SWA261

Planning Phase:
Project Selection & Management

Outcomes

Students should understand the following outcomes, upon successful completion of this module:

- Define Project Selection as part of the Planning Phase
- Define Project Management
- Defining Project Manager and identify their roles
- Describe the Project Management Methodology Options
- Explain the Project Plan
- Explain the Work Breakdown Structure (WBS)
- Explain use cases of Gantt chart
- Explain use cases of PERT Chart

Project Management

Project management

Project management is the process of planning and controlling the development of a system within a specified time frame at a minimum cost with the right functionality.

It is part of the Planning Phase of the SDLC.

A *Project Manager* has the primary responsibility for managing the hundreds of tasks and roles that need to be carefully coordinated.

A project manager must use project management in making *trade-offs* among the Triple Constraints of a project:

a) The *size* of the system (*in terms of what it does*)

b) The *time* to complete the project (*when the project will be finished*)

c) The *cost* of the project.

PROJECT MANAGEMENT

Once a project has been selected, the project manager plans the project.

Project management involves:

1. Selecting a project methodology
2. Creating the project work plan
3. Identifying project staffing requirements
4. Preparing to manage and control the project

Project Selection

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- *Project Selection* involves the process of *identifying*, *evaluating*, and *prioritizing* potential projects to be included in the organization's portfolio.

- This process typically involves several key stakeholders, including:

1. IT Steering Committee: This is a group of senior leaders and stakeholders responsible for providing strategic direction and oversight for IT initiatives within the organization. They play a crucial role in the project selection process by:
   - setting priorities,
   - defining criteria for project evaluation, and,
   - making final decisions on which projects to pursue

- Approval Committee: Involves a dedicated approval committee responsible for:
  - reviewing project proposals,
  - conducting feasibility analyses, and,
  - making decisions regarding project selection and prioritization.

This committee may include representatives from various departments or functional areas within the organization, as well as members of the IT steering committee.

Project Selection

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- Organizations typically maintain a portfolio of projects.
- A project is defined as a specific, singular endeavour to deliver a tangible output.
- This portfolio of projects usually represents the collection of all ongoing and proposed projects within the organization.
- The project selection process involves evaluating and prioritizing projects to ensure that the portfolio is:

    1. Balanced,
    2. Aligned with organizational goals, and,
    3. Optimized for maximum value delivery

- Before a project is approved for inclusion in the portfolio, it also undergoes a feasibility analysis to assess its viability and potential for success.

Classifying Projects

There are different ways that the Approval Committee can utilise to classify projects for selection.

These include:

Size	What is the size? How many people are needed to work on the project?
Cost	How much will the project cost the organization?
Purpose	What is the purpose of the project? Is it meant to improve the technical infrastructure? Support a current business strategy? Improve operations? Demonstrate a new innovation?
Length	How long will the project take before completion? How much time will go by before value is delivered to the business?
Risk	How likely is it that the project will succeed or fail?
Scope	How much of the organization is affected by the system? A department? A division? The entire corporation?
Economic Value	How much money does the organization expect to receive in return for the amount the project costs?

Project Methodology Options

- The SDLC provides the foundation for the processes used to develop an information system.
- A methodology is a formalized approach to implementing the SDLC (i.e., it is a list of tasks, steps, and deliverables).
- There are many different systems development methodologies, and they vary in terms of the progression that is followed through the phases of the SDLC.
- Organizations can utilize:
  - ✓ Their own in-house developed methodologies that explain exactly how each phase of the SDLC is to be performed in that company
  - ✓ Methodologies obtained from consulting firms for their clients to follow
  - ✓ Methodologies provided by the vendor of the software to be installed; or,
  - ✓ Methodologies mandated as a part of projects involving government agencies.

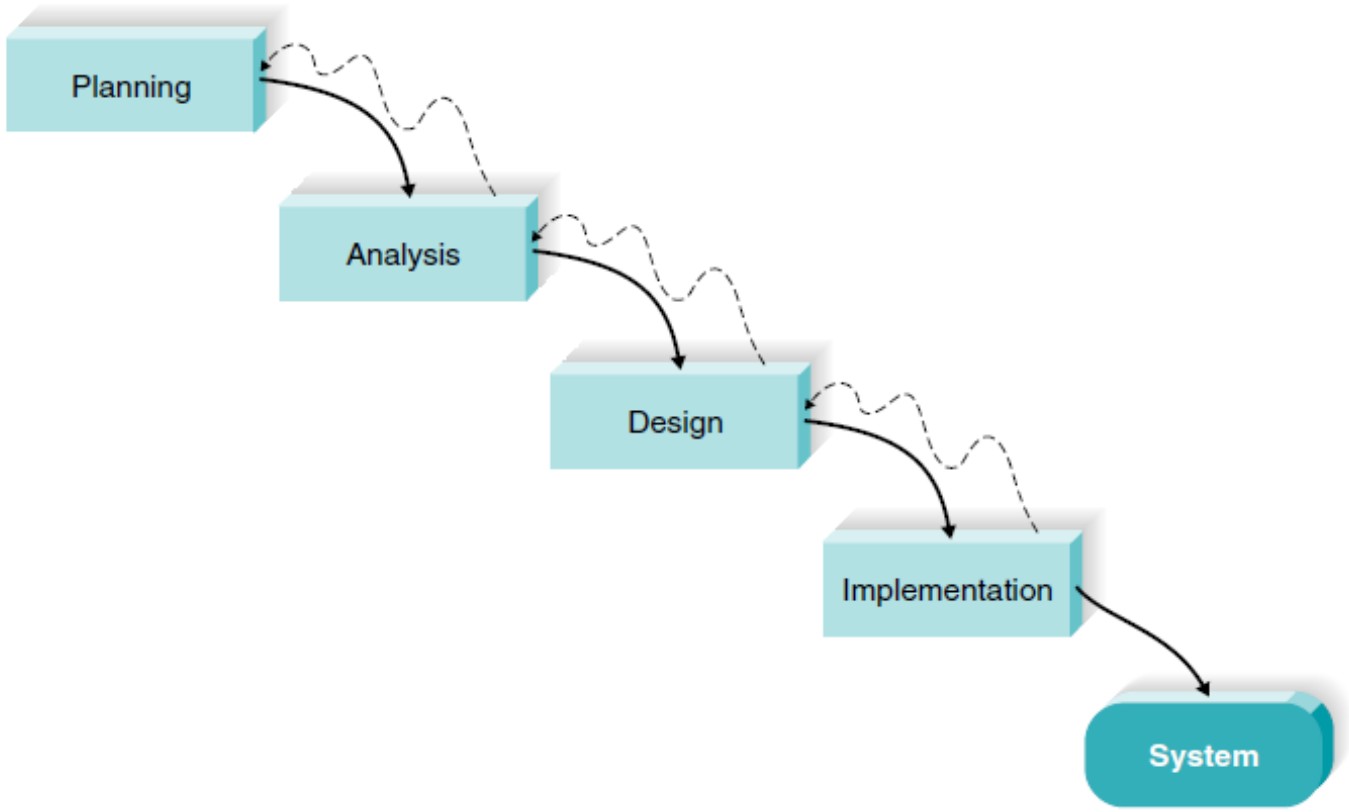
Project Methodology Options

- Before reviewing several of the predominant methodologies that have evolved over time, some project characteristics that will affect the methodology selection decision include:

  - **Clarity of User Requirements** How well do the users and analysts understand the functions and capabilities needed from the new system?
  - **Familiarity with Technology** How much experience does the project team have with the technology that will be used?
  - **System Complexity** How much complexity is anticipated in the new system? Does the new system include a wide array of features? Will the system have to integrate with many existing systems? Does it span multiple organizational units, or even multiple organizations?
  - **System Reliability** Will this system need to be highly reliable or is some downtime tolerable?
  - **Short Time Schedules** Is the project time frame tight?
  - **Schedule Visibility** Are the project sponsors, users, or organizational managers anxious to see progress?

Project Methodology Options

1) Waterfall Model: With waterfall development methodologies, the project team proceeds sequentially from one phase to the next:



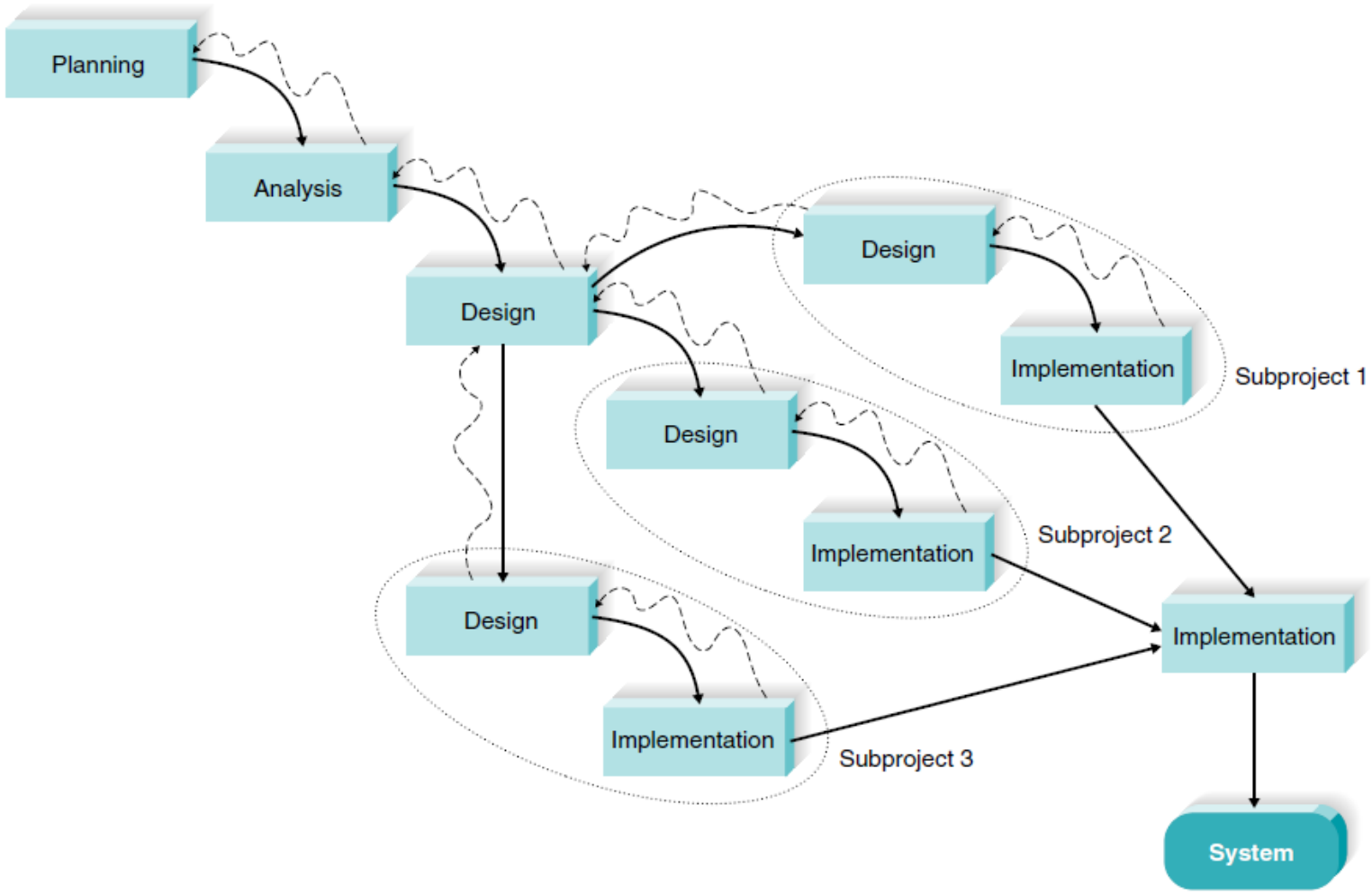
Waterfall Model: Pros and Cons

Advantages	Disadvantages
Provides a clear and structured approach to development, with distinct phases.	The design must be completely specified before programming begins
Requirements are identified long before programming begins.	A long time elapses between the completion of the system proposal in the analysis phase and the delivery of system.
Requirement changes are limited as the project progresses.	Testing may be treated almost as an afterthought in the implementation phase
Tried and tested a very long time in software development.	Once a phase is completed and the project moves to the next phase, it is costly to go back and make changes.
Emphasizes comprehensive documentation at each phase.	Relies on a predefined set of requirements and a linear progression through phases, there is a higher risk of scope creep.

Project Methodology Options

2) The Parallel Development Model: Evolved to address the lengthy time frame of waterfall development.

The project is divided into a series of subprojects that can be designed and implemented in parallel:



Parallel Dev Model: Pros and Cons

Advantages	Disadvantages
Reduces the time required to deliver a system.	If the subprojects are not completely independent, design decisions in one subproject may affect another.
Changes in the business environment are less likely to produce the need for rework	At the end of the project, integrating the subprojects may be quite challenging.
parallel development involves iterative cycles, it enables early feedback from stakeholders and end-users.	Complexity of coordination when managing parallel development.

