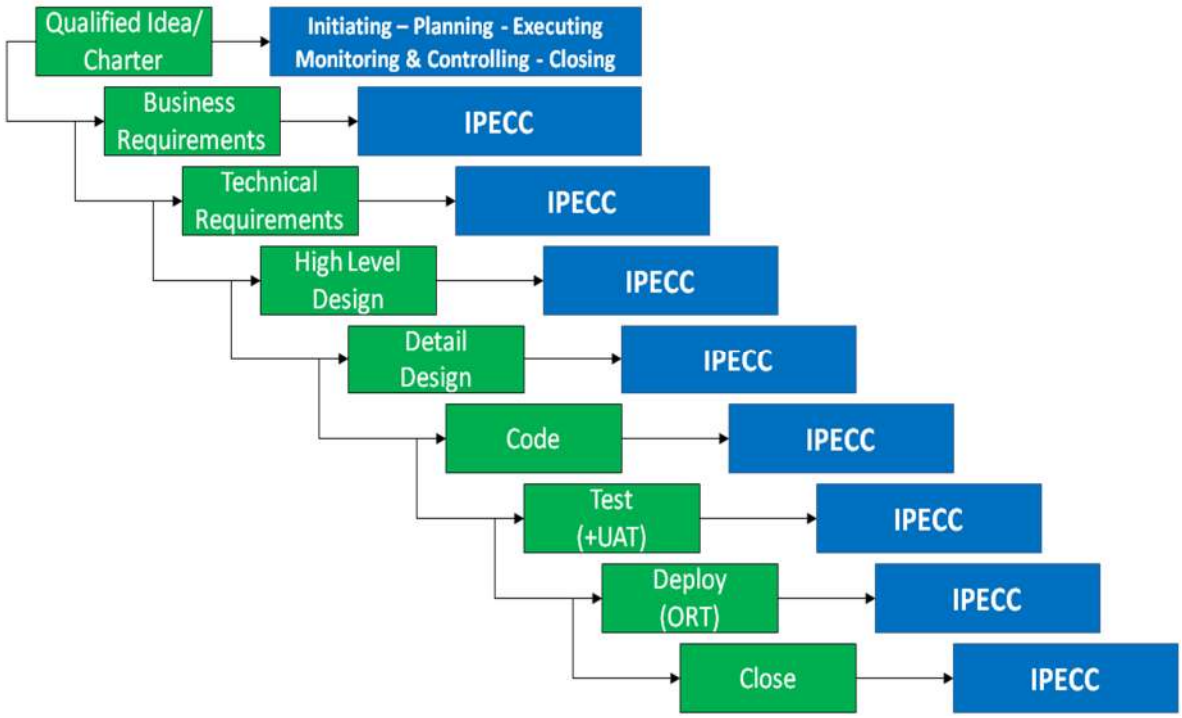
The adaptive lifecycle, also known as 'change driven' or 'agile' is designed to address high levels of change, risk, and/or uncertainty in a project. Agile projects are also incremental and iterative, but with the singular difference that the iterations are generally very short term; usually 2 to 4 weeks. Once a Project iteration length is selected for a project it remains consistent throughout the project. The overall scope of the work is decomposed into an element called a product backlog. The product owner, or business representative, collaborates with the performing organization to prioritize the product backlog and is ultimately responsible for deciding what gets developed and in what sequence.

In an adaptive cycle, the project team delivers an increment of the product to production standards, also known as a 'potentially shippable product increment' which is submitted to the customer for review and acceptance. Incomplete or defective features are not accepted for signoff at an iteration-end review.

One of the most effective agile methods currently used in the project management space is known as Scrum, a graphic of which appears below:



The Project Life cycle Versus the Project Management Life cycle



The example shown above does not need to be memorized. It demonstrates the difference between a specific project lifecycle and the processes contained in the Project Management Lifecycle. The IPECC acronym represents the five process groups.

The distinction between the *project management life cycle* versus the *project life cycle* is this:

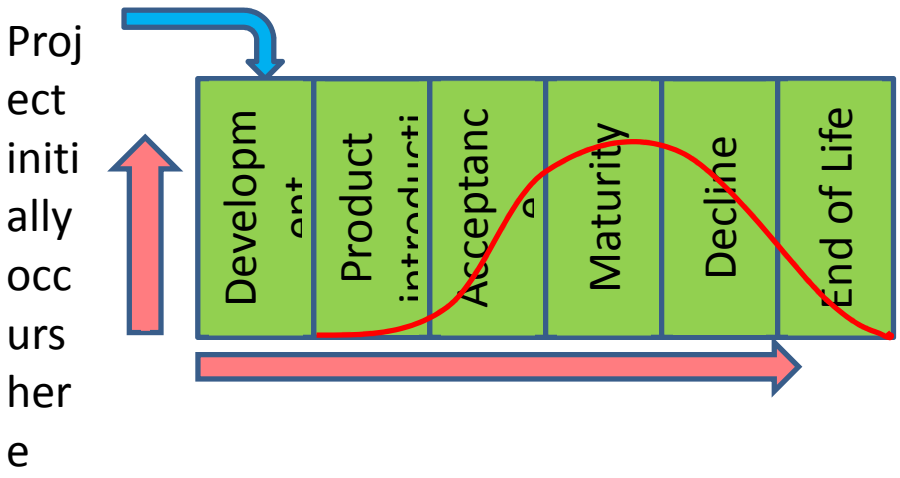
1. The project life cycle is frequently unique to each organization and industry. While there may be similarities between project life cycles, you will see distinct differences between a project life cycle for a construction project, a software project, an energy project, an airline project, a pharmaceutical project, etc. The clear distinction is this; project life cycles may vary industry to industry,
2. The Project Management Life Cycle is immutable and always consists of the following five process groups:
   - **I**nitiating
   - **P**lanning
   - **E**xecuting
   - Monitoring and **C**ontrolling
   - **C**losing

The five process groups are applied to each phase in the project. *This means that no matter what project life cycle or phase structure you may use for your project, the five project management process groups will be executed within each phase of your project.*(*PMBOK® Guide*, 5th edition, pp. 41- 43).

For example: You will ***initiate*** a phase, ***plan*** the work of the phase, ***execute*** the work of the phase, ***monitor and control*** the work as it is being executed for the phase, and finally you will ***close*** the phase or the project. Closing a phase includes a process called 'lessons learned' in which we identify what's working, what's not working, where we can improve, what puzzles us, etc. This lessons-learned process is applied at the completion of every phase of your project.

The figure above shows a generic software development life cycle. Notice that for each phase of the software development life cycle we execute the process groups defined in the project management life cycle: initiating, planning, executing, monitoring and controlling, and closing.

Defining the Product Life Cycle



- Endures for the life of the product
- A *project* may have been implemented to create to product

- Many smaller projects may be implemented to incrementally improve the product

The ***product*** is what is created as a result of executing a ***project***. When we talk about project management, what we are talking about is the work that is being done in the project to produce and deliver the product of the project.

While your project may have taken two years to deliver its product, the product may have a much longer lifetime. As the product grows and matures, a series of smaller projects may be implemented to enhance, improve or change the product over time. Each of these smaller projects is in support of the product and ensuring its longevity in the marketplace.

However, just as a product may have been an ideal solution at one fixed point in time, the need for the product may have deteriorated significantly over the years. The Ford Model-T was at one point, an optimal solution for a specific transportation problem. Today the model-T is considered a quaint antique compared to the vehicles available today. The wood-burning/coal-burning locomotive at one point was an optimal solution for railroad transportation. Today, the use of diesel and electric engines has rendered the wood-burning/coal-burning locomotive obsolete.

Defining the product life cycle is important because from a strategic perspective, the organization must determine when it is of no use to the organization to utilize resources and funds to improve a product that is essentially at the end of its lifetime.

We will address stakeholder management more completely in the Stakeholder Management chapter.

MBO, OPM3™ and Progressive Elaboration

Management by Objectives (MBO) is a term that was first introduced by Peter Drucker in his 1954 book 'The Practice of Management'.

Exam Tip: MBO will only work if it is supported by management.

OPM3™- the Organizational Project Management Maturity Model. The model was based on the Software Engineering Institute's Capability Maturity Model Integration (CMMI) for software. OPM3™ helps organizations determine their level of maturity in project management.

Progressive Elaboration - this concept is *key* to the entire PMI framework. It fundamentally states that you cannot come up with a definitive estimate for timeline and budget at the very start of a project. Why? The reason is that there are many unknowns and very little analysis has been done at the beginning of the project. As the project team dives into the analysis, consults with subject matter experts, and begins to define the details of the project - only then can more accurate estimates be created.

The greater the number of the unknowns that exist in a project, the more a progressive elaboration is required to ensure project success.

