



Why the SW Development is Difficult?

- Users **do not know** their requirements
- Users requirements are **changed**
- How to put **right man in the right jobs**
- Team work **communication**
- The change **of technologies**

Why Project Management is Important?

Writing Process

- Define the project definition and details
- Cost
- Risk management
- Planning
- Team communication

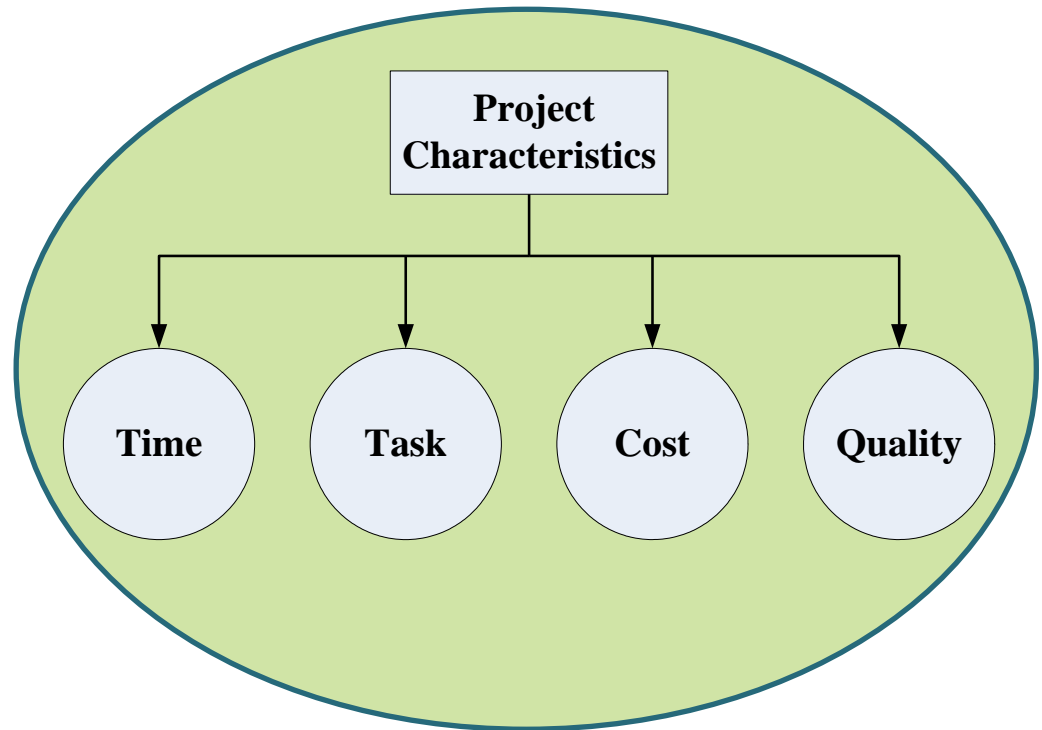
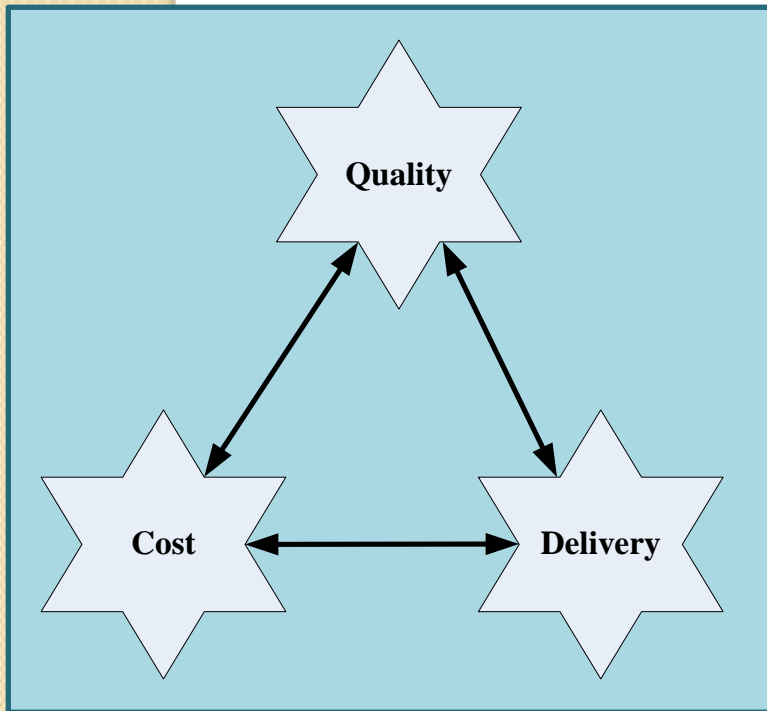
Management Process

