

INTRO TO PROJECT MANAGEMENT

CE 4200 PROFESSIONAL ENGINEERING PRACTICE
ISSUES

Spring 2022 SEMESTER

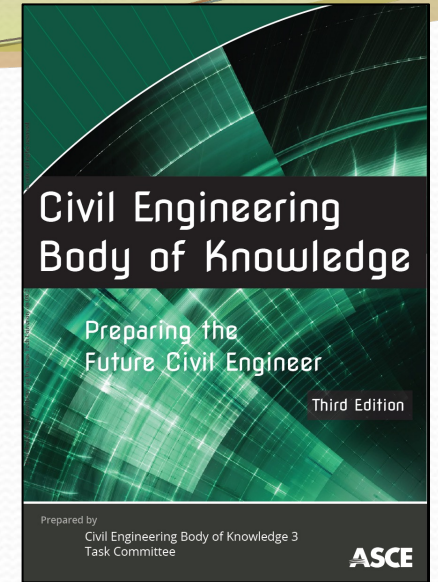
WILLIAM D. LAWSON, PE, PHD

ASCE BOK3... “PROJECT MANAGEMENT”

Project Management

Table 2-9. Project Management (Cognitive Domain).

Cognitive Domain Level of Achievement	Demonstrated Ability	Typical Pathway
1 Remember (remember previously learned material)	Identify concepts and principles of project management.	Undergraduate education
2 Comprehend (grasp the meaning of learned material)	Explain concepts and principles of project management.	Undergraduate education
3 Apply (use learned material in new and concrete situations)	Apply concepts and principles of project management in the practice of civil engineering.	Mentored experience
4 Analyze (break down learned material into its component parts so that its organizational structure may be understood)	Analyze components of a project management plan for a complex civil engineering project.	
5 Synthesize (put learned material together to form a new whole)	Integrate components into a complete project management plan for a complex civil engineering project.	
6 Evaluate (judge the value of learned material for a given purpose)	Evaluate a complete project management plan for a complex civil engineering project.	





Introduction to Project Management

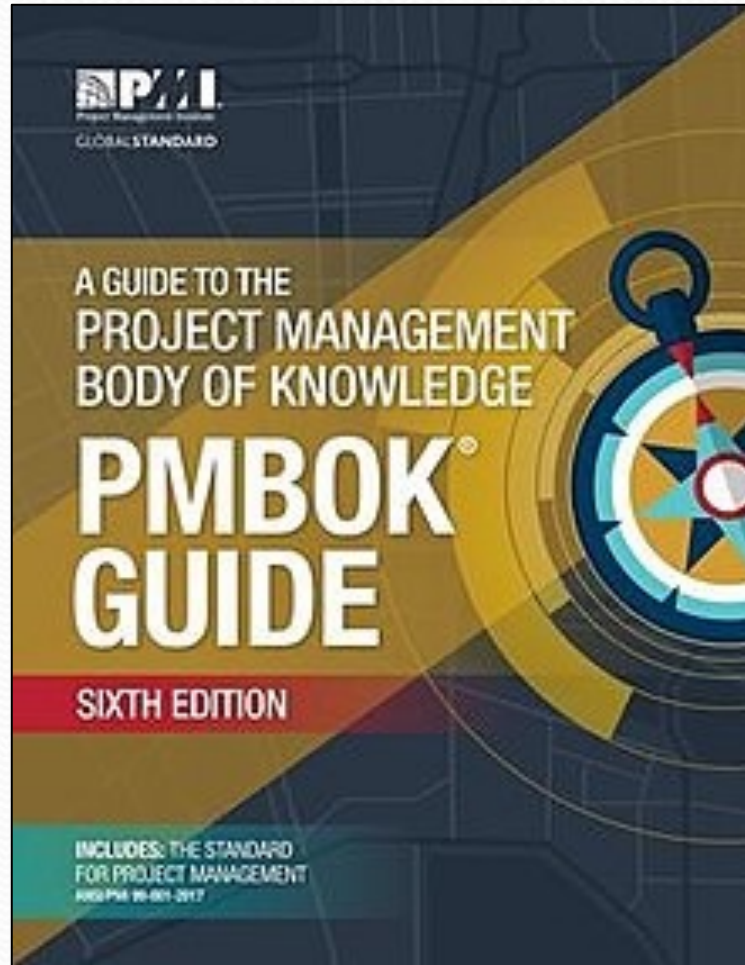
SOURCE: online presentation by Avneet Mathur, PMP



The **Project Management Institute (PMI)** is a global nonprofit professional organization for project management.

The PMI serves more than 2.9 million professionals including over 500,000 members in 208 countries and territories around the world, with 300 chapters and 10,000 volunteers serving local members in over 80 countries.

Its services include the development of standards, research, education, publication, networking-opportunities in local chapters, hosting conferences and training seminars, and providing accreditation in project management.



The **Project Management Body of Knowledge** is a set of standard terminology and guidelines (a body of knowledge) for project management.

The PMBOK Guide is intended to be a "subset of the project management body of knowledge that is generally recognized as a good practice.

The PMI produced the first Project Management Body of Knowledge (PMBOK) in 1996.

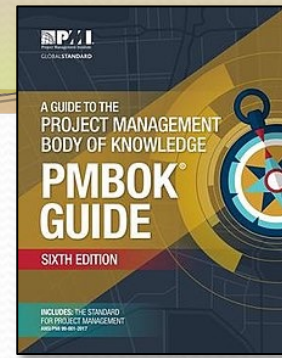
PMP

Project Management Professional



Government, commercial and other organizations employ PMP certified project managers in an attempt to improve the success rate of projects in all areas of knowledge, by applying a standardized and evolving set of project management principles as contained in PMI's PMBOK Guide.

Candidates must have completed a high school diploma or an associates degree with 60 months and 7,500 hours of project management experience, or a bachelor's degree with 36 months and 4,500 hours of project management experience.



What is a Project?