Section Review:

- Definition of PM terms, such as project, PMO, stakeholder, project life cycle, product life cycle, project management life cycle, project management system
- The role of the project manager
- Definition of project constraints
- Project phase concepts
- Advantages and disadvantages of different organizational structures

Chapter Two Memory Check

1. A project is _____, _____ and delivers a _____, _____or _____
2. Three key constraints on a project are _____, _____, and _____ as well as quality, resources and risk
3. Three key characteristics of the project manager include; _____, _____, and _____ effectiveness
4. A _____is a group of related projects. A _____can be a collection of projects, programs or sub-projects
5. A _____centralizes and co-ordinates the management of portfolios, programs and projects
6. The _____ life cycle deals with the work done to accomplish the goals of the project, while the _____ life cycle deals with the lifetime of the deliverable(s)
7. The three categories of multi-phase project types are; _____, _____, and _____
8. A stakeholder is anyone who is _____ or _____impacted by the project
9. The four basic organizational types are; _____, _____,_____ and _____
10. The term used to describe the process of delivering more accurate estimates for time and budget as the project progresses is called _____
11. Clearly defined career paths and little PM authority describe an advantage and a disadvantage of a _____organization
12. Project loyalty and the possibility of not having a job after the project completes describes an advantage and a disadvantage of a _____organization
13. Increased PM control and multiple bosses describes an advantage and a disadvantage of a _____organization
14. A project _____ has very little decision making authority on a project, whereas the project _____ has some decision making authority
15. The three types of matrixed organizations are referred to as: _____ matrix, _____ matrix and _____ matrix
16. The three type of project lifecycles defined by PMI are _____, _____ and _____
17. Three types of PMOs defined by PMI are _____, _____ and _____

Chapter 2 Test

1. The five process groups of the Project Management Life cycle are, in order:
    a. Initiating, Executing, Planning, Monitor and Control, Closing
    b. Initiating, Analyzing, Designing, Executing, Closing
    c. Initiating, Planning, Executing, Monitoring and Controlling, Closing
    d. Initiating, Planning, Monitoring and Controlling, Validating, Closing

2. You have just started a new position as a project manager with your new company. Upon starting your job you are informed by the line manager that all budgetary decisions rest with her and that all key project decisions will be her responsibility as well. Most likely, PMI would say you are functioning as a _____?
    a. Resource coordinator
    b. Project manager
    c. Functional expediter
    d. Project coordinator

3. The project manager that you just hired said that she came from a Projectized organization prior to working for your company. Your VP just asked you what that means in terms of her level of authority. You responded:
    a. she had responsibility for the project but not for the budget
    b. she had little responsibility for the project or the budget
    c. she split the project and budget responsibilities with the functional manager
    d. she was responsible for the budget and the project almost 100%

4. The company you are working for has decided to adopt Scrum as a project management method. You've never heard of Scrum before but decide to do some research and discover that Scrum is an agile method. What kind of project phase method is being adopted here?
    a. Iterative
    b. Sequential
    c. Overlapping
    d. Phase-neutral

5. Two junior project managers who are working on the same project are having a heated discussion(an argument) on the difference between the project management life cycle and the project life cycle. The first project manager is saying there is essentially no difference between the two while the second project manager is saying that there is a significant difference between the two. While this debate is occurring, a senior vice president from your division interrupts the two and asks them the following question: "When the project is completed what is the expected lifetime of the deliverable?" Essentially, what is the vice president asking them?
    a. He is asking about the status of the project life cycle
    b. He is asking about the status of the project management life cycle
    c. He is asking about the status of the product
    d. He is trying to determine if they understand life cycle costing

6. What is the *BEST* definition for a project manager's role on the project?
    a. Take instruction and direction from functional managers
    b. Assigned by the organization to achieve project objectives
    c. Balance stakeholder interests on the project
    d. Effectively manage the project team while also being an expert technical resource

7. Your project team has been assigned to work full-time on your current project. In terms of project team composition, this is best described as a _____ project team.
    a. Projectized
    b. Composite
    c. Focused
    d. Dedicated

8. You have just gotten a new job within an organization that can't spell 'project management' much less figure out how to run a project. Their project management process has been described by some in the organization as an 'adrenaline pounding thrill-ride usually resulting in a train wreck'. At your project kickoff meeting a number of the team members have expressed dismay at how the last project was managed and ask if this one will be just like the last one. In terms of the project approach, what is the *BEST* response you can offer?
    a. As the project manager, you will protect the team from executive interference
    b. You will take a life-cycle approach to managing the project
    c. You will ask the project team for a list of difficult stakeholders so that you can defuse problems before they begin.
    d. Your project management approach is calm, cool, and collected

9. The Director of Product Development and the chief engineer of the company have decided to add scope to the project you are managing. They have completed the necessary paperwork, received the required sign-offs and have told you to simply get it done. In this instance you are probably:
    a. In a strong matrix environment
    b. Project administrator
    c. Working a balanced matrix function
    d. Project expediter

10. The project team has been arguing about what should go into the project management plan. They've built the same product over a hundred times before and have always been bothered that the project management plan never seemed to get completed. They were determined to get it done *right* this time. The team has come to you for advice regarding the project management plan. The most *appropriate* response you can give them is:
    a. Use project phase concepts ; initiate, plan, execute, monitor & control, and close
    b. They need training in project management
    c. The 'project' is really operations
    d. Tell them to take direction from the PMO

11. Management by Objectives is most successful when:
    a. The organization's executives stay out of the way of the project team
    b. Management delegates the work of the organization to the most senior project managers
    c. You were managing projects in the 1950s. Technique is rarely used now
    d. It is supported by upper management

12. The portfolio manager from your division thought it might be helpful to the project teams if she delivered a short presentation on the elements in her portfolio. A number of team members, after receiving the e-mail announcement for the presentation, come to you and ask if this meeting is worth their time. After all isn't a portfolio just a big project? As a Senior Project manager your *best* response would be:
    a. You're right. The meeting probably would be a waste of your time
    b. Not really. A portfolio is a group of related projects managed together to achieve synergies between the projects and establish common methods and procedures.
    c. Not really. A portfolio can be a group of programs, projects, or sub-projects designed to help the organization meet specific business goals

d. Not really. A portfolio is a collection of documents, methods, and procedures that help us manage projects

13. The executives are debating about whether to implement a PMO for their organization. One of the executives thinks that PMO means 'project management overhead' while others are wondering about the actual value it will bring to the organization. As a senior project manager, they bring you in to the meeting on a consultative basis to help them get their hands around what value the PMO brings the organization. All of the following answers are correct *except*:
    a. The PMO serves as a disciplinary organization for project managers
    b. The PMO helps the organization align its projects around strategic organizational objectives
    c. The PMO provides the organization with project management standards, methods, and procedures
    d. The PMO helps to mentor and train project managers within the organization

14. All of the statements about the project life cycle are true *except* which of the following:
    a. The project life cycle consists of five distinct phases
    b. The project life cycle is different for every organization
    c. The project life cycle works with the project management life cycle to help meet project objectives
    d. The project life cycle can be modified depending on the needs of the project

15. You have contracted a third-party to install five rack-mounts and the server gear at your new data center for your new web service, which is designed to handle 50,000 simultaneous users. The performing organization stated you could have a custom-designed system and sit down with an architect to do that, however, they have a catalog of 10 systems that they can build from the simplest to the most complex. If you want to pick something from the catalog, the configuration is well known and well understood, and their installation time can literally be cut in half, saving you considerable funds. You selected one of the 10 catalog systems because there was one that coincided with your needs to a 99% level. You also assigned a senior project manager from your organization to coordinate all activities with the vendor for installation. A week later you hear the project manager having a heated discussion with one of the junior project managers about whether this installation constitutes a project or operations. The junior project manager maintains that the installation is time bound and delivers a unique product process or result and by definition, is a project. The Senior Project manager counters with the following argument: it is fundamentally operations because the performing organization does this all the time. The configuration selected came out of a catalog which means that the installation is a repetitive, predictable, and repeatable process which is why they could do it on such a narrow fixed-price basis. What is the *best* response you could give to the junior and senior project manager?
    a. The Junior Project manager is correct: this is a project
    b. TheSenior Project manager is correct: this is operations
    c. This is a project that has elements of operations
    d. It really depends upon from whose point of view the question is being asked

16. All of the following reasons elaborate why is it important for the project manager to consider stakeholder influence on a project, *except* for which of the following?
    a. The negatively impacted stakeholder can create significant road blocks for your project
    b. All the stakeholders control your budget
    c. Stakeholders may supply technical expertise or resources to your project
    d. Stakeholders provide many of the key requirements that need to be fulfilled for the successful completion of the project

17. The organization wants you to manage a project with a very aggressive timeline. You have done an initial assessment of the statement of work, the timeline, resource availability, and the budget. Based on this

information you have reported back to senior management at their aggressive timeline is a fiction and it will be impossible to meet given the scope of work. Senior management then asks you what the most effective project phase approach would be employed to compress the timeline given that the project is fraught with many uncertainties, risks and is something that the organization has never tried before. The *most likely* response you would give to address this situation is:

a. You recommend the overlapping phase approach. This would allow work on a subsequent phase to start before the predecessor phase had completed
b. You recommend an iterative approach. It helps reduce complexity and is useful when partial delivery of a product is beneficial to the stakeholders
c. You recommend the inverse-evolutionary phase approach. Since his project sounds more like an R&D project you have no idea what the real scope is or when you will be done. Innovation cannot be timed on a punch clock
d. You recommend the adaptive phase approach. It addresses high-change, high-risk, high uncertainty projects effectively