- Understand the progress and cost
- Understand the problems and Analyze the solution
- Know how to follow time line

Project management is how to apply the knowledge, skills, tools, and techniques to process the activities that follow the project requirements.

How to Write Software Projects

Control these following 3 things; Important projects Characteristics;



Writing Projects

Consideration Items	Details
1. Project	Scope Schedule Quality Risk
2. Developers	Organization Training Communication
3. Demand, Supply	Supplier Delivery Quality Price
4. Cost	Salary Equipment Management cost
5. Tool	Hardware Software

Management Activities

- Proposal writing
- Project planning and scheduling
- Project costing
- Project monitoring and reviews
- Personnel selection and evaluation
- Report writing and presentations

Project Staffing

- May not be possible to appoint the ideal people to **work on a project**
 - Project budget may not allow for the use of highly-paid staff
 - Staff with the **appropriate experience** may not be available
 - An organisation may wish to **develop employee skills on a software project**
- Managers have to work within these constraints especially when (as is currently the case) there is an international shortage of skilled IT staff

Project Planning

- Probably the most **time-consuming** project management **activity**
- Continuous activity from initial concept through to system delivery. **Plans must be regularly revised as new information becomes available**
- Various different types of plan may be developed to support the main software project plan that **is concerned with schedule and budget**

Types of Project Plan

Plan	Description
Quality plan	Describes the quality procedures and standards that will be used in a project.
Validation plan	Describes the approach, resources and schedule used for system validation.
Configuration management plan	Describes the configuration management procedures and structures to be used.
Maintenance plan	Predicts the maintenance requirements of the system, maintenance costs and effort required.
Staff development plan.	Describes how the skills and experience of the project team members will be developed.

Project Planning Process

Establish the project constraints

Make initial assessments of the project parameters

Define project milestones and deliverables

while project has not been completed or cancelled **loop**

 Draw up project schedule

 Initiate activities according to schedule

 Wait (for a while)