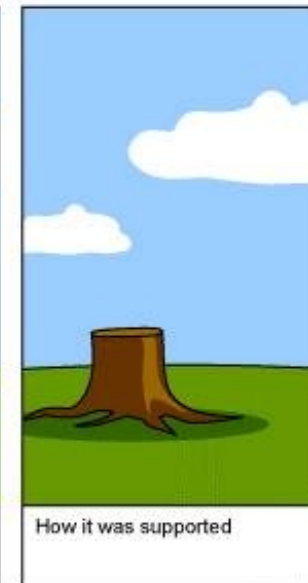
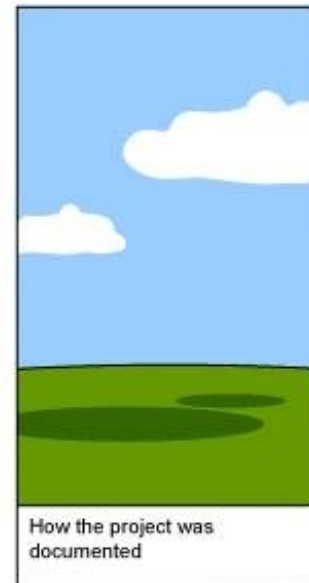
- A project is a temporary endeavor undertaken to produce a unique product or service



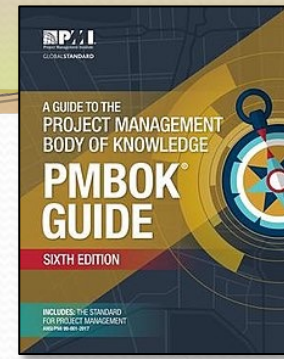
- **Temporary** – Definitive beginning and end
- **Unique** – New undertaking, unfamiliar ground

Examples

- Developing a new pharmaceutical compound for market
- Expanding a tour guide service
- Merging two organizations
- Improving a business process within an organization
- Acquiring and installing a new computer hardware system for use in an organization
- Exploring for oil in a region
- Conducting research to develop a new manufacturing process
- Constructing a building