18. Several junior programmers ask you about the difference between the product life cycleand the project life cycle. The *best* answer that you can give them in describing the difference between the two is:
    a. The product life cycle and the project life cycle coincide - the difference is that the product life cycle has to do with the product created whereas the project life cycle has to do with the work needed to create the product
    b. The product life cycle addresses the entire life time of the product, whereas the project life cycle is to work needed to create the product
    c. The product life cycle addresses the time that is needed to initially create the first iteration of the product, whereas the project life cycle endures for the lifetime of the product
    d. The real answer addresses the sequence of the two: product life cycle completes before project life cycle begins

19. You have just collected project information from stakeholders and are analyzing their input with the project team. One stakeholder is worried about whether the organization has the proper skill sets in-house to deliver the product of the project. This can be best described in project management terms as:
    a. A constraint
    b. A potential risk
    c. An issue
    d. A and C

20. You are the program manager for a large multimillion dollar program managing 10 projects, each with a project manager. Because of the varying complexity of the projects, there are at least three different project life cycle types are being used across the 10 projects. Some of the project managers are discussing whether the project management life cycle needs to change to adjust to different project life cycles. The *most correct* answer that you can give them is:
    a. The project management life cycle is applied to every project phase
    b. The project management life cycle may change depending on the specific project life cycle being employed
    c. There is no difference between the project management life cycle and the project life cycle
    d. The project management life cycle changes for each project

21. All of the following are project lifecycle approaches with the exception of _____.
    a. Iterative
    b. Linear
    c. Predictive
    d. Adaptive

22. The project manager must be knowledgeable about organizational governance policies that relate to the product or service as well as sustainability requirements as they relate to project _____.
    a. Risk
    b. Constraints
    c. Planning
    d. Deliverables

23. Projects can intersect with operations at various points in the _____ lifecycle.
    a. Project
    b. Product
    c. Project management
    d. Process development

24. You are working in an organization in which the PMO offers consulting services to projects. This type of PMO is best described as:
    a. Supportive
    b. Directing
    c. Controlling
    d. Consultive

25. Project governance is an oversight function that aligns with organizational governance practices. As such, the governance framework provides the project manager and the team with structure, processes, decision-making models and tools for managing the project. What is the PMO's role in project governance?
    a. The PMO has no role in project governance
    b. The PMO may have some role in project governance
    c. The PMO may play a decisive role in project governance
    d. The PMO plays a distinct leadership role in project governance

26. If the goals of a project conflict with the organization's business strategy, whose responsibility is it to identify these conflicts?
    a. Project manager
    b. Sponsor
    c. Program manager
    d. Portfolio manager

Chapter 2 Test Answers

1. C –Initiating, Planning, Executing, Monitoring and Controlling, Closing. *PMBOK® Guide*, 5th edition, p 39.
2. D – Project coordinators have minimal decision authority on projects. Thus by PMI's definition of a PM, (you are authorized to commit resources and spend money) you are not an actual project manager. A resource coordinator is an HR function and' functional expediter' is a made-up term
3. D – High to almost total control on a project identifies a projectized organization
4. A – Scrum is in agile method that utilizes the iterative approach to development
5. C – The first part of the question is a red herring. The VP is asking about the lifetime of the deliverable i.e. the product. This is a question about the product status.
6. B – The key job of the project manager is to meet the organization's project objectives
7. D – this is the definition of a dedicated project team. Projectized and composite describe organizational structures. Focused is a made-up term. *PMBOK® Guide*, 5th edition, p. 37
8. B – Taking a life cycle approach to the project is the best answer you can give. Answers A and C might be tactics you employ while managing the project. Answer D is meaningless
9. D – The director and the chief and an engineer have all the responsibility, therefore you are just a project expediter
10. C - Since the project team has done the same thing a hundred times before, this is an assembly line process, which makes it operations
11. D – This is the only possible answer, *PMP®* Exam Prep p 2-22
12. C – A portfolio can be a group of projects, programs, subprojects, or any combination of the previous. *PMBOK® Guide*, 5th edition, p 9
13. A – The PMO does not discipline project managers. Insubordination and other similar issues are the province of human resources, functional managers and senior management
14. A – The project life cycle changes for every organization. The *project management* life cycle consists of five distinct process groups. *PMBOK® Guide*, 5th edition, pp. 48-49
15. D - That was like reading *War and Peace* wasn't it? Sometimes you get long-winded questions on the exam. Point of view is the most important element in this question; to the customer it is a project, however to the performing organization it is operations (it's an assembly line process)
16. B – If *all* the stakeholders control your budget, you're in trouble. Funding primarily comes from the sponsor/ senior management, who can be a potential stakeholder. *PMBOK® Guide*, 5th edition, p. 54
17. D - The project as described - a high-risk, high uncertainty project - is best addressed with an adaptive phase approach. *PMBOK® Guide*, 5th edition, p.46
18. B – Product lifecycle addresses the lifetime of the product; project life cycle is to work needed to create the product. *PMBOK® Guide*, 5th edition, pp 18-21
19. D – This is not exactly a trick question, but it's close. The scenario described is not only a constraint (no internal headcount with the skillset), but it is also an issue (if I need additional headcount, how do I go about obtaining it?)
20. A - The project management life cycle is *applied to every phase of your project life cycle* regardless what that project life cycle looks like. *PMBOK® Guide*, 5th edition, pp 18-21
21. B - Linear is not a project lifecycle defined by PMI.*PMBOK® Guide*, 5th edition, pp 44-46
22. D - Deliverables is the correct answer. *PMBOK® Guide*, 5th edition, p.15
23. B - Product lifecycle. *PMBOK® Guide*, 5th edition, p.12
24. A - the scenario describes a supportive PMO. *PMBOK® Guide*, 5th edition, p.11
25. C - the PMO may play a decisive role in project governance. *PMBOK® Guide*, 5th edition, p. 34
26. A - the project manager identifies and documents these conflicts. *PMBOK® Guide*, 5th edition, p. 15

Chapter 3 Project Management Processes and Knowledge Areas

Topics Covered:

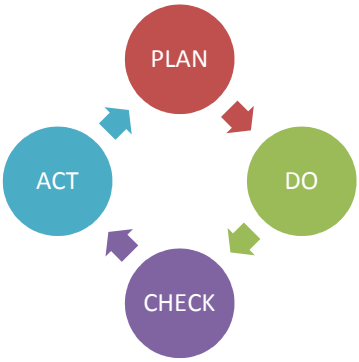
- Project Management Processes
- Project Management Process Groups
- Process Interactions
- Project Management Process Mapping

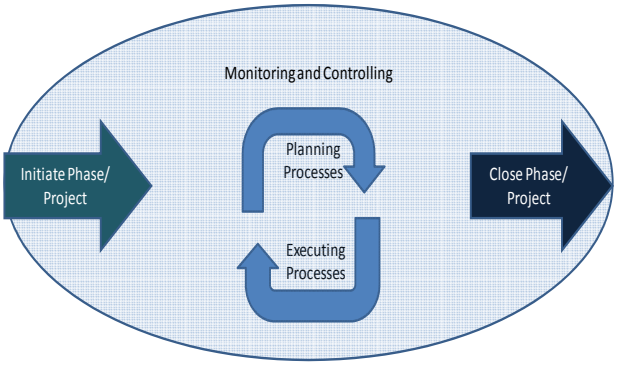
Section Objectives

- Identify the five stages of the PM life cycle
- List and define the 10 PMI knowledge areas
- Explain the processes and characteristics within each process group
- Elaborate the *PMBOK® Guide,* 5th edition1) inputs, 2) tools and techniques, and 3) outputs are. What you need to know about them to pass the exam
- Map the 47 major processes by knowledge area

The Project Management Process Groups

The five process groups are based on a variant of the Shewhart-Deming Plan-Do-Check-Act Cycle:





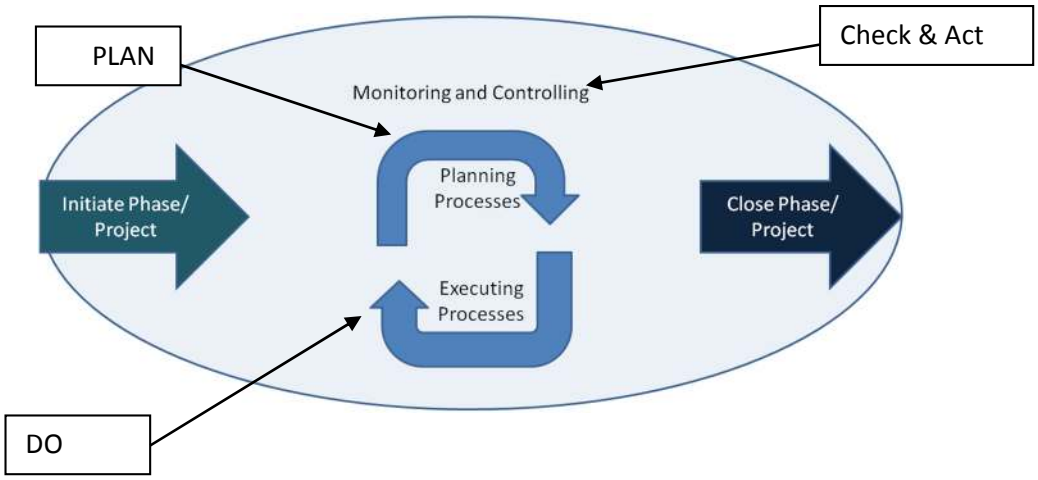
Notice that the Planning and Executing Processes are iterative[6]

The Shewhart-Deming plan-do-check-act cycle is the fundamental basis of incremental improvement for all manufactured product or business processes. The IPECC process is basically a variant on the Shewhart-Deming cycle:

- The initiating process is basically the entry point into the cycle

[6] *PMBOK® Guide*,5th edition, p 50

- The closing process is basically the exit point from the cycle
- The plan-do-check-act iteration maps in the following manner to the IPECC cycle:



Based on the *PMBOK® Guide*,5th edition, p 40

A key point to understand in the IPECC cycle is that Planning and Executing processes are *iterative.* Notice also that monitoring and controlling processes are an 'umbrella' type of process, in that all the other processes within the IPECC cycle are in some way monitored and controlled. We are constantly checking the results of our work and making actionable decisions based on what we discover.