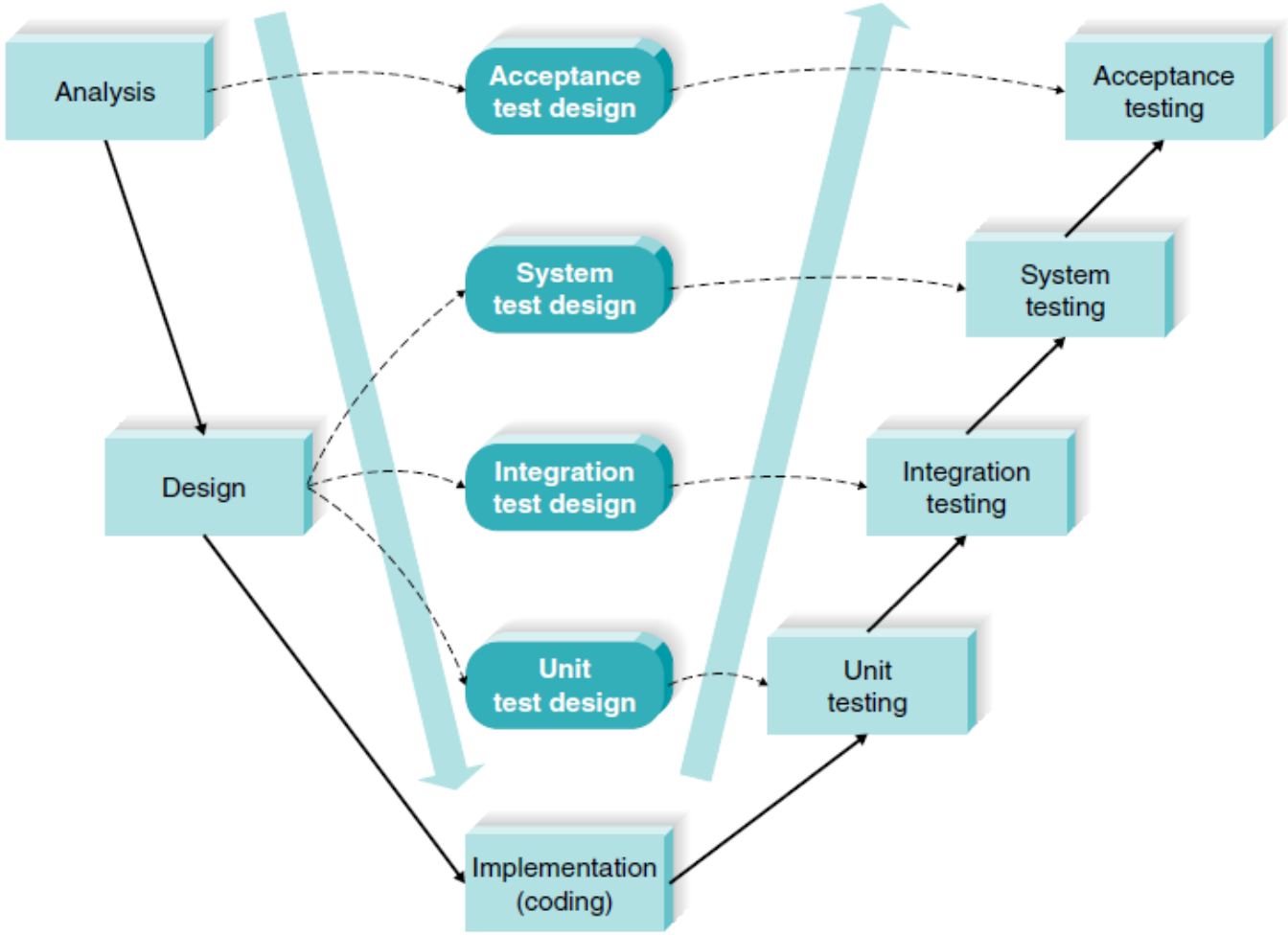
Project Methodology Options

3) The V-Model: another variation of waterfall development that pays more explicit attention to testing.

The development process proceeds down the left-hand slope of the V, defining requirements and designing system components.

At the base of the V, the code is written.

On the upward-sloping right Side of the model, testing of components, integration testing, and, finally, acceptance testing are performed.



V-Model: Pros and Cons

Advantages	Disadvantages
As requirements are specified and components designed, testing for those elements is also defined.	Still suffers from the rigidity of the waterfall development process.
Each level of testing is clearly linked to a part of the analysis or design phase, helping to ensure high quality and relevant testing and maximize test effectiveness.	It is not always appropriate for the dynamic nature of the business environment
Improves the overall quality of systems through its emphasis on early development of test plans.	Feedback from testing activities may not be available until later stages of the project.

Project Methodology Options

4) Rapid application development (RAD) is a collection of methodologies that emerged in response to the weaknesses of waterfall development and its variations.

RAD incorporates special techniques and computer tools to speed up the analysis, design, and implementation phases in order to get some portion of the system developed quickly and into the hands of the user for evaluation and feedback.

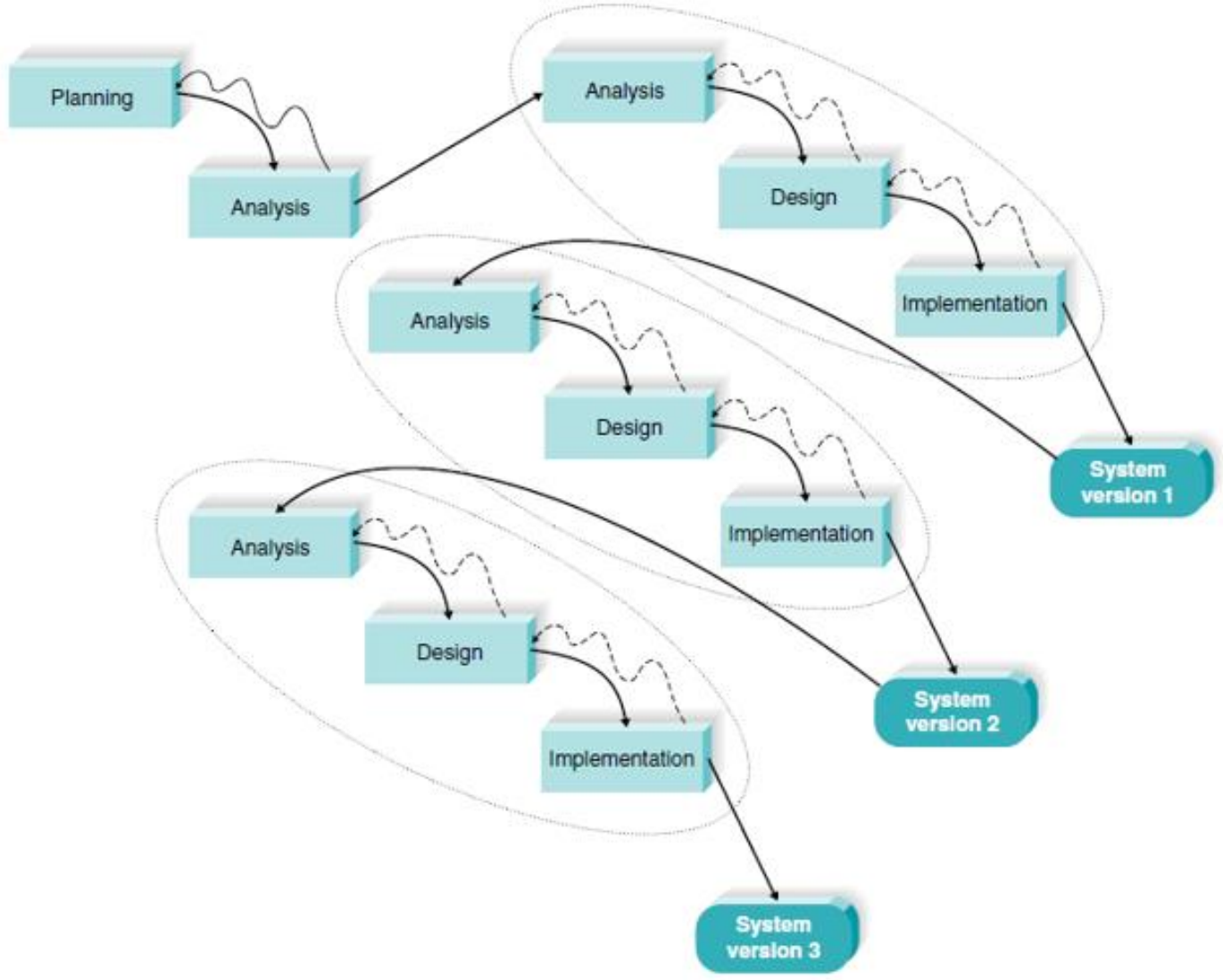
Tools that play a role in RAD include:

a) Computer-aided software engineering (CASE) tools,
b) Joint Application Development (JAD) sessions,
c) Fourth-generation/visual programming languages (e.g., Visual Basic.NET), and
d) Code generators.

While RAD can improve the speed and quality of systems development, it may also introduce a problem in managing user expectations.

Project Methodology Options

- ✓ ***RAD*** may be conducted in a variety of ways. Iterative development breaks the overall project into a series of versions that are developed sequentially.
- ✓ The most important and fundamental requirements are bundled into the first version of the system.
- ✓ This version is developed quickly by a mini-waterfall process, and once implemented, the users can provide valuable feedback to be incorporated into the next version of the system.



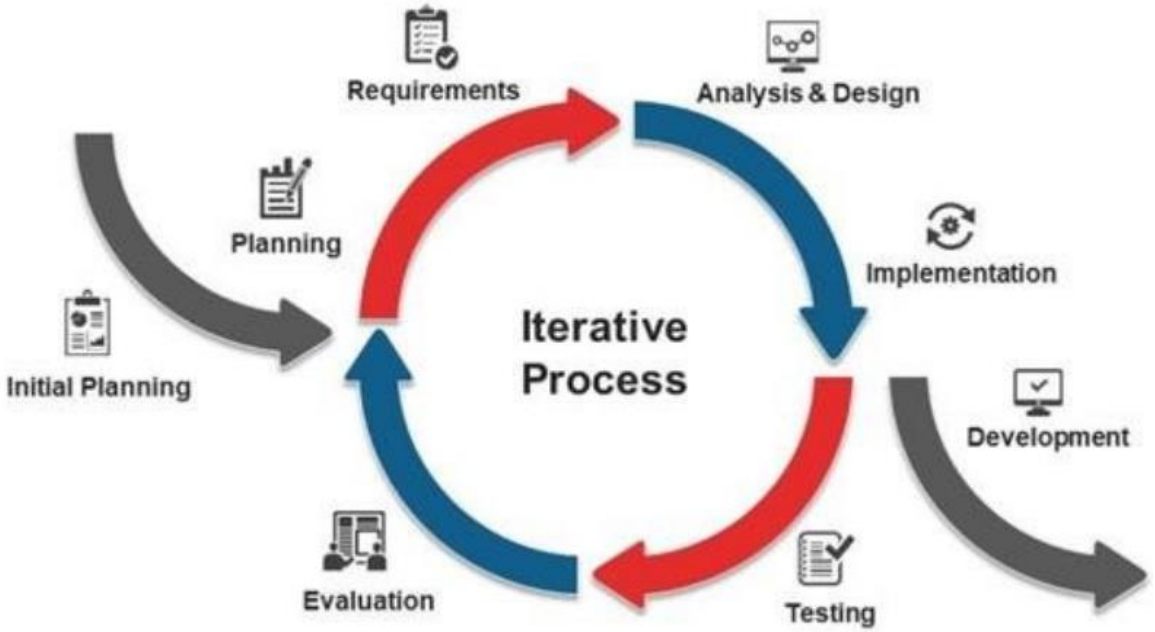
Project Methodology Options

✓ ***RAD*** types:

a) Iterative development: the development process is broken down into smaller cycles or iterations.

b) Each iteration typically follows a sequence of activities, including:

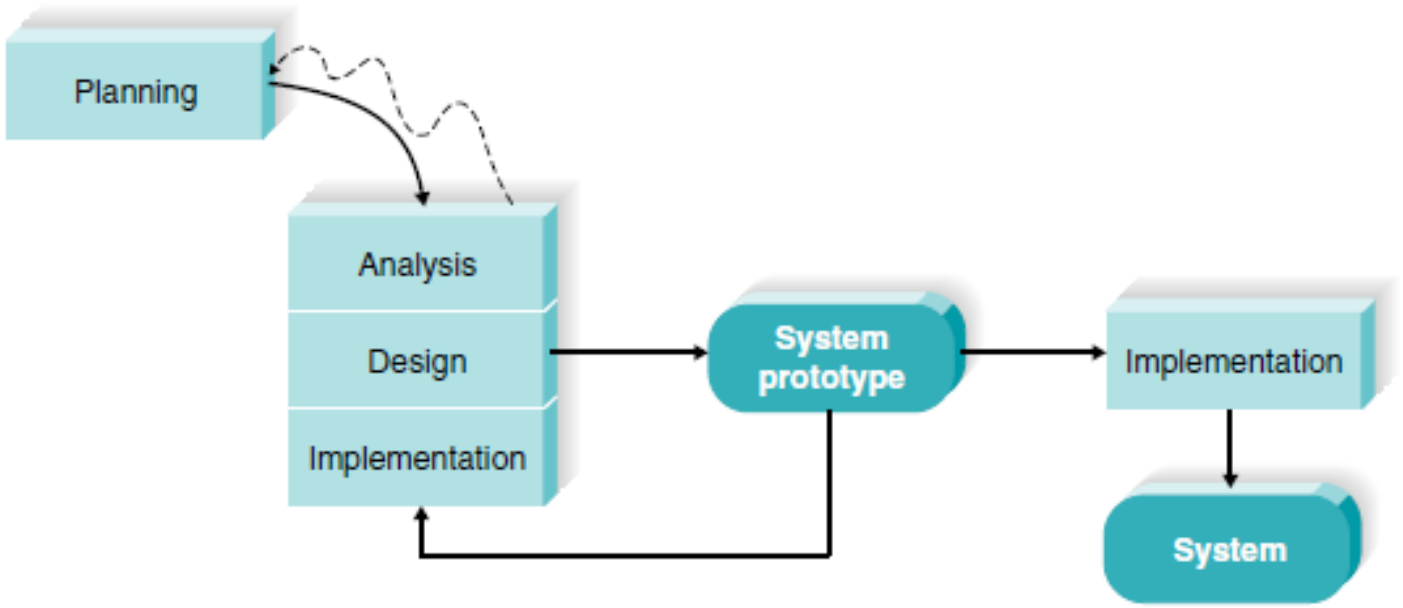
- planning,
- requirements analysis,
- design,
- implementation,
- testing, and,
- deployment