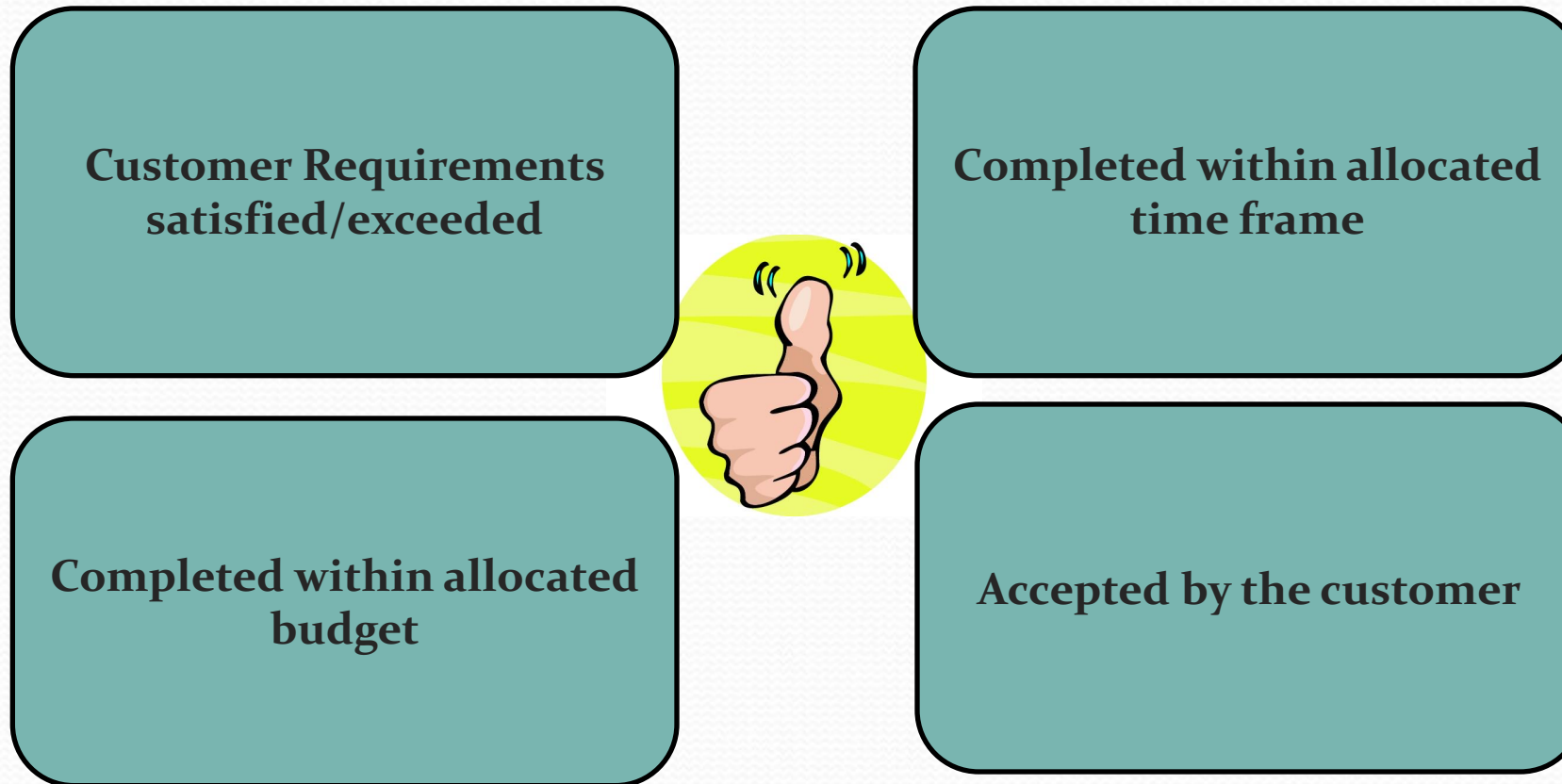


Deliverable

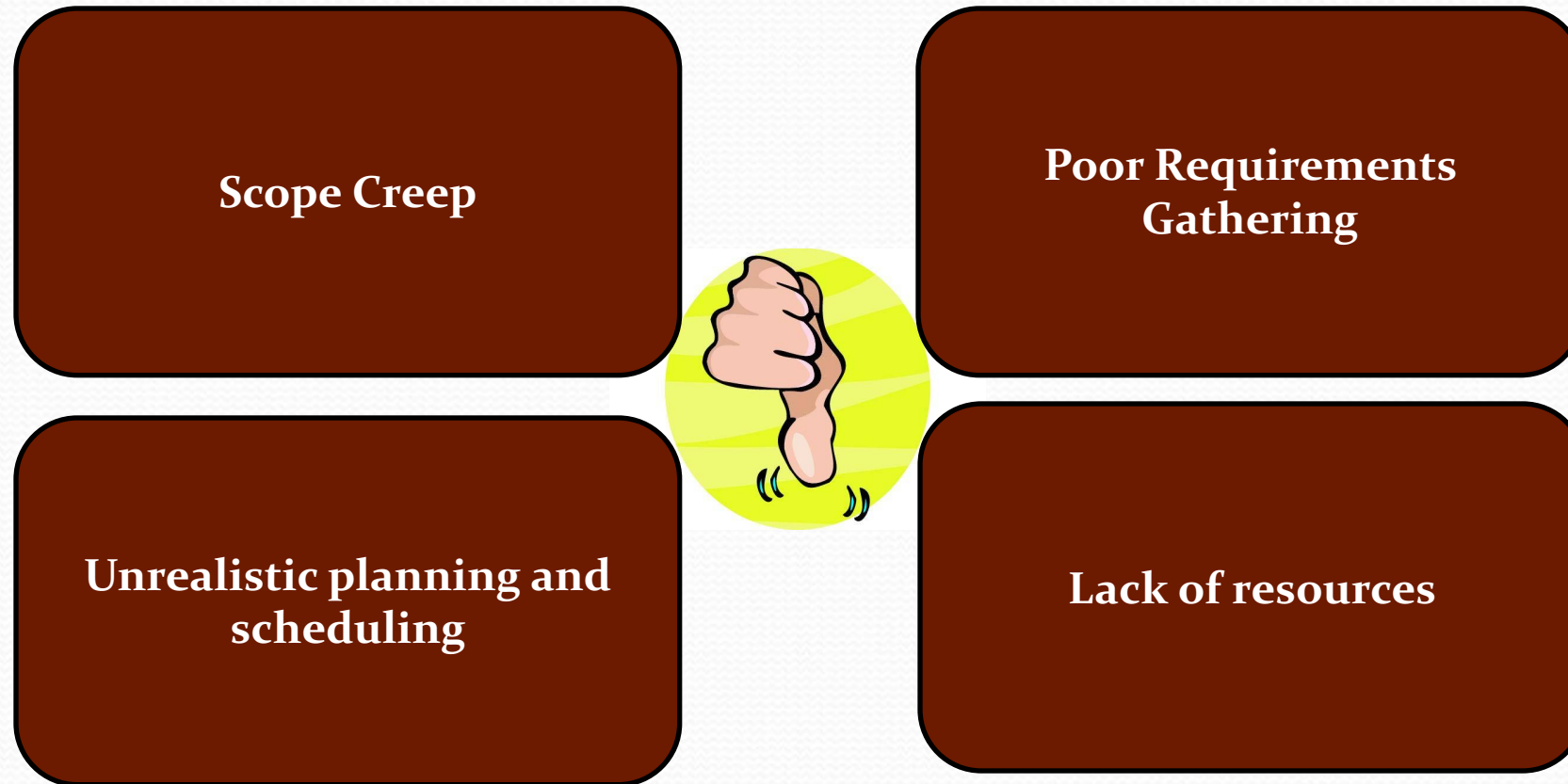


- Any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.
- Some examples:
 - Engineering report
 - Proposal
 - Design drawings
 - Design documents
 - Completed product (building, bridge, etc.)
 - Technical interpretation
 - Site investigation report