 Review project progress

 Revise estimates of project parameters

 Update the project schedule

 Re-negotiate project constraints and deliverables

if (problems arise) **then**

 Initiate technical review and possible revision

end if

end loop

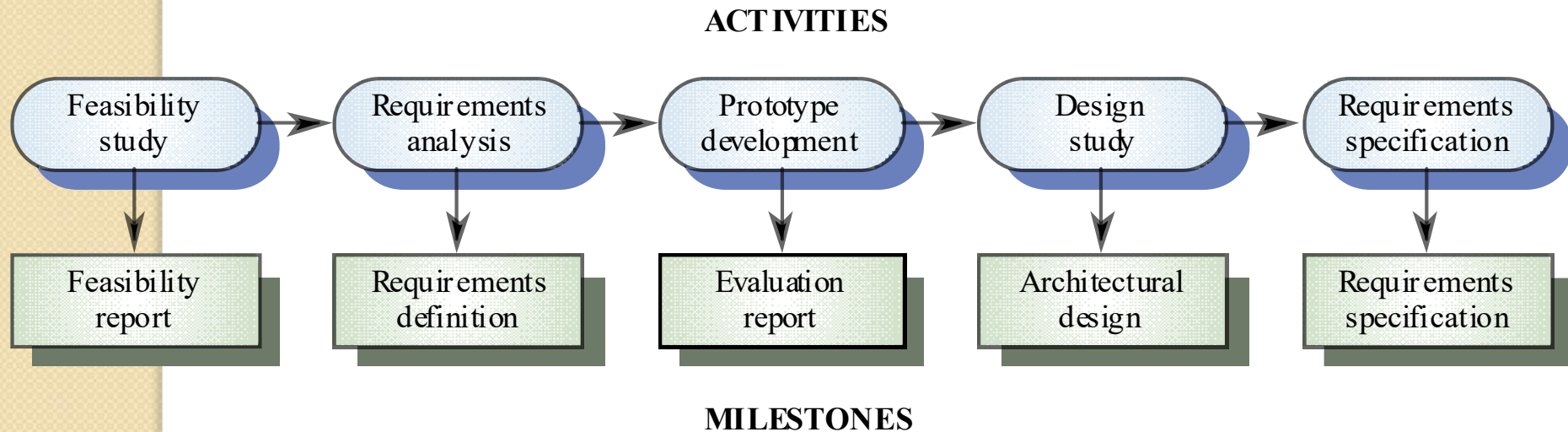
Project Plan Structure

- Introduction
- Project organisation
- Risk analysis
- Hardware and software resource requirements
- Work breakdown
- Project schedule
- Monitoring and reporting mechanisms

Activity Organization

- Activities in a project should be organised to produce tangible outputs for management to judge progress
- *Milestones* are the end-point of a process activity
- *Deliverables* are project results delivered to customers
- The waterfall process allows for the straightforward definition of progress milestones

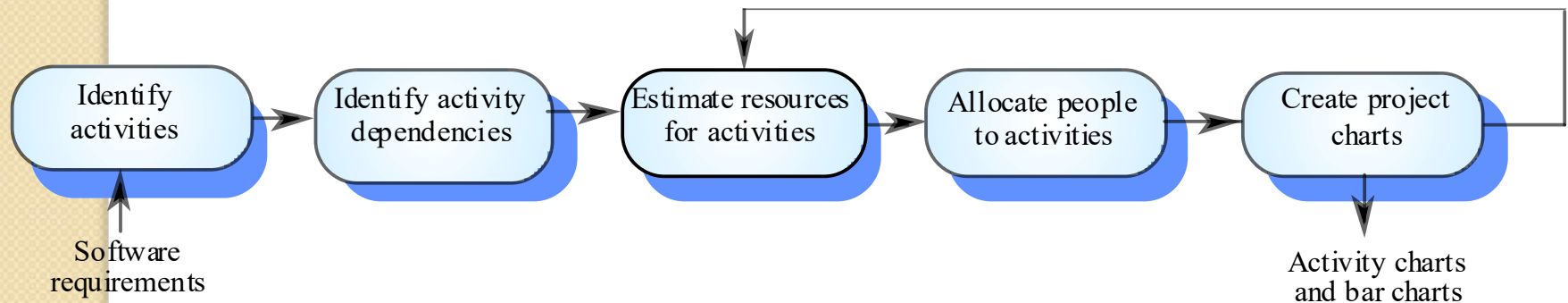
Milestones in the RE Process



Project scheduling

- Split project into tasks and estimate time and resources required to complete each task
- Organize tasks concurrently to make optimal use of workforce
- Minimize task dependencies to avoid delays caused by one task waiting for another to complete
- Dependent on project managers intuition and experience