Initiating Process Group

The key purpose of the initiating process group is to align the stakeholders expectations with the project's purpose. The primary elements in initiating a project include:

Stakeholder process

- Identify stakeholders / stakeholder identification techniques*

Integration processes

- Determine phase/project goals
- Obtain authorization to start phase/project
- Determine initial scope
- Identify constraints and assumptions
- Select/assign project manager
- Project statement of work
- Define high-level resource requirements
- Determine initial financial resources
- Verify success criteria
- Create project charter/ charter elements*

- Obtain formal approval of charter

Several other supporting actions that help to complete the initiating process include the following:

- Subdivide large projects into phases
- Document the business case and the cost-benefit analysis*
- Project selection criteria (e.g. cost, feasibility, impact)*
- Ensure the project scope is achievable
- Identify high-level risks and requirements/ risk identification techniques*
- Facilitate resolution of conflicting stakeholder objectives
- Create an order of magnitude budget and schedule estimate
- Determine critical success factors for the project

* These elements address specific knowledge and skills needed by the PM in the Initiating process

Exam tip: The primary goals of the Initiating processes are:

1. develop the project charter and
2. identify stakeholders

Exam tip: In the Initiating processes, understand the following:

- Staffing levels are low
- Costs are low
- Chance of success is low

- Risk is high
- Stakeholder influence is high

Planning Process Group

While the main goal of the Planning process group is to create the Project Management Plan, other subsidiary management plans are also created here. This includes subsidiary management plans for scope, schedule, budget, quality, human resources, communications, risk, and procurement knowledge areas defined in the *PMBOK® Guide*, 5th edition. Below is a listing of the major elements you can expect to find as part of the Planning process:

- Create scope statement
- Create scope management plan
- Create WBS (work breakdown structure)
- Create network diagram
- Estimate activity durations
- Estimate costs
- Determine project schedule

- Refine time and cost estimates
- Create communications plan
- Develop Human Resource Plan
- Create Staffing Management Plan
- Develop Communications Management Plan
- Determine project budget
- Develop quality management plan
- Identify risks
- Qualitatively and quantitatively rank risks
- Develop risk response plan
- Adjust estimates as necessary
- Develop procurement management plan
- SOW (procurement statement of work)
- Create procurement documents
- Develop PM plan
- Obtain approval of plan
- Hold kick-off meeting[7]

Additional knowledge and skills needed by the PM for planning activities also include:

- Describing each work package in the WBS dictionary
- Evaluating other projects for potential positive or negative impacts on this project
- Identifying quality metrics for the project
- Requirements gathering techniques
- WBS tools and techniques
- Time budget and cost estimation techniques
- Scope management techniques
- Resource planning process
- Workflow diagramming techniques
- Type and uses of org charts
- Elements, purpose and techniques of:
    - Project planning
    - Communications planning
    - Quality management planning
    - Risk management planning
    - Procurement planning
    - Change management planning

With the planning process group, it is critical to understand that neither the project management plan nor any of the subsidiary management plans are finalized until a thorough risk assessment and identification has been performed.

The primary goal of the Planning process is to develop the project management plan.

[7] *PMBOK Guide,* 5th edition pp. 47-55

Executing Process Group

The processes in this group are performed to complete the work in the project management plan that was designed to satisfy the project specifications. As the project manager, you are responsible for coordinating the activities of human resources as well as infrastructure resources and integrating the activities of both in accordance with the project management plan.

As a result, several or all of the plans created in the planning process may require replanning, updates and re-baselining during project execution. A large portion of the project budget is normally expended during the Executing Process Group processes.

The primary elements in the Executing process group include:

- Complete work packages
- Use a work authorization system
- Collect status information
- Hold meetings
- Acquire, develop and manage project team
- Distribute project information
- Obtain bids from outside vendors
- Select a vendor
- Negotiate vendor contract
- Manage contracts
- Perform quality assurance
- Manage Stakeholder Expectations

Additional knowledge and skills needed by the PM for executing activities also include:

- Project monitoring tools and techniques
- Elements of a statement of work
- WBS interaction elements within the project schedule
- Project budgeting tools and techniques
- Quality standard tools
- Continuous improvement process

The primary goal of the Executing process is to Direct and Manage Project Work.

Monitoring and Controlling Process Group

The focus in the monitoring and controlling process group is to measure the performance of the project and address change requests, recommended corrective and preventive actions, and implement defect repairs.

The elements in the Monitoring and Controlling process group include:

- Performance measuring
- Performance reporting
- Identify and control changes
- Verify and control scope
- Control schedule
- Control cost
- Control quality
- Risk monitoring and control
- Take corrective action
- Update PM plan
- Update actions and changes
- Inspections
- Accept/Reject work
- Identify & analyze trends
- Look for new risks
- Assess variances for change or corrective action
- Manage Stakeholders
- Contract administration
- Use quality control tools
- Project performance appraisals
- Perform earned value calculations

Additional knowledge and skills needed by the PM for monitoring and controlling activities also include:

- Performance measurement and tracking techniques (e.g. PERT, EV, CPM)
- Project control limits and thresholds
- Project performance metrics
- Cost analysis techniques
- Project plan management techniques
- Change management techniques
- Integrated change control processes
- Risk identification and analysis techniques
- Risk response techniques
- Problem solving techniques (e.g. root cause analysis)
- Reporting procedures

The primary goals of this process group are: Monitor and Control Project Work and Integrated Change Control

Typically, this is one of the lowest scoring process groups on the PMI exam. Make sure you spend adequate time studying and understand the concepts and actions taken in this area. You may see exam questions regarding the following actions required to complete the monitoring and controlling process group:

- Perform root cause analysis
- Secure additional funding, if needed
- Perform validated defect repair
- Calculate the ETC (estimate to complete)
- Reassess project control systems for effectiveness

Exam Tip. For the exam assume that:

- The project management plan and subsidiary plans are complete and realistic
- You measure the project against defined metrics to determine how well the project is performing
- You implement corrective actions for any variances
- If there are deviations from the project management plan, that is the responsibility of the project manager, and the Project manager is responsible for correcting those deviations without issuing a change request. CRs should be used only as a last resort in this instance.

Closing Process Group

The primary elements in the Closing process group include:

- Perform final product verification
- Deliver final contract performance reporting
- Audits of all procured service/merchandise
- Obtain formal contract acceptance
- Create a contract archive
- Complete final performance reporting
- Obtain formal acceptance of project
- Document and lessons learned
- Create the project archives
- Release all project resources

Additional knowledge and skills needed by the PM for closing activities also include:

- Contract closure requirements
- Basic project accounting principles
- Close-out procedures
- Feedback techniques
- Project review techniques

- Archiving techniques and statutes
- Compliance
- Transition planning techniques

The project is only complete when administrative closure of the project has been completed. Whether the project has completed all scope elements, has completed a specific project phase, or is canceled, the project is not officially closed until Administrative Closure has been completed.

If the scope of the project has been completed, the listing above is generally a good guide to the administrative closure process. However, if the project was terminated or stopped after a specific phase, you want to document the reasons for the early termination in your closeout documentation.

If your project was successful, and of course it will be because you are an excellent project manager, there is one final step you must never forget: CELEBRATE!

Project Information

During project execution, data from the project is continuously collected and analyzed for the purpose of reporting back to senior management and stakeholders on the status and progress of the project. PMI makes distinctions between three types of project information that may appear on the exam:

- **Work Performance Data**: this consists of the raw observations and measurements taking during the performance of project activities to carry out the project work. Examples can include percentage of work completed, quality and technical performance measurements, start and finish dates of scheduled activities, number and frequency of change requests, defect counts, costs and generations, etc.
- **Work Performance Information**: this is performance data collected from various monitoring and controlling processes which is analyzed and integrated across all project areas. Examples include status of deliverables, status of change requests, forecasted estimates to completion, etc.
- **Work Performance Reports**: work performance information that has been collected in project documents. This can be in the form of dashboard reports, stoplight reports, Jeopardy reports, status and progress reports, memos, recommendations, updates, etc.