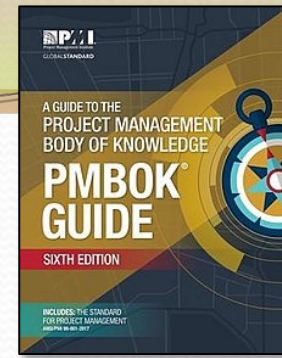
Project Success



Project Failure

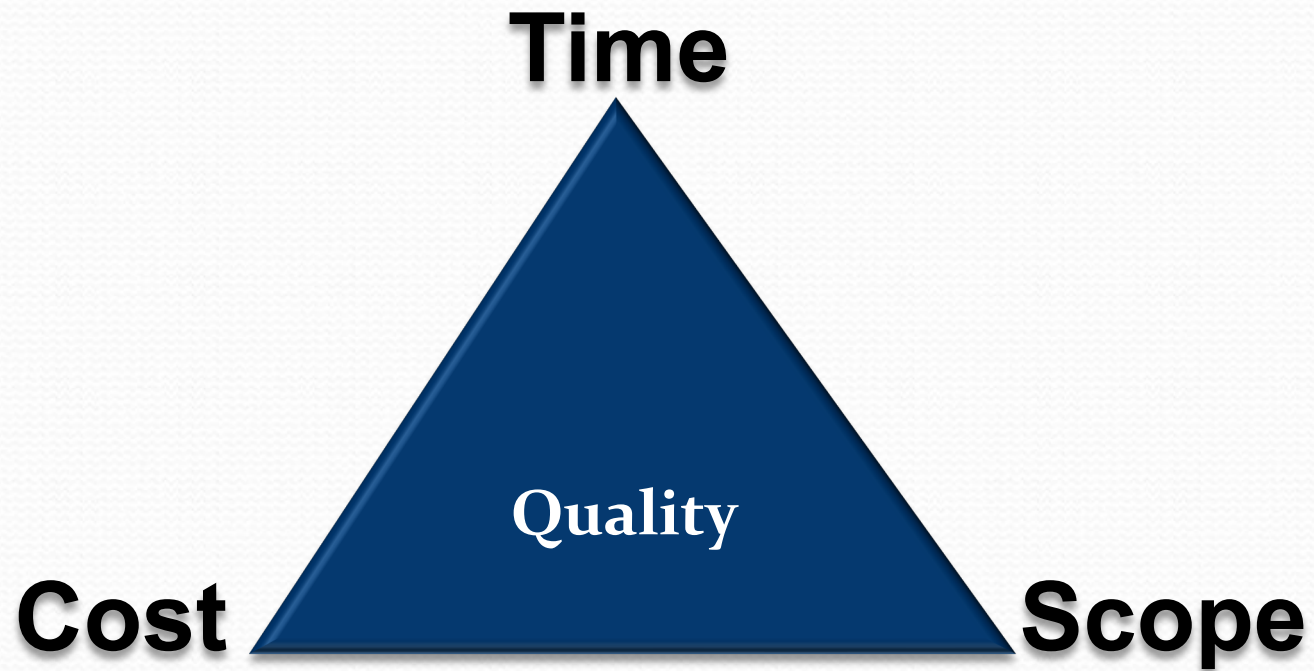


What is Project Management?



- Project Management is the application of skills, knowledge, tools and techniques to meet the needs and expectations of stakeholders for a project.
- The purpose of project management is **prediction** and **prevention**, NOT **recognition** and **reaction**

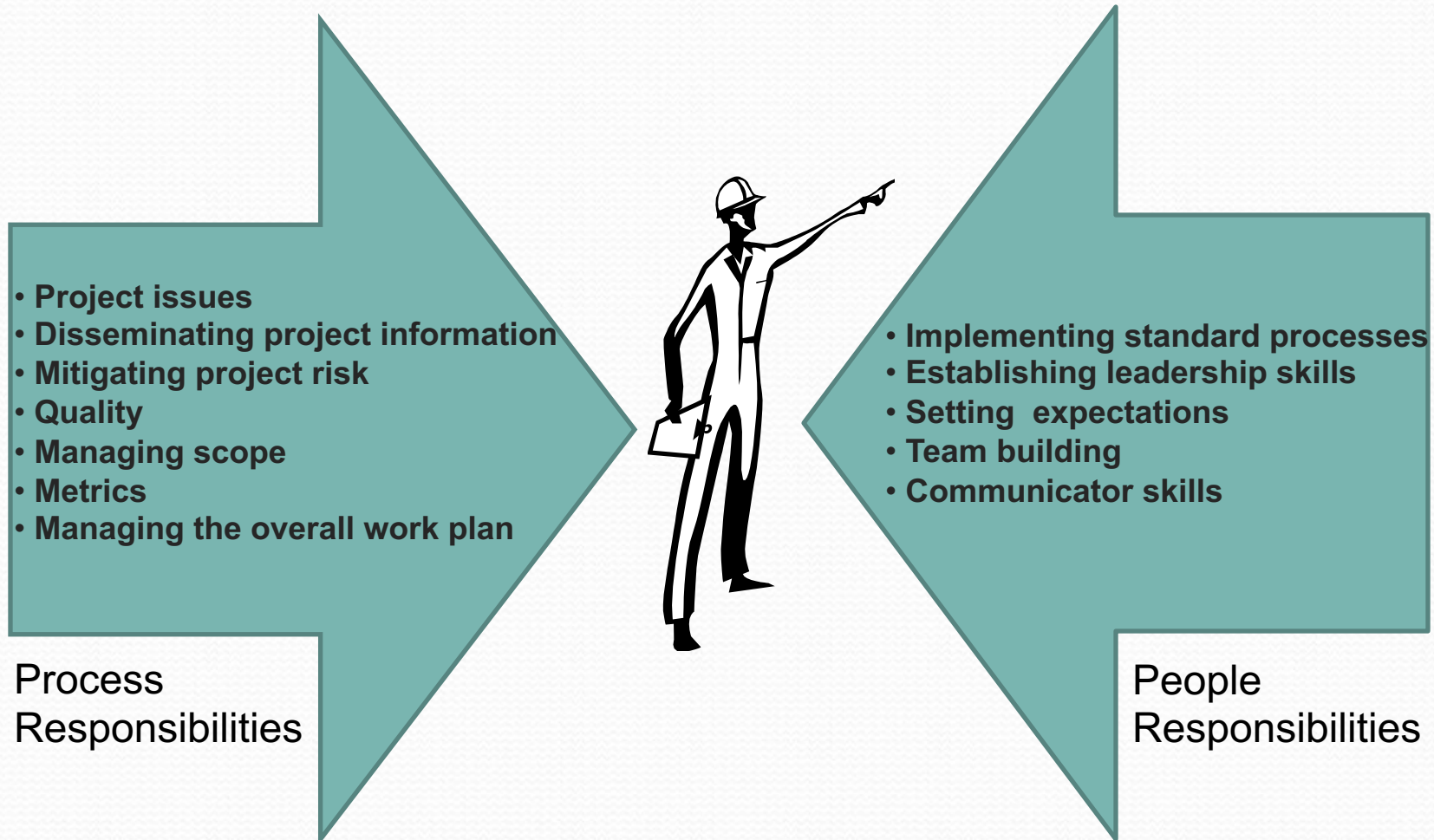
Triple Constraint



Triple Constraint

- Increased **Scope** = increased time + increased cost
- Tight **Time** = increased costs + reduced scope
- Tight **Budget** = increased time + reduced scope.