Project Methodology Options

✓ ***RAD*** types:

b) System prototyping: performs the analysis, design, and implementation phases concurrently in order to quickly develop a simplified version of the proposed system and give it to the users for evaluation and feedback.

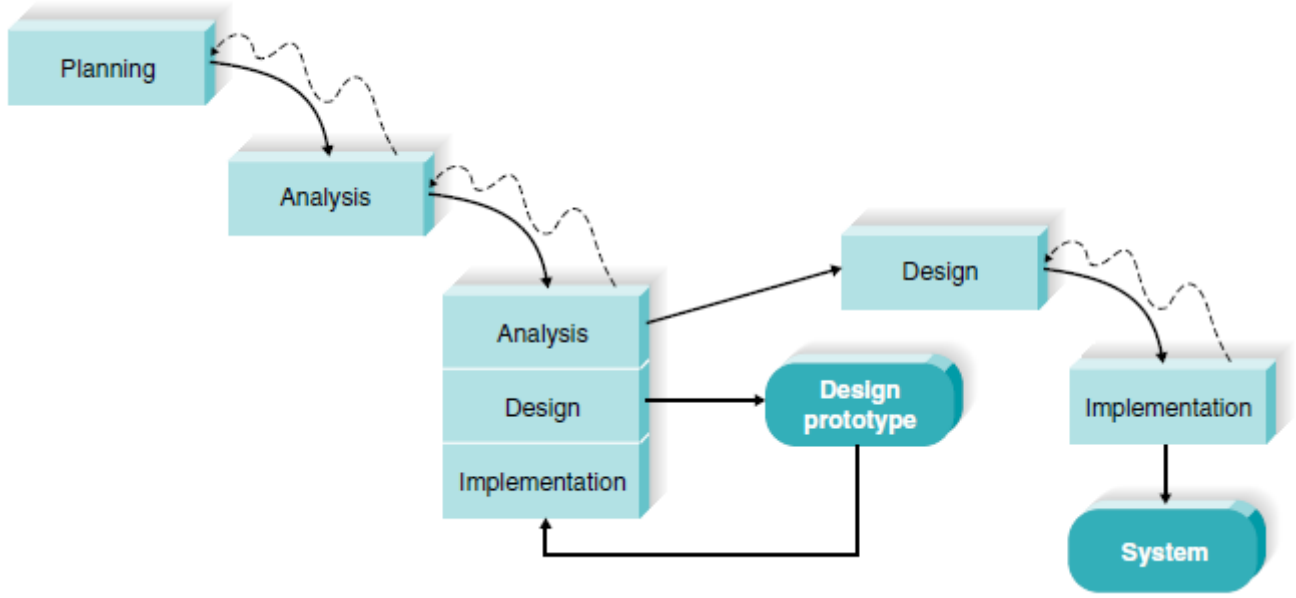


Project Methodology Options

✓ ***RAD*** types:

b) Throwaway prototyping: includes the development of prototypes, but uses the prototypes primarily to explore design alternatives rather than as the actual new system (as in system prototyping).

It has a fairly thorough analysis phase that is used to gather requirements and to develop ideas for the system concept:



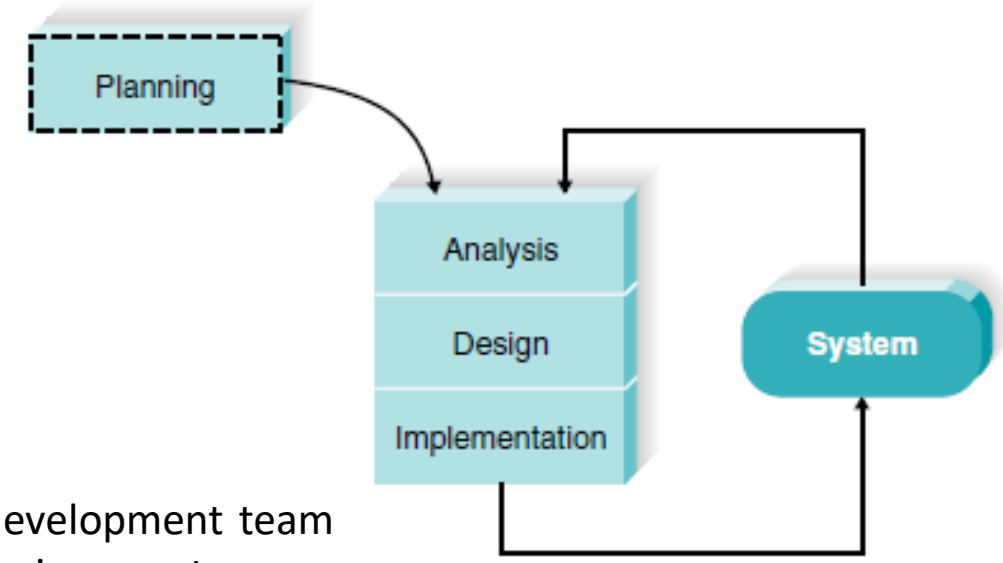
Project Methodology Options

4) The Agile Development Model: is a group of programming-centric methodologies that focus on streamlining the SDLC.

- Much of the modeling and documentation overhead is eliminated; instead, face-to-face communication is preferred.

- A project emphasizes simple, iterative application development in which every iteration is a complete software project, including:

  - ✓ planning,
  - ✓ requirements analysis,
  - ✓ design,
  - ✓ coding,
  - ✓ testing, and,
  - ✓ Documentation



- Cycles are kept short (1–4 weeks), and the development team focuses on adapting to the current business environment

The Agile Development Model

- Popular approaches to agile development include Extreme *Programming (XP)* and *Scrum*:

An *XP project* begins with user stories that describe what the system needs to do.

Then, programmers code in small, simple modules and test to meet those needs. Users are required to be available to clear up questions and issues as they arise.

XP projects deliver results sooner than even the RAD approaches, and they rarely get bogged down in gathering requirements for the system.

Scrum has some similarities with XP, including small teams, a series of iterations (called sprints), and a focus on building the system one small piece at a time.