Cross-Cutting Skills

PMI has defined what is described as cross-cutting skills needed by the PM that apply to all process groups. These skills include:

- Active listening
- Brainstorming techniques
- Conflict resolution techniques
- Cultural sensitivity and diversity
- Data gathering techniques
- Decision making techniques

- Facilitation
- Information management tools, techniques, methods
- Leadership tools, techniques
- Negotiating
- Oral and written communication techniques, channels, applications
- *PMI's Code of Ethics and Professional Conduct*
- Presentation tools and techniques
- Prioritization/time management
- Problem-solving tools, techniques
- Project management software
- Relationship management
- Stakeholder impact analysis
- Targeting communications to intended audiences
- Team motivation methods

CRITICAL NOTE:

Review the high level elements in the Initiating, Planning, Executing, Monitoring and Controlling and Closing process groups from pages 3-4 thru 3-10 regularly. As you review each knowledge area, specifically review the process groups that apply to the knowledge area. This is critical for maintaining a high level perspective for the PMP examination.

Knowledge Area Logistics

There are ten key knowledge areas contained in the *PMBOK® Guide*, 5th edition. Each key knowledge area along with its subsidiary processes all follow the same format when describing deliverables for each process:

- **Inputs**- these are the documents and processes that contain the data and information from the project which are then acted upon by:
- **Tools and Techniques** - which can include formal analysis, the use of mathematical models and templates to produce:
- **Outputs** - which are the desired results of the process

In this manual these elements will be represented in the graphic below:

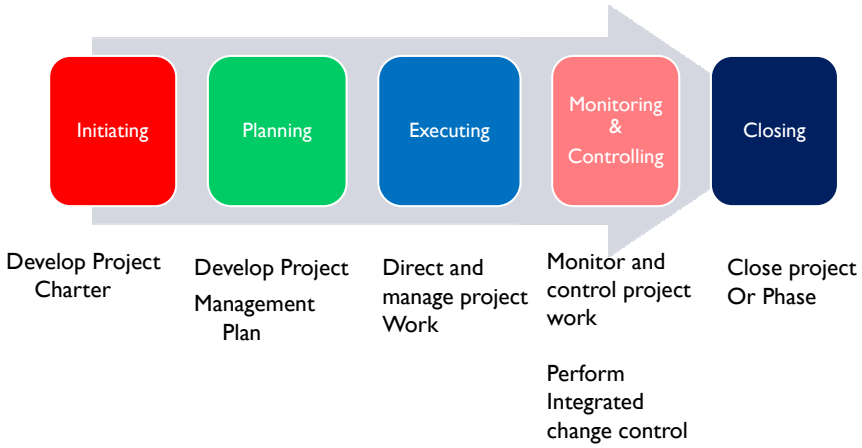
The ten PMI® Knowledge Areas:

Project Integration Management	Project Human Resources Management
Project Scope Management	Project Communications Management
Project Time Management	Project Risk Management

Project Cost Management	Project Procurement Management
Project Quality Management	Project Stakeholder Management

On the next pages we will show the general processes that apply to each of the ten PMI knowledge areas.

Project Integration Management

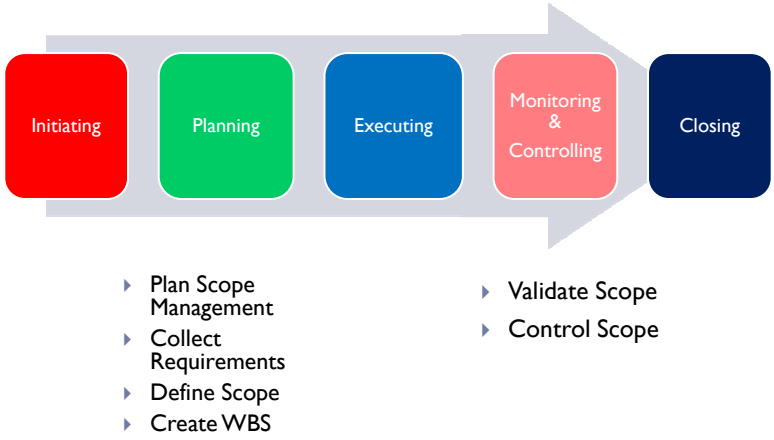


For the purposes of the exam, the primary job of the project manager is to assemble all the parts and pieces of the project into a coherent whole. The way the project manager does this is through Project Integration activities.

The Project Integration is the only area that has activities in all five of the PMI process groups. The following six processes and the primary goals of these processes are listed below:

- Develop project charter. Goal: the project charter
- Develop project management plan. Goal: the project management plan
- Direct and Manage Project Work. Goal: deliverables
- Monitor and control project work. Goal: change requests, work performance reports
- Perform integrated change control. Goal: approved change requests, updates
- Close project or phase. Goal: Final product, service, or result transition

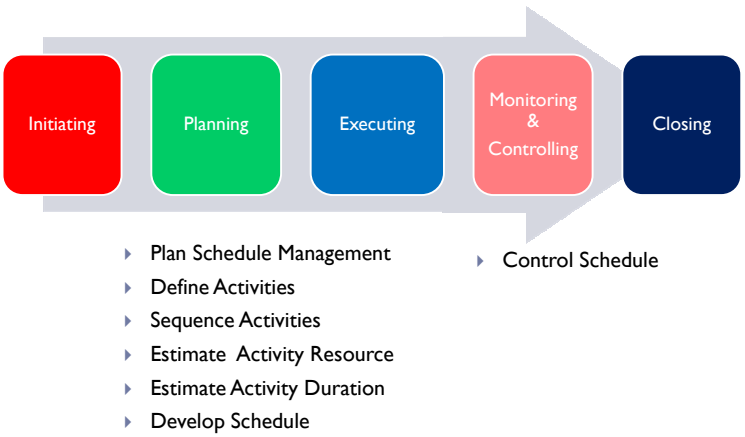
Project Scope Management



Project scope management focuses on the processes that are needed to ensure that the work of the project, and only the work required, is performed to deliver project success. The following processes and the primary goals of project scope management are defined below:

- Plan Scope Management. Goal: Scope Management Plan
- Collect requirements. Goal: requirements documentation
- Define scope. Goal: Project scope statement
- Create WBS. Goal: Scope Baseline
- Validate Scope. Goal: accepted deliverables
- Control scope. Goal: updates and change requests

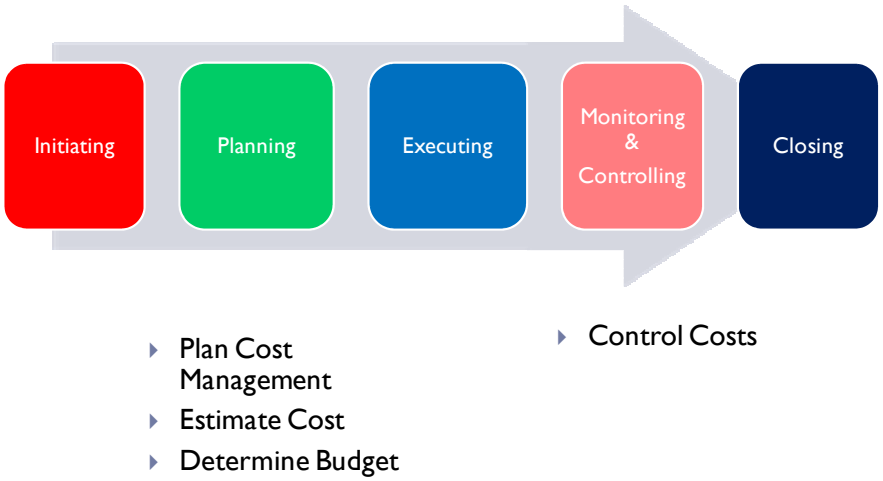
Project Time Management



Project Time management includes all the activities necessary to complete the project in a timely fashion. The following processes and the primary goals of project time management are defined below:

- Plan Schedule Management. Goal: Schedule Management Plan
- Define activities. Goal: activity list
- Sequence activities. Goal: project schedule network diagrams
- Estimate activity resources. Goal: activity resource requirements
- Estimate activity durations. Goal: activity duration estimates
- Develop schedule. Goal: project schedule
- Control schedule. Goal: schedule forecasts

Project Cost Management

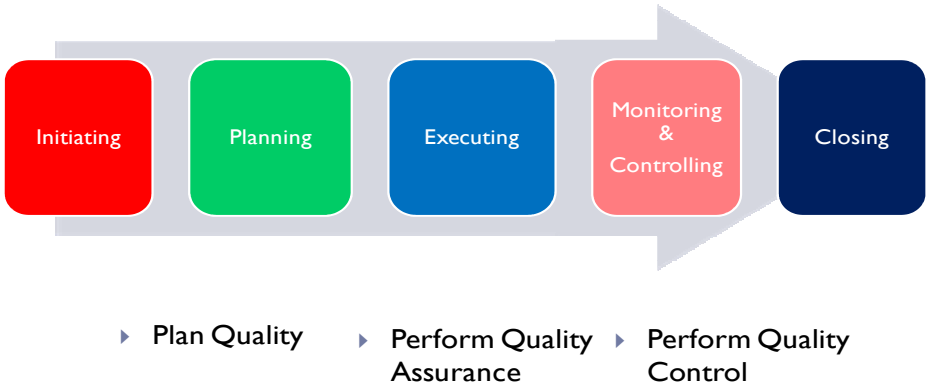


Project cost management involves the processes that are needed to estimate, budget, and control costs, so the project can be completed within the approved budget.