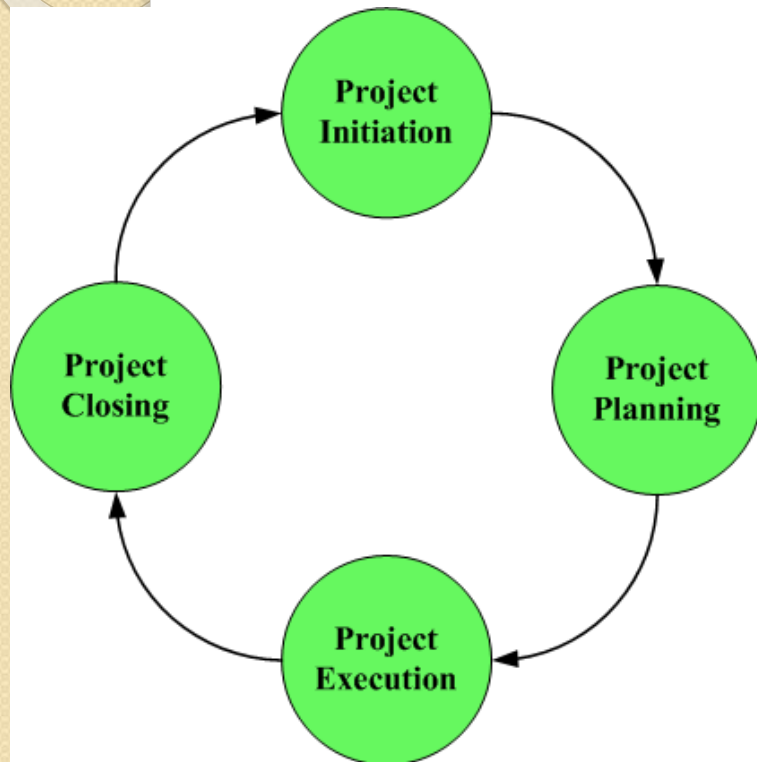
The project scheduling process



Scheduling Problems

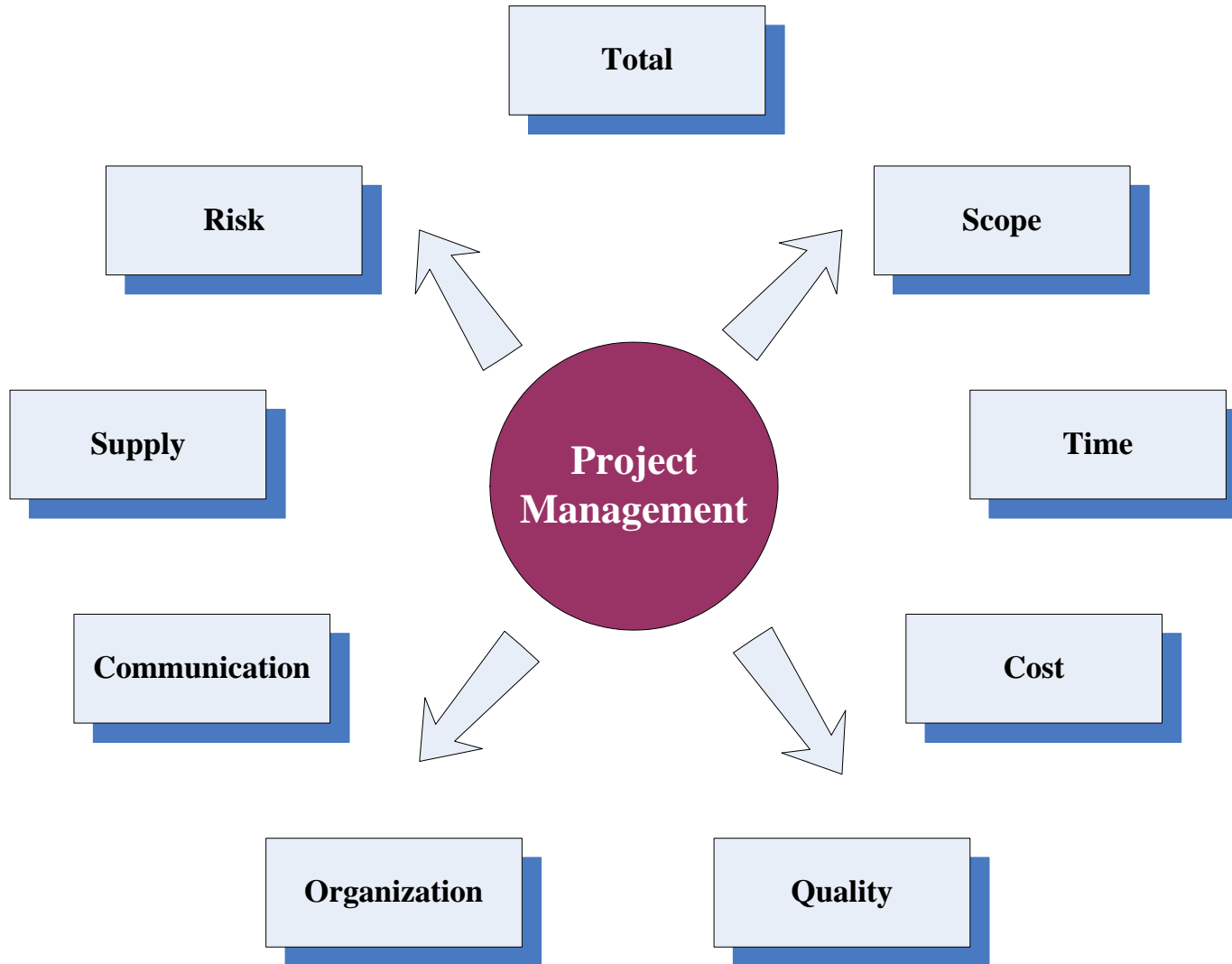
- Estimating the difficulty of problems and hence the cost of developing a solution is hard
- Productivity is not proportional to the number of people working on a task
- Adding people to a late project makes it later because of communication overheads
- The unexpected always happens. Always allow contingency in planning