Scrum teams obtain requirements at the start of a project or a sprint, then self-organize and form backlogs containing their planned approach to the project.

The *Scrum Master* plays an important role in guiding the team's progress through the backlogs with repeated sprints.

The most essential features are built and delivered in the first sprint; additional features are included in subsequent sprints.

Selecting the Appropriate Development Methodology

- The first challenge faced by project managers is to select which methodology to use.
- Choosing a methodology is not simple, because no one methodology is always best.

Usefulness in Developing Systems	Waterfall	Parallel	V-Model	Iterative	System Prototyping	Throwaway Prototyping	Agile Development
With unclear user requirements	Poor	Poor	Poor	Good	Excellent	Excellent	Excellent
With unfamiliar technology	Poor	Poor	Poor	Good	Poor	Excellent	Poor
That are complex	Good	Good	Good	Good	Poor	Excellent	Poor
That are reliable	Good	Good	Excellent	Good	Poor	Excellent	Good
With short time schedule	Poor	Good	Poor	Excellent	Excellent	Good	Excellent
With schedule visibility	Poor	Poor	Poor	Excellent	Excellent	Good	Good

Project Plan

Once the project is launched by being selected by the approval committee, it is time to carefully plan the project.

The project manager will follow a set of project management guidelines, called the Project Management Life Cycle (PMLC)

This helps to organize, guide, and direct the project from inception to completion.

PMLC phases consist of:

Creating a Work Plan

- Once a project manager has a general idea of the *size* and approximate *schedule* for the project, he or she creates a *workplan.*
- A workplan is a dynamic schedule that records and keeps track of all of the tasks that need to be accomplished over the course of the project.
- The workplan lists each task, along with important information about it, such as when it needs to be completed, the person assigned to do the work, and any deliverables that will result.

			Estimated		
Task ID	Task Name	Assigned To	Duration (days)	Start Date	Finish Date
1	Design Phase		31	Mon 1/6/20	Mon 2/17/20
1.1	Develop database design document	Megan	9	Mon 1/6/20	Thurs 1/16/20
1.1.1	Staging database design	Megan	9	Mon 1/6/20	Thurs 1/16/20
1.1.2	Suspense database design	Megan	9	Mon 1/6/20	Thurs 1/16/20
1.2	Develop rejects-handling design document	Megan	9	Fri 1/17/20	Wed 1/29/20
1.2.1	Rejects-handling engine design	Megan	9	Fri 1/17/20	Wed 1/29/20
1.3	Develop OLAP design document	Joachim	9	Fri 1/17/20	Wed 1/29/20
1.3.1	Universe design	Joachim	9	Fri 1/17/20	Wed 1/29/20
1.4	Develop OLAP design part 1	Kevin	8	Fri 1/10/20	Tues 1/21/20
1.4.1	High-priority reports design	Kevin	8	Fri 1/10/20	Tues 1/21/20
1.5	Develop application design document	Tomas	9	Fri 1/17/20	Wed 1/29/20
1.5.1	Group consolidation and corporate reporting (GCCR) maintenance application design	Tomas	9	Fri 1/17/20	Wed 1/29/20
1.6	Extract, transform, load (ETL) design document	Joachim	2	Thu 1/30/20	Fri 1/31/20
1.6.1	Data export utility design	Joachim	2	Thu 1/30/20	Fri 1/31/20
1.7	Application design document	Mei-ling	27	Mon 1/6/20	Tue 2/11/20
1.7.1	Web entry application UI design	Mei-ling	26	Mon 1/6/20	Wed 2/10/20
1.7.2	Web entry application UI design sign-off	Mei-ling	1	Tue 2/11/20	Tue 2/11/20
1.7.3	Web entry forms and database model validation	Kevin	11	Wed 1/15/20	Wed 1/29/20
1.8	Functional requirements document	Chantelle	9	Mon 1/20/20	Thu 1/30/20

Staffing the Project

- Staffing the project includes determining how many people should be assigned to the project, matching people's skills with the needs of the project, motivating them to meet the project's objectives, and minimizing project team conflict that will occur over time.

- The deliverable for this part of project management is a staffing plan, which describes the number and kinds of people who will work on the project, the overall reporting structure, and the project charter, which describes the project's objectives and rules.

- Staffing Plan involves:

    a) Determining the average number of staff needed for the project
    b) Creating a staffing plan that lists the roles that are required for the project and the proposed reporting structure for the project.
    c) Assigning people to roles depending on their skills, either technical skills or interpersonal skills
    d) Outsourcing skills in they are not in-house
    e) Facilitating training classes for both technical and interpersonal skills