The following processes and the primary goals of project cost management are defined below:

- Plan Cost Management. Goal: Cost Management Plan
- Estimate costs. Goal: activity cost estimates
- Determine budget. Goal: cost performance baseline
- Control costs. Goal: cost forecasts, change requests

Project Quality Management

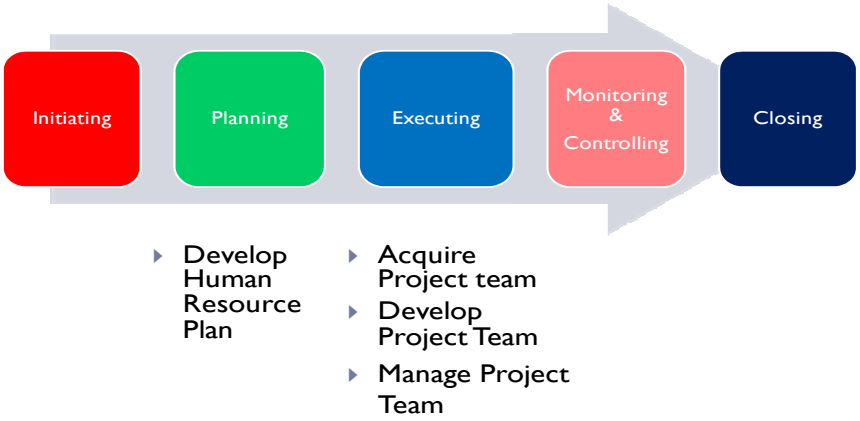


Project quality management focuses on the activities, quality policies, objectives, and measurements required to satisfy the needs of the project and ultimately the customer.

The following processes and the primary goals of Project quality management are defined below:

- Plan quality. Goal: quality management plan
- Perform quality assurance. Goal: change requests
- Control Quality. Goal: verified deliverables, validated changes

Project Human Resource Management

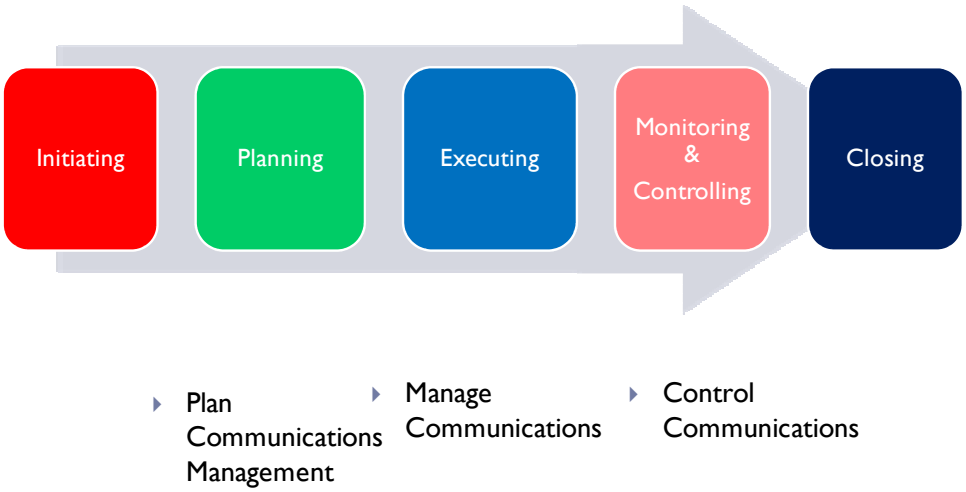


Project human resource management includes the processes that organize, manage, and lead the project team. The following processes and the primary goals of Project human resource management are defined below:

- Develop human resource plan. Goal: human resource plan
- Acquire project team. Goal: project staff assignments

- Developed project team. Goal: team performance assessments
- Manage project team. Goal: updates

Project Communications Management

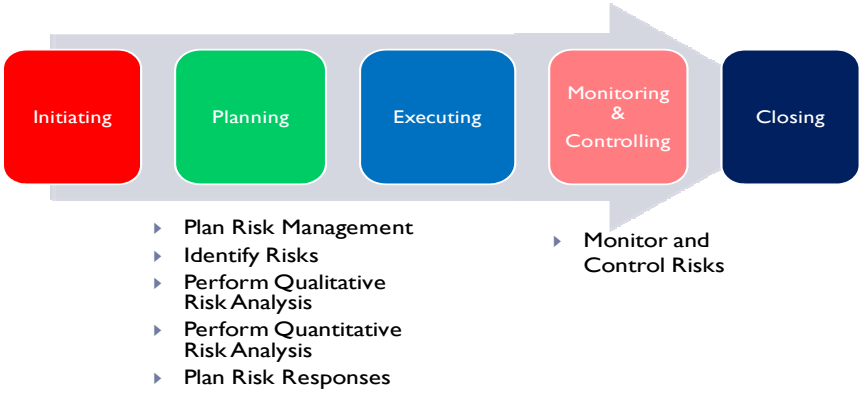


Project communications management focuses on the processes to deliver, collect, distribute, store, and retrieve project information to all internal and external project organization environments.

The following processes and the primary goals of Project communications management are defined below:

- Plan communications. Goal: communications management plan
- Manage Communications. Goal: project communications
- Control communications. Goal: work performance information, change requests

Project Risk Management

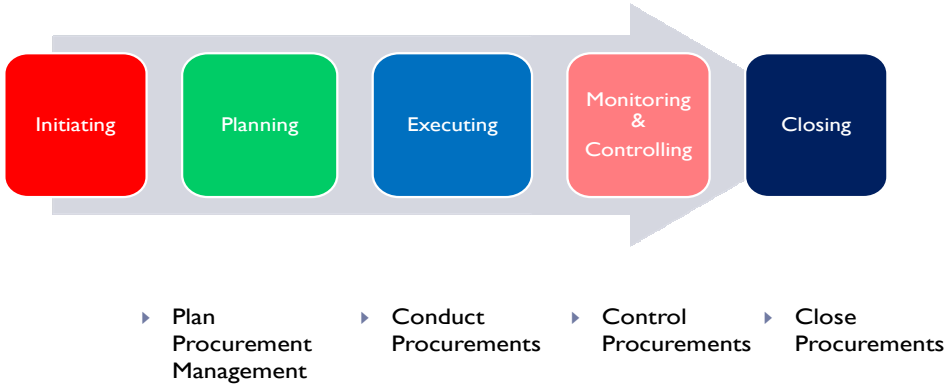


Project risk management focuses on the planning, identification, analysis, response planning, and monitoring and control of risk on a project.

The following processes and the primary goals of Project risk management are defined below:

- Plan risk management. Goal: risk management plan
- Identify risks. Goal: risk register
- Perform qualitative risk analysis. Goal: project documents updates
- Perform quantitative risk analysis. Goal: project documents updates
- Plan risk responses. Goal: project documents updates
- Monitor & control risks. Goal: project documents updates, change requests

Project Procurement Management

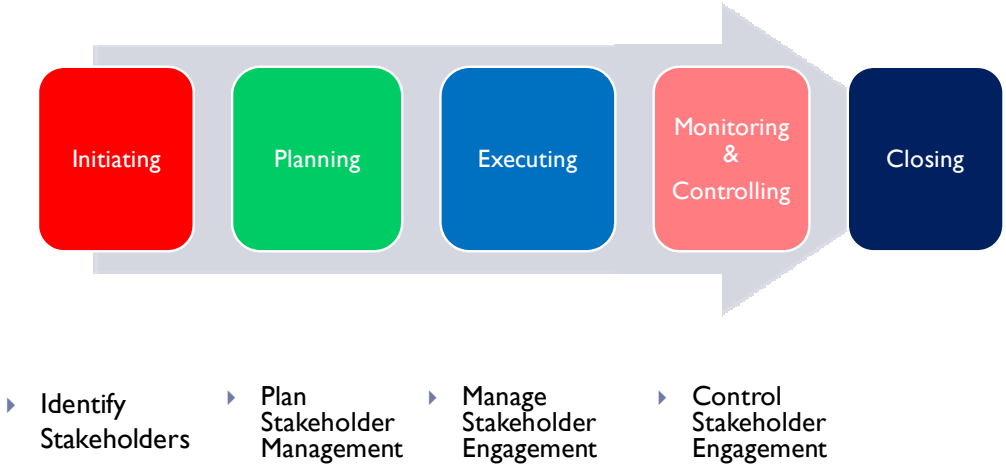


Project procurement management focuses on the processes needed to purchase or acquire products, services, or results from outside the project team or the organization.

The following processes and the primary goals of Project procurement management are defined below:

- Plan procurements. Goal: procurement management plan, procurement SOW
- Conduct procurements. Goal: select sellers, agreements (e.g. contract, sub-contract, PO, etc)
- Control procurements. Goal: procurement documentation, change requests
- Close procurements. Goal: closed procurements

Project Stakeholder Management



Project stakeholder management identifies the processes required to identify the people, groups, organizations that can impact/be impacted by the project. It involves analyzing stakeholder expectations in developing management strategies for effectively engaging stakeholders and project decisions and execution. Stakeholder management also focuses on continuous communications with stakeholders, managing conflict and promoting appropriate stakeholder engagement in project decisions and activities.