Project Life Cycle



- **Project Initiation** : Determine scope, size, tasks in each process
- **Project Planning** : Project directors determine activities or tasks in each process of SW production, cost, time, risk, etc.
- **Project Execution** : Project teams execute the SW project development from the schedule and record the progress. The directors control team works to follow the project schedule.
- **Project Closing** : It will be done in maintenance process with 2 types of **succeed or fail**.

Project Management



Management Functions

Enable team project to work towards a common goal.

Planning

- Decide the objectives, resources and goals.
- Determine the flow of information, people, products.

Organizing

- Clear lines of authority and responsibility for groups of activities that achieve the goals of the enterprise.
- Best structure devised only when the goals are clear and good planning.

Management Functions (2)

Staffing

- Hiring personal for positions followed by organization structure involving with recruiting, compensating, developing and promoting.

Directing

- Guide the subordinates to understand and identify with organization structure and with goals.
- Including the best training for the beginning engineers.

Management Functions (3)

Controlling

- Measuring and correcting activities to ensure that goals are achieved.
- Requires the measurement of performance against plans and corrective action.

Software Pricing

- ❖ Estimates are made to discover the cost, to the developer, of producing a software system.
 - ❖ You take into account, hardware, software, travel, training and effort costs.
- ❖ There is not a simple relationship between the development cost and the price charged to the customer.
- ❖ Broader organisational, economic, political and business considerations influence the price charged.

Factors Affecting Software Pricing

Factor	Description
Market opportunity	A development organization may quote a low price because it wishes to move into a new segment of the software market. Accepting a low profit on one project may give the organization the opportunity to make a greater profit later. The experience gained may also help it develop new products.
Cost estimate uncertainty	If an organization is unsure of its cost estimate, it may increase its price by a contingency over and above its normal profit.
Contractual terms	A customer may be willing to allow the developer to retain ownership of the source code and reuse it in other projects. The price charged may then be less than if the software source code is handed over to the customer.