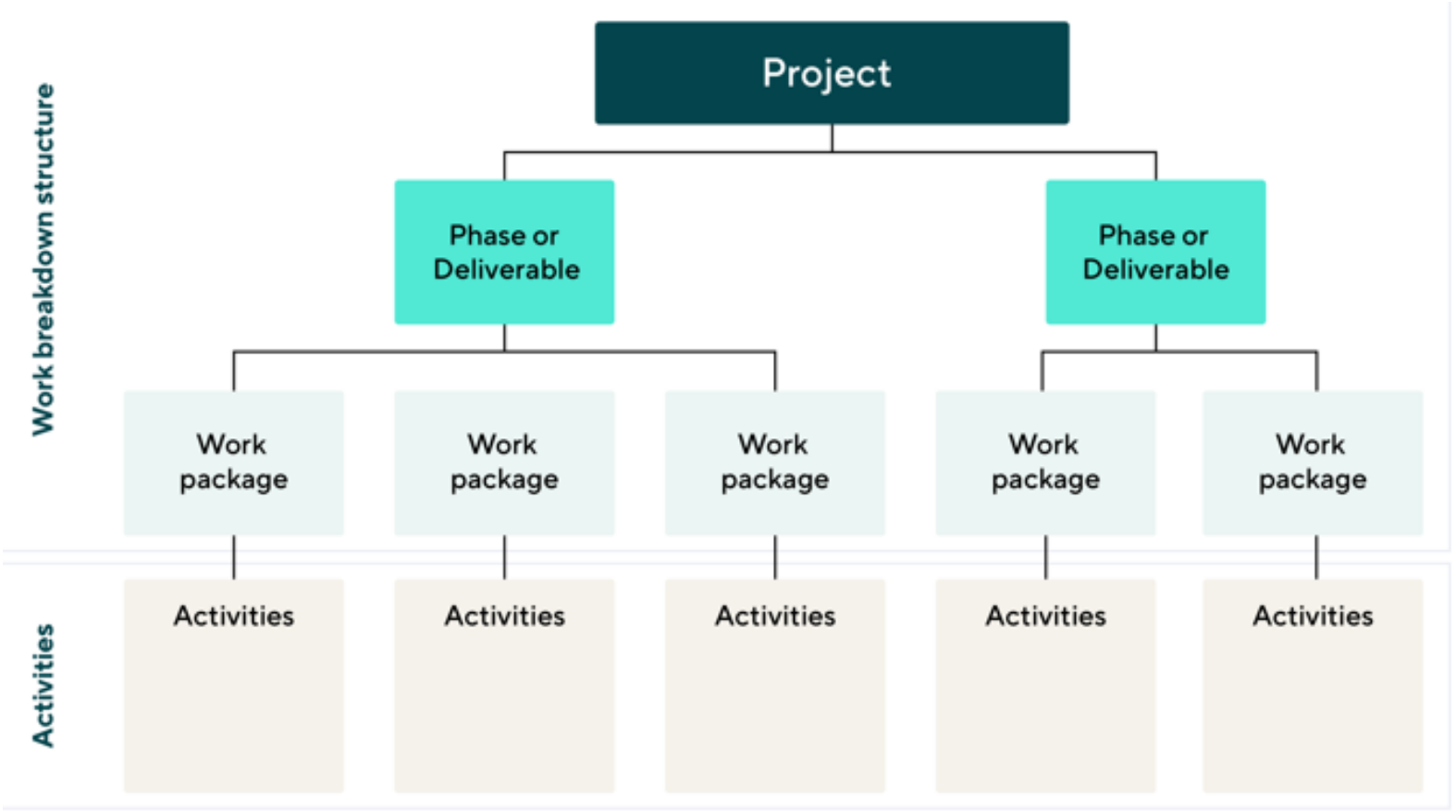
Coordinating Project Activities

- Like all project management responsibilities, the act of coordinating project activities continues throughout the entire project until a system is delivered to the project sponsor and end users.
- This can be done through the usage of Computer-Aided Software Engineering (CASE) tools.
- CASE is a category of software that automates all or part of the development process.
- Some CASE software packages are primarily used during the analysis phase to create integrated diagrams of the system and to store information regarding the system components (often called **upper CASE**)
- Others are design-phase tools that create the diagrams and then generate code for database tables and system functionality (often called **lower CASE**).
- Case tools help use create three important diagrams for a project:

    a) *Work Breakdown Structure*
    b) *PERT*
    c) *Gannt Chart*

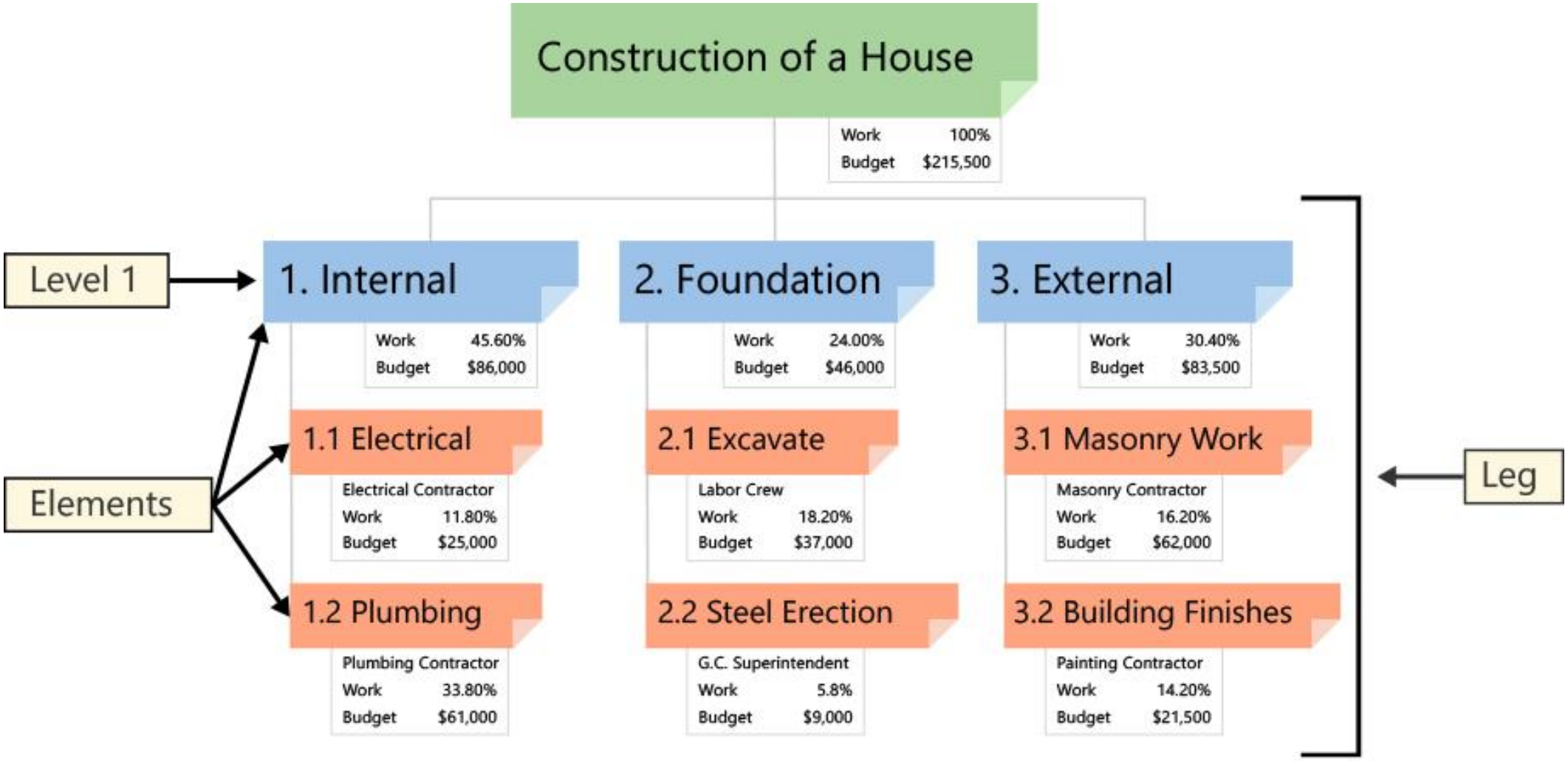
Work Breakdown Structure

Definition: WBS is a deliverable-oriented hierarchical decomposition of the work to be executed by the project team, to accomplish project objectives and create the required deliverables.