Role of a Project Manager



Key Areas of Project Management

- **Scope Management**
- **Schedule Management**
- **Cost Management**
- **Quality Management**
- **Resource Management**
- **Communications Management**
- **Risk Management**
- **Change Control Management**



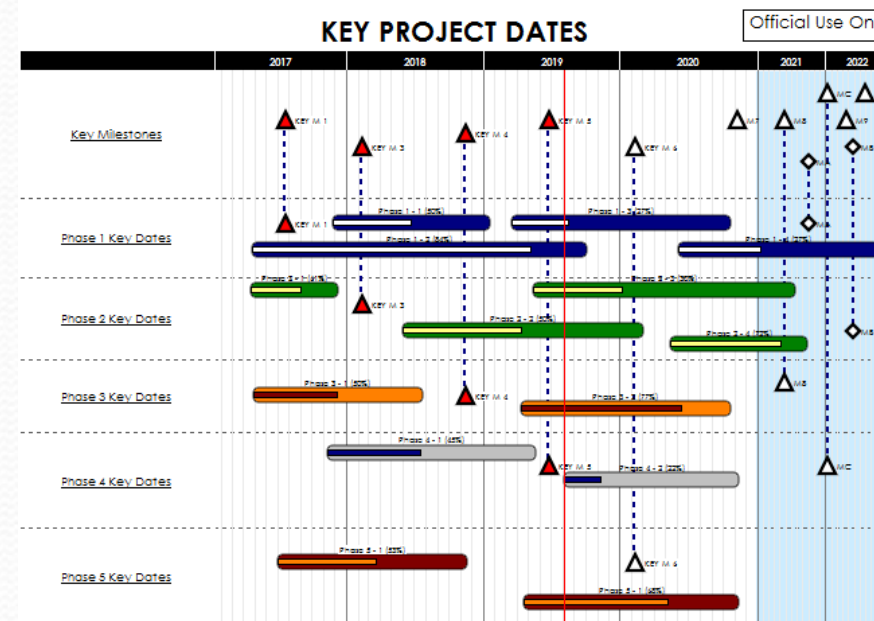
Scope Management

- Project Scope Management is the process to ensure that the project is inclusive of all the work required, and only the work required, for successful completion.
- Primarily it is the definition and control of what *IS* and *IS NOT* included in the project.



Schedule Management

- Project Schedule: an output of a schedule model that presents linked activities with planned dates, durations, milestones, and resources.



- Typically identified throughout the project and logged and tracked through resolution.

Exercise 15.1

Explore the underpinnings of project scheduling



THINK

1. Identify a specific project you are personally familiar with (say, either at work or here at University – associated with your education)
2. What is the project schedule? How is the project schedule communicated?
3. **Why do you think “owners” or “supervisors” set project schedules the way they do?**

Exercise 15.1, cont'd.

Explore the underpinnings of project scheduling



PAIR, SHARE...

4. Meet the people around you (3 to 4 persons) and discuss your ideas about project schedules
5. Consider the possible inputs that influence setting schedules for engineering work. Come up with a list

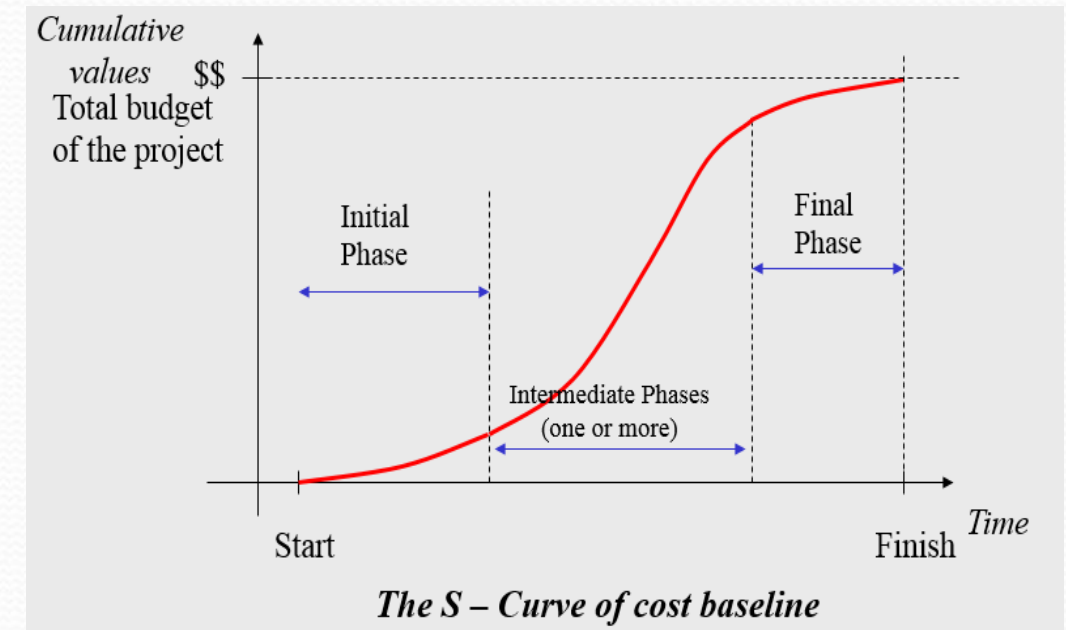
Be prepared to share your answers (5 minutes).

Issue Management

- Issues are restraints to accomplishing the deliverables of the project.
- Issues are typically identified throughout the project and logged and tracked through resolution.
- In this section of the plan the following processes are depicted:
 - Where issues will be maintained and tracked
 - The process for updating issues regularly
 - The escalation process
 - The vehicle by which team members can access documented issues

Cost Management

- This process is required to ensure the project is completed within the approved budget and includes:
 - **Resource Planning** - The physical resources required (people, equipment, materials) and what quantities are necessary for the project
 - **Budget**
 - Budget estimates
 - Baseline estimates
 - Project Actuals



Quality Management

- Quality Management is the process that insure the project will meet the needs



“the degree to which a set of inherent characteristics fulfills requirements” - **PMBOK6**

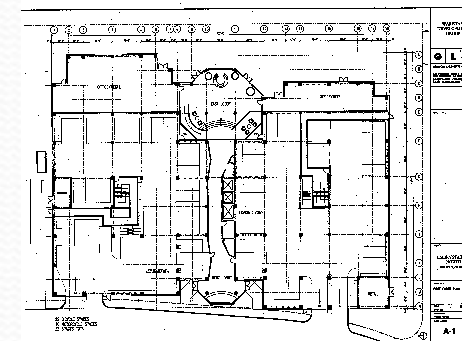
“conformance to requirements” - **Crosby**