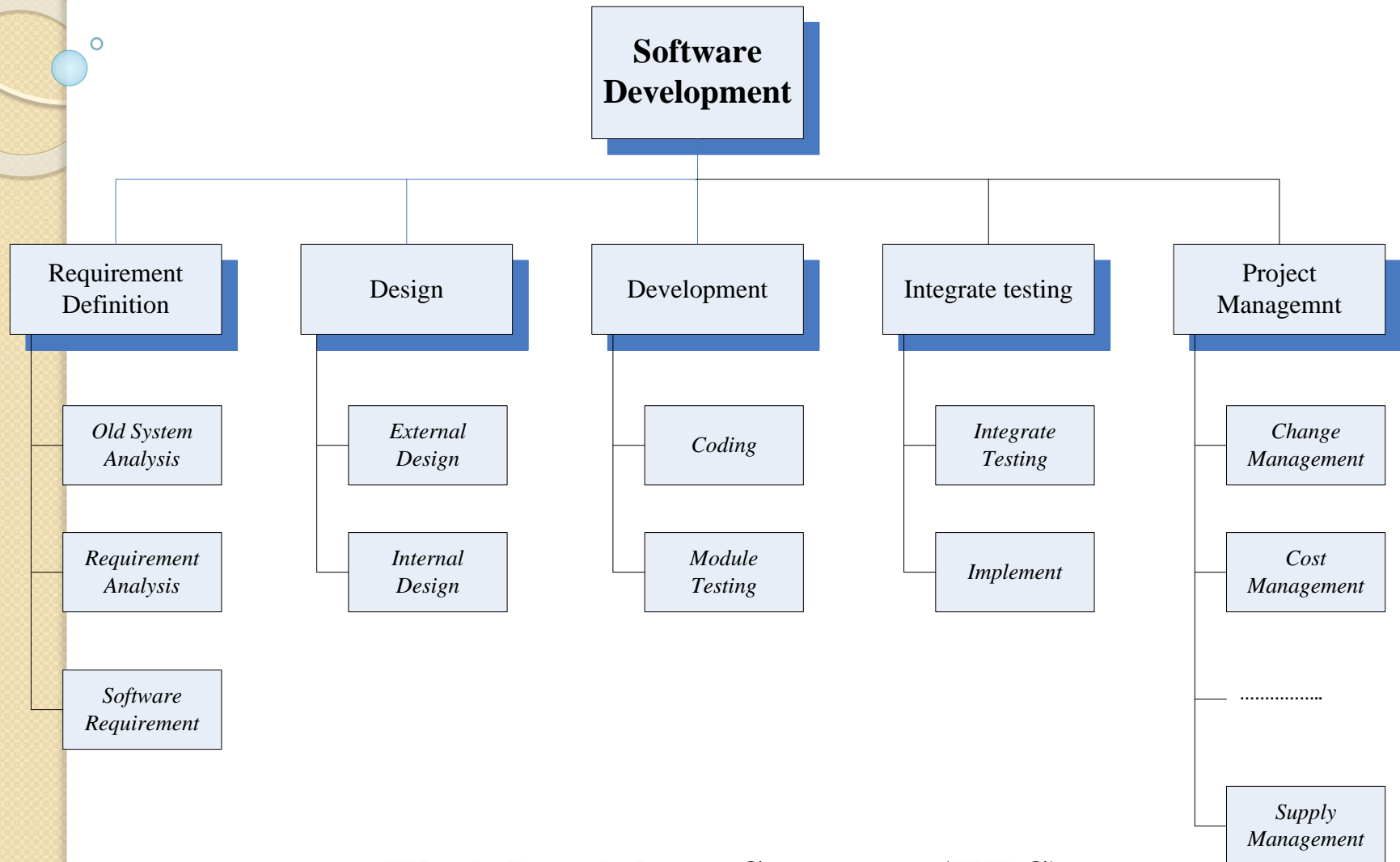
Factors Affecting Software Pricing (2)

Factor	Description
Requirements volatility	If the requirements are likely to change , an organization may lower its price to win a contract. After the contract is awarded, high prices can be charged for changes to the requirements.
Financial health	Developers in financial difficulty may lower their price to gain a contract . It is better to make a smaller than normal profit or break even than to go out of business. Cash flow is more important than profit in difficult economic times.