Work Breakdown Structure

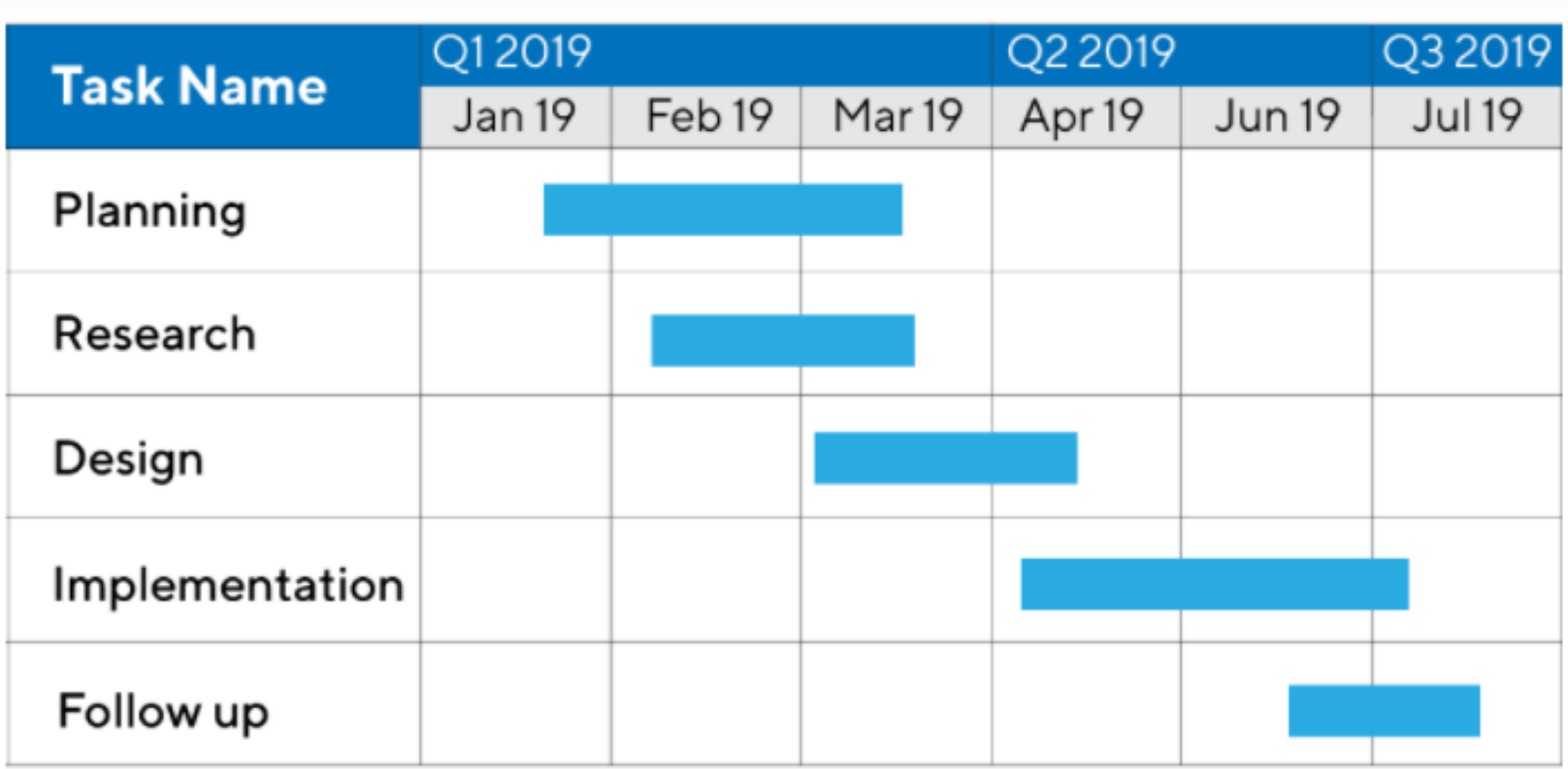
Example:



The Gantt chart

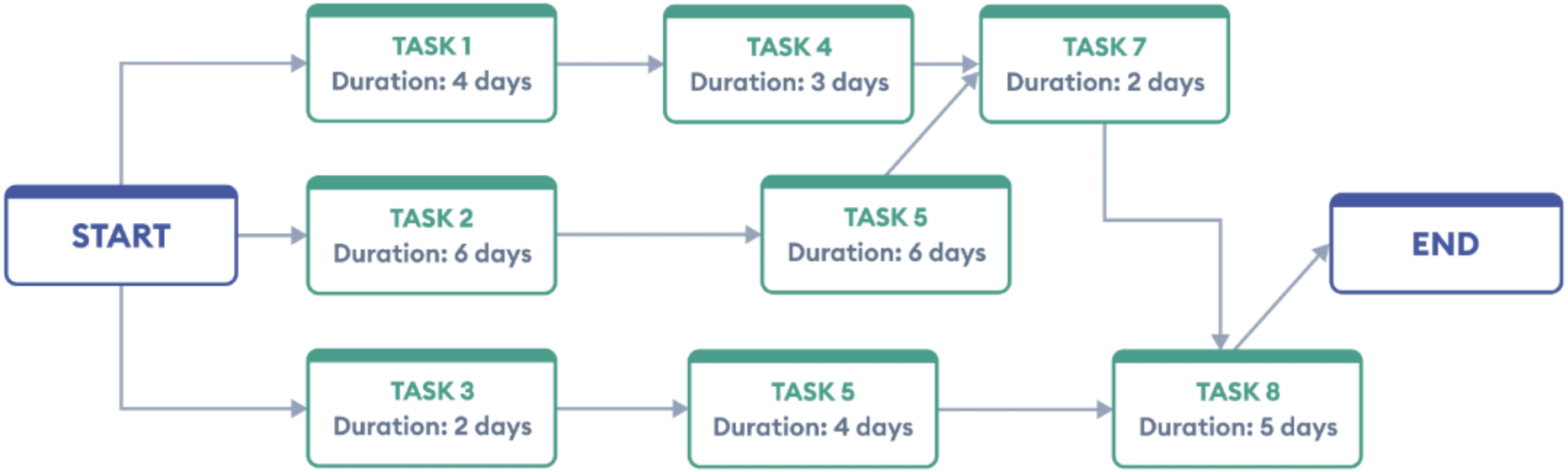
It is a horizontal *bar chart*, that shows the same task information as the *project workplan*, but in a *graphical* way.

The Gantt chart can communicate the high-level *status* of a project much faster and easier than the workplan.



The PERT chart

- PERT*, which stands* for *Program Evaluation and Review Technique,* is a network analysis technique that can be used when the individual task time estimates are fairly uncertain.
- The PERT chart lays out the project tasks in a flowchart or network diagram that uses boxes or circles, lines, and arrows to put a project into perspective.
- It helps project managers organize, schedule, and coordinate project tasks.



Questions…

1. Describe how projects are selected in organizations.
2. Some companies hire consulting firms to develop the initial project plans and manage the project, but use their own analysts and programmers to develop the system. Why do you think some companies do this?
3. Describe three technical skills and three interpersonal skills that would be very important to have on any project.
4. Compare and contrast the Gantt chart and the PERT chart.
5. Contrast agile methodologies vs waterfall methodologies during project selection

Thank You!

THE END

info@belgiumcampus.ac.za +27 10 593 53 68

/belgiumcampusSA

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