The following processes and the primary goals of project stakeholder management are defined below:

- Identify Stakeholders. Goal: stakeholder register
- Plan Stakeholder Management. Goal: stakeholder management plan
- Manage Stakeholder Engagement. Goal: issue log, change requests
- Control Stakeholder Engagement. Goal: work performance information, change requests

Role of the Knowledge Areas

A knowledge area can represent a set of concepts, terms, and activities that can constitute a professional field, a project management field, or some area of specialization. The ten knowledge areas described above are used on most projects most of the time. The interplay between the knowledge areas and the Project Management Process Groups are shown on the following page. For the PMP exam, it is expected that the credential seeker will commit the 47 processes and their respective knowledge areas, as well as the interplay with the Project Management Process Groups to memory.

Mapping Knowledge Areas to Process Groups

V Process Groups >>> V V Knowledge Areas	Initiating	Planning	Executing	Monitoring & Controlling	Closing
4. Project Integration Management	Develop Project Charter	Develop Project Management Plan	Direct and Manage Project Work	Monitor and Control Project Work Perform Integrated Change Control	Close Project or Phase
5. Project Scope Management		Plan Scope Management Collect Requirements Define Scope Create WBS		Validate Scope Control Scope	
6. Project Time Management		Plan Schedule Management Define Activities Sequence Activities Estimate Activity Resources Estimate Activity Durations Develop Schedule		Control Schedule	
7. Project Cost Management		Plan Cost Management Estimate Costs Determine Budget		Control Costs	
8. Project Quality Management		Plan Quality Management	Perform Quality Assurance	Control Quality	
9. Project HR Management		Plan Human Resource Management	Acquire Project Team Develop Project Team Manage Project Team		
10. Project Communications Management		Plan Communications Management	Manage Communications	Control Communications	
11. Project Risk Management		Plan Risk Management Identify Risks Perform Qualitative Risk Analysis Perform Quantitative Risk Analysis Plan Risk Responses		Control Risks	
12. Project Procurement Management		Plan Procurement Management	Conduct Procurements	Control Procurements	Close Procurements
13. Project Stakeholder Management	1dentify Stakeholders	Plan Stakeholder Management	Manage Stakeholder Engagement	Control Stakeholder Engagement	

Graphic above based on the *PMBOK® Guide,*5th edition, p. 61

It is strongly recommended that the process groups, knowledge areas, their subsidiary processes and primary goals of the processes be well understood for the examination.

Understanding Process Interactions

IMPORTANT NOTE: on the PMI, PMP exam, you will be assessed by process group, ***not*** by Knowledge Area. You will be graded as, 'proficient', 'moderately proficient' or 'not proficient' in each of the project management lifecycle process groups:

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

While it is important to understand the processes in each knowledge area, it is more important to understand the interactions of the processes as they occur between the process groups. Many of the questions on the exam will test your understanding of what happens in each of the process groups. Notice on page 3 – 3 that the planning and executing processes iterate, and that this occurs under an umbrella of monitoring and controlling processes. In other words, all three process groups are occurring simultaneously, however, there are specific processes within those groups that occur in a cyclical fashion. Use the charts below to help you understand the process interactions. The specific interactions by knowledge area will appear at the beginning of each knowledge area chapter.

The table below outlines the specific, key output/deliverables by process group and knowledge area. You will find that if you address each knowledge area thoroughly, the contents of the table below will become committed to memory as you progress through this manual.

Initiating	Planning	Executing	Monitoring and Controlling	Closing
Integration: -Select Project manager -Create project charter	Project Management (PM) Plan	Deliverables Work Performance Information	-Change request status updates -Approved CRs -Validated changes	Final product OPA updates
	-Scope Management Plan -Requirements Management Plan -Requirements Traceability matrix -Scope Statement -Scope baseline		-Accepted deliverables -CRs	
	Schedule Mgt. Plan Activity list/attributes Network diagrams Resource requirements Duration Estimates Schedule/baseline		-Work Performance Information -CRs	
	-Cost Management Plan -Cost estimates -Cost performance baseline		Budget forecasts	
	Quality: -Quality Management Plan -Metrics / checklists -Process Improvement Plan	CRs and updates	-Validated deliverables/changes -Work Performance Measurements -QC measurements	
	HR: Human Resource Plan	-Staff assignments -Team performance assessments -Resource calendars		
	Communications Management Plan	Project communications	Work performance information	
	Risk: -Risk Management Plan -Risk register/updates -Risk related Contract decisions -PM plan updates		Risk register Updates to: -Risk register -Project documents -CRs	
	Procurement: -Procurement Management Plan -Procurement SOW -Make-or-buy decisions	Select Sellers Agreements	Procurements docs	Closed procurements
Stakeholder Mgt: stakeholder register	stakeholder management plan	issue log change requests	work performance information	

In Summary…

- This section mapped the ten PMI knowledge areas:
- The five PM process groups and the importance in understanding the steps within each process group for the exam
- The definition of the 47 process areas contained within each of the ten knowledge areas
- How those processes fit into the PM process groups

Chapter Three Memory Check

1. The five process groups that comprise the project management life cycle are: _____, _____, _____, _____ _____ and_____
2. The two primary outputs of the Initiating process are the project _____ and identify _____
3. The primary goal of the planning process group is to produce the _____.
4. The ten Knowledge Areas of the *PMBOK® Guide,*5th edition are, in short, _____, _____,_____, _____, _____, _____ _____, _____, _____, _____, and _____ _____
5. Over half of the processes that occur in the ten knowledge areas of the *PMBOK® Guide,*5th edition occur in the _____ process group
6. Only the _____knowledge area has processes in all five of the process groups of the project management life cycle
7. Two primary goals of the Monitoring and Control process group are to _____ project work and to perform _____
8. Early in the project the _____, and the _____of_____ are low – the _____ and _____ _____ are high
9. PMI defines how a project will tighten its estimates for budget and timeline as more is learned about the project as a _____ _____
10. There are ____ processes spread across the ten Knowledge Areas in the *PMBOK® Guide,*5th edition
11. Percentage of work completed, quality and technical performance measurements, start and finish dates of scheduled activities is known as _____ _____ _____, whereas status of deliverables, status of change requests, forecasted estimates to completion is called _____ _____ _____

Chapter 3 Test

1. You are managing a project in which the organization utilizes the 'waterfall approach' in executing projects. They have adopted the PMI 'methodology' and the IPECC approach has become the foundation for their internal project methodology. Senior management has approached you and has insisted that you use the phased approach as defined by PMI in delivering the project: initiate, plan, execute, monitor and control, and close (IPECC). What is the *most factual* information you can give senior management regarding IPECC process groups?
    a. You will follow the PMI methodology to the letter
    b. You will follow the PMI methodology if the specific project warrants its use
    c. The process groups are not project phases
    d. IPECC will only work if you use all the processes in the ten key process areas

2. What is the primary purpose of the Initiating process group?
    a. Determine the project goals
    b. Align stakeholder expectations with the project's purpose
    c. Determine the initial budget
    d. Identify processes and standards

3. Validate Scope is part of what process group?
    a. Planning
    b. Executing
    c. Closing
    d. Monitoring and Controlling

4. The completion of work packages, holding meetings, distributing Project information, negotiating contracts and performing quality assurance are all part of what process group?
    a. Executing
    b. Planning
    c. Initiating
    d. Closing

5. The Planning process group touches all ten of the key knowledge areas in that planning has to occur in each of these areas. Which of the following is *not* part of the planning process?
    a. Creating the WBS
    b. Develop the project management plan
    c. Estimate activity durations
    d. Identify stakeholders

6. You are a senior project manager at a company that has just hired several junior project managers. Part of your job is to mentor these junior project managers so that they can rapidly become effective in the organization. Each of these junior project managers is a PMP® so you are reasonably sure that they understand the PMI framework. You decide to find out how deep their knowledge goes and ask them, "How many of the processes in the key knowledge areas do we use all the time?" Which junior PM gave the *best* answer?
    a. Jr. PM#1: All the processes have to be used all the time; otherwise you're not following the PMI methodology.
    b. Jr. PM#2: All the Planning processes have to be used all the time; you have some flexibility with the other process groups
    c. Jr. PM#3: The Project manager and their teams are responsible for determining which processes are appropriate for the specific project

d. Jr. PM#4: ***All*** processes in the Planning group that address the triple constraints of cost, time, and budget, along with risk planning must be done on all projects. The remaining processes are at the discretion of the project manager

7. In the Monitoring and Controlling process group, one of the primary goals of that group is to monitor and control the project work. What is the second equally important, major goal of the monitoring and control process?
    a. Quality control
    b. Change control
    c. Scope control and verification
    d. Corrective action

8. You are just initiating a project for your organization. Which of the following is a true statement regarding the Initiating process?
    a. Risk is low but stakeholder influence is high
    b. Staffing level is high while chance of success is low
    c. Risk is high but the chances of success are also high
    d. Stakeholder influence is high while costs are low

9. Your project is in the planning phase and many of the stakeholders are excited about the product that will be delivered once the project is done. You have solicited input from the stakeholders, addressed technical issues with the technical team, estimated costs, determined the high-level project schedule, created a statement of work, created a work breakdown structure, identified and quantified risks, developed the project management plan and all subsidiary key knowledge area plans, and received stakeholder sign off of the plan. What is the *next* thing you will most likely do?
    a. Verify stakeholder input
    b. Hold a kickoff meeting
    c. Consult management for a go/no-go decision
    d. Place the project management plan under configuration management