“fitness for use” - **Juran**

“the totality of characteristics of an entity that bear on its ability to satisfy stated and implied need’ - **ISO 8402:1994**

Communications Management

- This process is necessary to ensure timely and appropriate generation, collection, dissemination, and storage of project information using:
 - Communications planning
 - Information Distribution
 - Performance Reporting
- Define the schedule for the Project Meetings (Team, OSC, ESC), Status Meetings and Issues Meetings to be implemented



Risk Management

- Risk: An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.
- Risk identification and mitigation strategy
- When\if new risks arise
- Risk update and tracking

Change Control Management

- Define how changes to the project scope will be executed

Scope Change



Technical Specification Changes

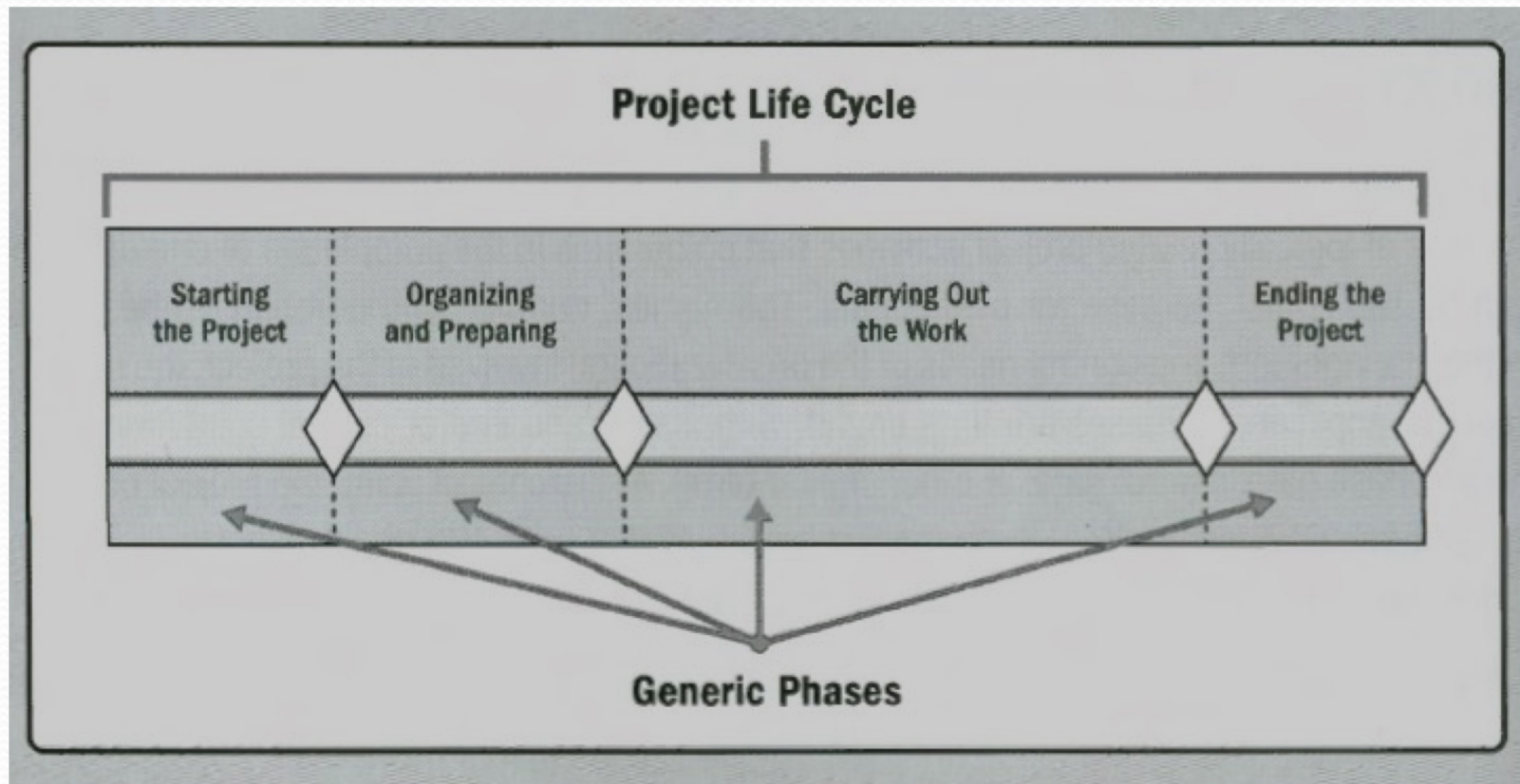


Schedule changes

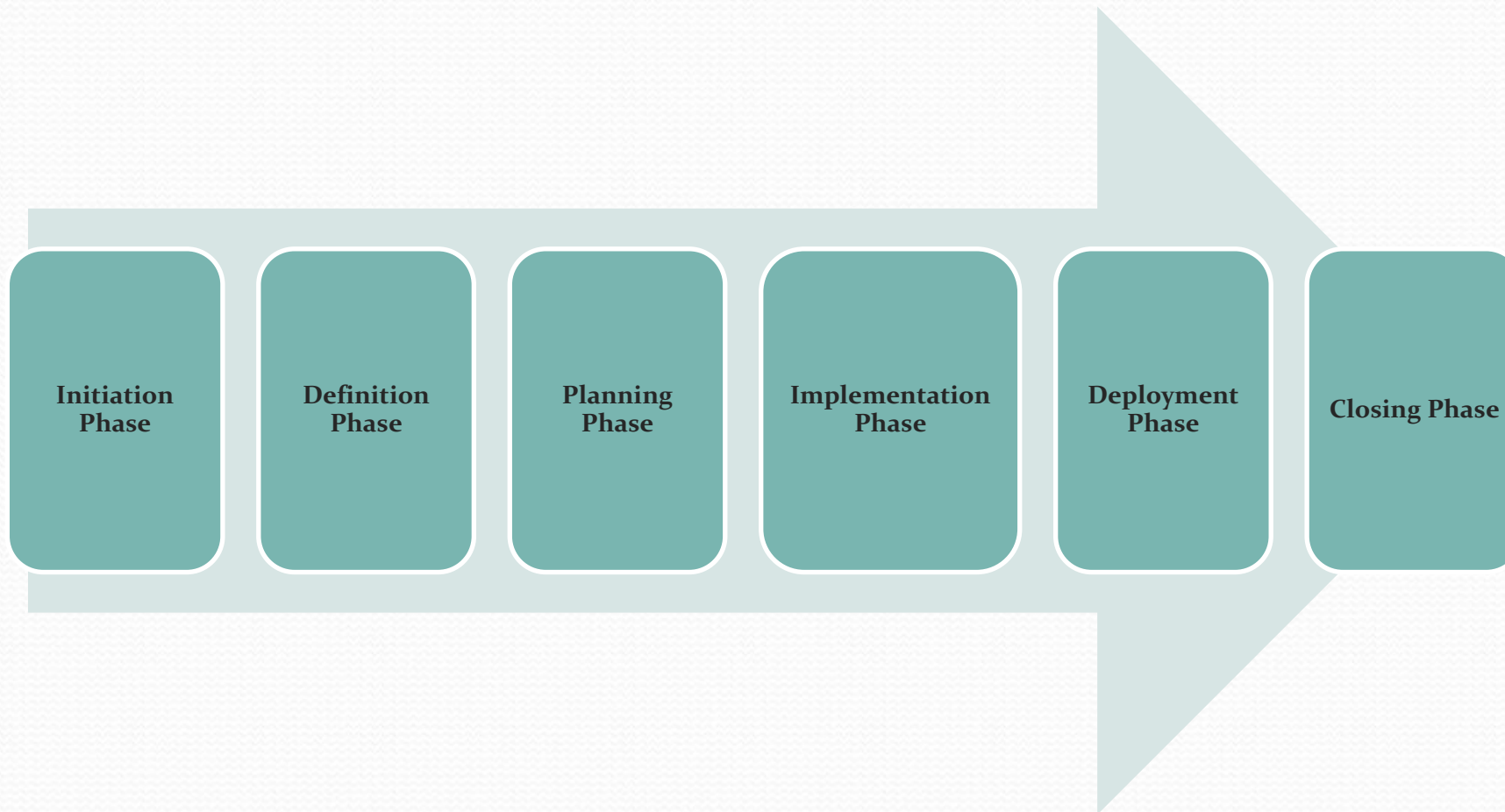


All changes require collaboration and buy in via the project sponsor's signature prior to implementation of the changes

PHASES OF A PROJECT



Project Life Cycle



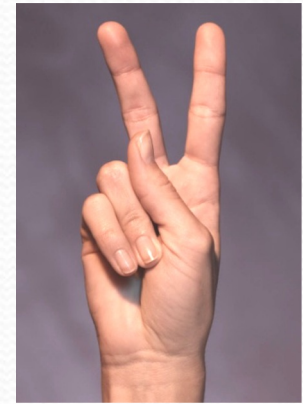
Initiation Phase

- Define the need
- Return on Investment Analysis
- Make or Buy Decision
- Budget Development



Definition Phase

- Determine goals, scope and project constraints
- Identify members and their roles
- Define communication channels, methods, frequency and content
- Risk management planning