10. In the Executing process group the main goal is to Direct and Manage Project Work. All of the following are elements in the executing process group with *one exception*:
    a. Complete work packages and use a work authorization system
    b. Obtain bids from vendors, select vendors and negotiate the vendor contract
    c. Collect status information and hold meetings
    d. Validate the deliverables as the project is being executed

11. When does the Closure process occur?
    a. Closure occurs only at the end of the project
    b. Closure activities can occur at the end of the project or at the end of a project phase
    c. Closure occurs before the closeout of any contracts on the project
    d. Closure occurs after the stakeholders have conducted user acceptance testing

12. The project you are managing includes many stakeholders, geographically distributed across the country. As part of the planning process you have put together a communications plan that will address the communications needs of all the stakeholders on the project, from the performing organization up to and including the sponsor. Part of this communications plan includes the distribution of information as well as reporting the performance of the team. The PMI process groups you are utilizing are:
    a. Information distribution and performance reporting occur in the Executing process group
    b. Information distribution and performance reporting occur in the Monitoring and Controlling process group

c. Information distribution occurs in the Executing process group while performance reporting occurs in the Monitoring and Controlling process group
d. Information distribution occurs in the Monitoring and Controlling process group while performance reporting occurs in the Executing process group

13. You are engaged in a large project that requires complex coordination between many departments in your organization. You have almost completed the planning phase and are looking for sign-off of the project management plan. You have addressed overall project integration activities, the budget, the timeline, the scope of the work, quality planning, resource acquisition, communications for a distributed team, and some procurement activities that require the use of external vendors. What has the project manager forgotten to do?
    a. Create a work breakdown structure
    b. Risk assessment
    c. Creation of a requirements traceability matrix
    d. Creation of a change management system

14. There are many reasons for creating a lessons learned document in a project. All of the following represent reasons why you would create a lessons learned document with the *exception* of:
    a. Creates an archive to advise future project teams about types of projects and resources they should avoid when initiating similar projects
    b. Serves as a historical record for what worked and what did not work in your project so that future project teams can make use of the information
    c. Used as a phase-end review tool so the team can implement incremental process improvement activities for the subsequent phases
    d. Gives all project stakeholders a chance to input what issue resolution approaches were most effective for them on the project

15. You have been brought into a project for a 'project rescue'. Management had issues with the previous project manager and dismissed him from the company. You sit down with the project team for the first time and discover that there is a lot of activity going on and that the project is well under way: the requirements have been completed and design work is about half way done. However, there is a lot of contention between the members of the performing organization. A number of people are arguing about who should handle what activities, how long they are going to take, and in what order the activities should occur. From listening to these arguments it becomes clear to you that the prior project manager *probably* did not do what?
    a. Obtain formal approval of the project charter
    b. Identify processes and standards
    c. Determine the project schedule
    d. Create a project management plan

16. The team has completed all design work and is ready to start creating a product of the project. There are construction and IT elements in this project, and the project manager has leaned heavily on the subject matter experts in the organization for their technical expertise and know-how. You have determined that some of the work needs to be contracted to an external vendor who has the necessary expertise to deliver what is needed for the project. You are in the process of selecting a vendor. What process group are you in?
    a. Planning
    b. Initiating
    c. Monitoring and Controlling
    d. Executing

17. All the following happen in the Initiating process with the *exception* of:
    a. Choose the project team
    b. Determine stakeholders
    c. Identify processes and standards
    d. Create the project charter

18. You are deep in the planning process for your project and have created a human resource plan in which you have identified what skill sets are needed, when they are needed, and when they will roll off the project. You are now focused on the process of acquiring, developing, and managing the project team. Which of these processes occur in the monitoring and controlling process group?
    a. Acquire project team only
    b. Manage project team only
    c. Develop and Manage project team only
    d. This is a trick question - none of them do

19. Within the Project Time Management knowledge area, in what order do the planning activities occur before you can develop the project schedule?
    a. Define activities, estimate activity duration, estimated activity resources, sequence activities
    b. Define activities, estimate activity resources, sequence activities, estimate activity duration
    c. Define activities, sequence activities, estimate activity resources, estimate activity duration
    d. Define activities, estimate activity duration, sequence activities, estimate activity resources

20. One of the Junior Project managers you're mentoring has come to you for help. She just started the planning process and sat down with the key stakeholders to begin the requirements collection activities for her project. At the end of the meeting the stakeholder who will be receiving the deliverable stated that he wanted to see a definitive budget estimate for the project within one week of the completion of the requirements collection process. She explained that might not be possible because the team will not have had enough detail at that point to construct a solid estimate. He said he didn't care and that he needed the estimate for the capital budgeting meeting that is occurring at the end of the month - two weeks from now. What is the *best* advice you can give your Junior Project manager?
    a. Take your best guess and double it. Since it is too early in the project to deliver a definitive estimate you tell the stakeholder this is the best estimate you can come up with at this point
    b. It is not possible to deliver a definitive estimate until the planning process is complete. The best you can do at this point is a rough order of magnitude estimate which goes from -50% to plus 50%
    c. Escalate the issue to senior management as the stakeholder is obviously delusional
    d. Sit down with the delivery organization, work through the weekend if you have to, and come up with the closest estimate you can deliver.

21. Where do lessons learned activities occur?
    a. In between the monitoring and controlling process and the closing process
    b. Whenever there is an issue identified that needs to be addressed
    c. In each phase-end closing process as well as the closing process at the end of the project
    d. Only at the end of the project

22. What is a synonym for 'progressive elaboration'?
    a. Cyclical planning
    b. Quantified elaboration
    c. PERT estimates
    d. Rolling wave planning

23. You are managing a program to recruit new project managers for your organization. You have just completed a training session in which you have identified the five process groups in the PMI framework and just asked the class the following question: “What is the purpose of the initiating process group?” Which of the student responses was the *best* answer?
    a. Initiating kicks off the project
    b. Initiating can kick off the project or a phase of the project
    c. Initiating can kick off a project, a project phase, or contract
    d. Initiating identifies the project manager and produces a project charter

24. What is the key primary benefit of the monitoring and controlling process group?
    a. It manages the change request process
    b. It plays a key role in measuring and managing procurement activities for the project
    c. You can observe project performance, measure it, and identify variances from the project management plan
    d. Insures, through metrics and measurement, that changes to the project management plan are prevented to eliminate scope creep

25. In an organization that uses 'hit or miss' project processes, they have come to you for advice on which of the five PMI process groups would be the best one to implement, if they had to boil it down to just one. What is the *best* advice you could give them?
    a. Executing processes would serve you best
    b. Planning processes would serve you best
    c. Initiating processes would serve you best
    d. Monitoring and Controlling processes would serve you best

Chapter 3 – Test Answers

1. C – The process groups are not project lifecycle phases. *PMBOK® Guide*, 5th edition, p. 52
2. B – While answers A, C, and D are partially correct, the purpose of the initiating process group is to align stakeholder expectations with the project's purpose. *PMBOK® Guide*, 5th edition, p. 54
3. D – Monitoring and controlling is the only correct answer. *PMBOK® Guide*, 5th edition, p. 61
4. A – Executing is the only correct answer. *PMBOK® Guide*, 5th edition, pp. 56
5. D – Identify stakeholders is part of the Initiating process
6. C – In *PMBOK® Guide*, 5th edition, p 48
7. B – Integrated Change Control is the only correct answer. *PMBOK® Guide*, 5th edition, p. 57
8. D – This is the only correct answer. *PMBOK® Guide*, 5th edition, p. 54
9. C – In phase gated process, when the planning work is completed and signoffs are received, we are looking for a go/no go decision from senior management
10. D – Validating deliverables is in the monitoring and controlling process group occurring in the Validate Scope process
11. B – Closure occurs at phase-end and project end activities
12. A – Information distribution and performance reporting both occur in the Executing process group. *PMBOK® Guide*, 5th edition, p. 301
13. B – Risk assessment is the only remaining knowledge area that was not covered
14. A – Lessons learned are not used to torpedo resources you had issues with or steer you away from uncomfortable projects. They usually focus on performance and process improvement
15. D – Only a well documented project management plan (which includes the entire scope baseline) would help to organize the work
16. D – Vendor identification and selection occurs in the Executing process group. *PMBOK® Guide*, 5th edition, p. 356
17. A – Choosing the project team is an Executing group activity. *PMBOK® Guide*, 5th edition, p. 267
18. D – It is a trick question; there are no processes in the Human Resources knowledge area that fall into the Monitoring and Controlling process group
19. C – Define activities, sequence activities, estimate activity resources, estimate activity durations is the correct sequence. *PMBOK® Guide*, 5th edition, p. 61
20. B – Your job is to give management a reality check, not feed in to a management wish- fulfillment fantasy or turn yourself and the team inside-out attempting to meet an impossible demand. This eliminates answers A and D. Answer C is something you might wish to say ☺, but will always be wrong on the exam…
21. C – Lessons learned occur when ever the closure process occurs: phase-end or end of project
22. D – Rolling wave planning is the correct answer. A and B are non-existent terms and PERT is used for schedule estimating
23. B – This is the most inclusive answer. A and D are both true but not complete. C is a red herring. *PMBOK® Guide*, 5th edition, p 44 “The Initiating Process Group consists of those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase”
24. C – *PMBOK® Guide*, 5th edition p 57
25. B – All the processes are important, but they all depend on Planning