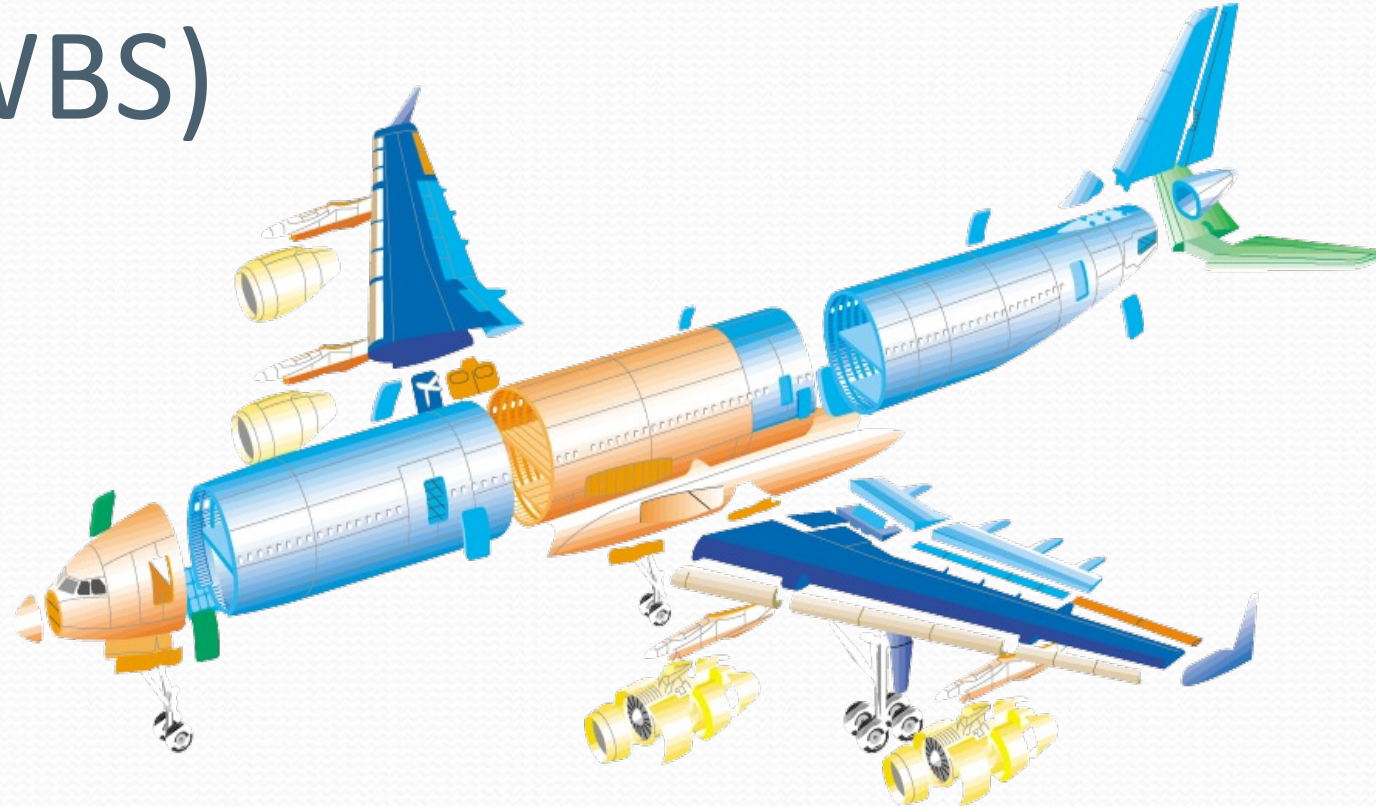


Planning Phase

- Resource Planning
- Work Breakdown Structure
- Project Schedule Development
- Quality Assurance Plan



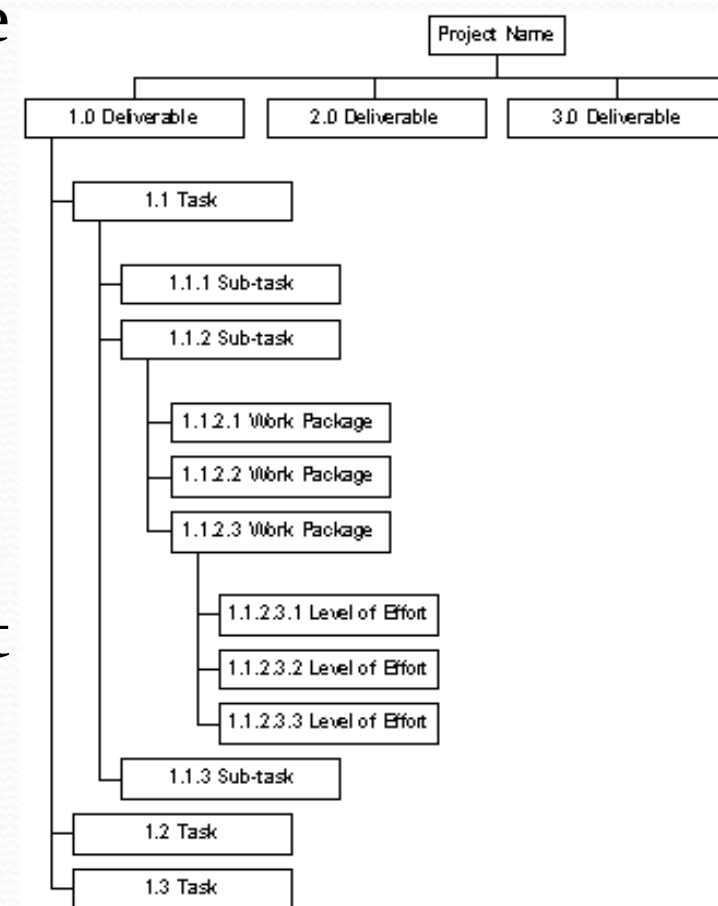
Work Breakdown Structure (WBS)



A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.

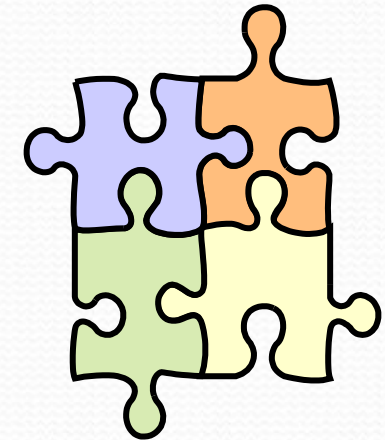
Work Breakdown Structure

- For defining and organizing the total scope of a project
- **First two levels** - define a set of planned outcomes that collectively and exclusively represent 100% of the project scope.
- **Subsequent levels** - represent 100% of the scope of their parent node



Implementation Phase

- Execute project plan and accomplish project goals
- Training Plan
- System Build
- Quality Assurance



Deployment Phase

- User Training
- Production Review
- Start Using



Closing Phase

- Contractual Closeout
- Post Production Transition
- Lessons Learned



Some PM Courses at TTU

If you're looking for a technical elective...

CONE 4322 - Construction Management

CONE 4322 - Construction Management

3 Semester Credit Hours

Prerequisite: At least junior status in the construction engineering program or consent of the department chairperson. Addresses modern methods for managing construction projects including CPM scheduling, resource allocation, and funds flow. Practical application made through project simulations.



Best Match: CONE 4320 - Construction Cost Estimating

CONE 4320 - Construction Cost Estimating

3 Semester Credit Hours

Prerequisites: At least junior status in the construction engineering program or consent of the department chairperson. Construction drawings and specs used to quantify material, labor, overhead, and equipment for bid preparation. Computer software used to develop construction bid in project simulation and case study.



IE 3329 - Fundamentals of Project Management

IE 3329 - Fundamentals of Project Management

3 Semester Credit Hours

Prerequisite: **IE 2341**. Fundamentals of project management for engineers, including project selection, planning, scheduling, budgeting, risk management, resource allocation, control, team operations, evaluation, and closure.



IE 5329 - Project Management

IE 5329 - Project Management

3 Semester Credit Hours

Technical, organizational, and personnel project management examination including planning, estimating, budgeting, scheduling, resources management, control. Risk analysis and management using software for project performance evaluation.



SUMMARY

- A project is a temporary endeavor undertaken to produce a unique product or service
- It is common for business activities to be “project based”
- Projects can go well or they can go poorly
- The triple constraints on any project are scope, cost and time... assumes acceptable quality
- Project management is the application of skills, knowledge, tools and techniques to project activities to meet the project requirements



THANK YOU.