Project Control

- Work Breakdown Structures
- Gantt Charts
- PERT and CPM

Work Breakdown Structure



Work Breakdown Structure (WBS)

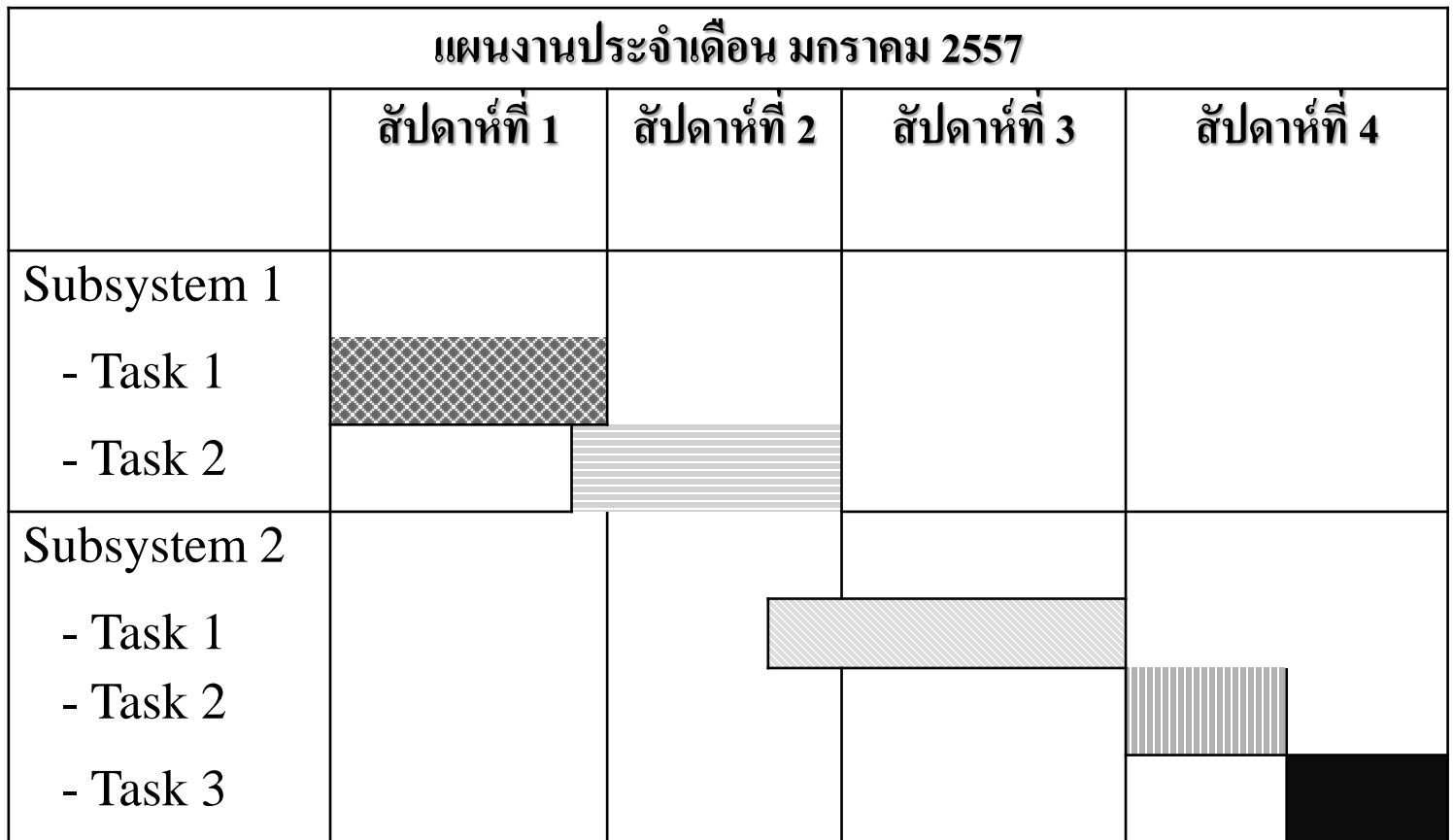
Gantt Chart

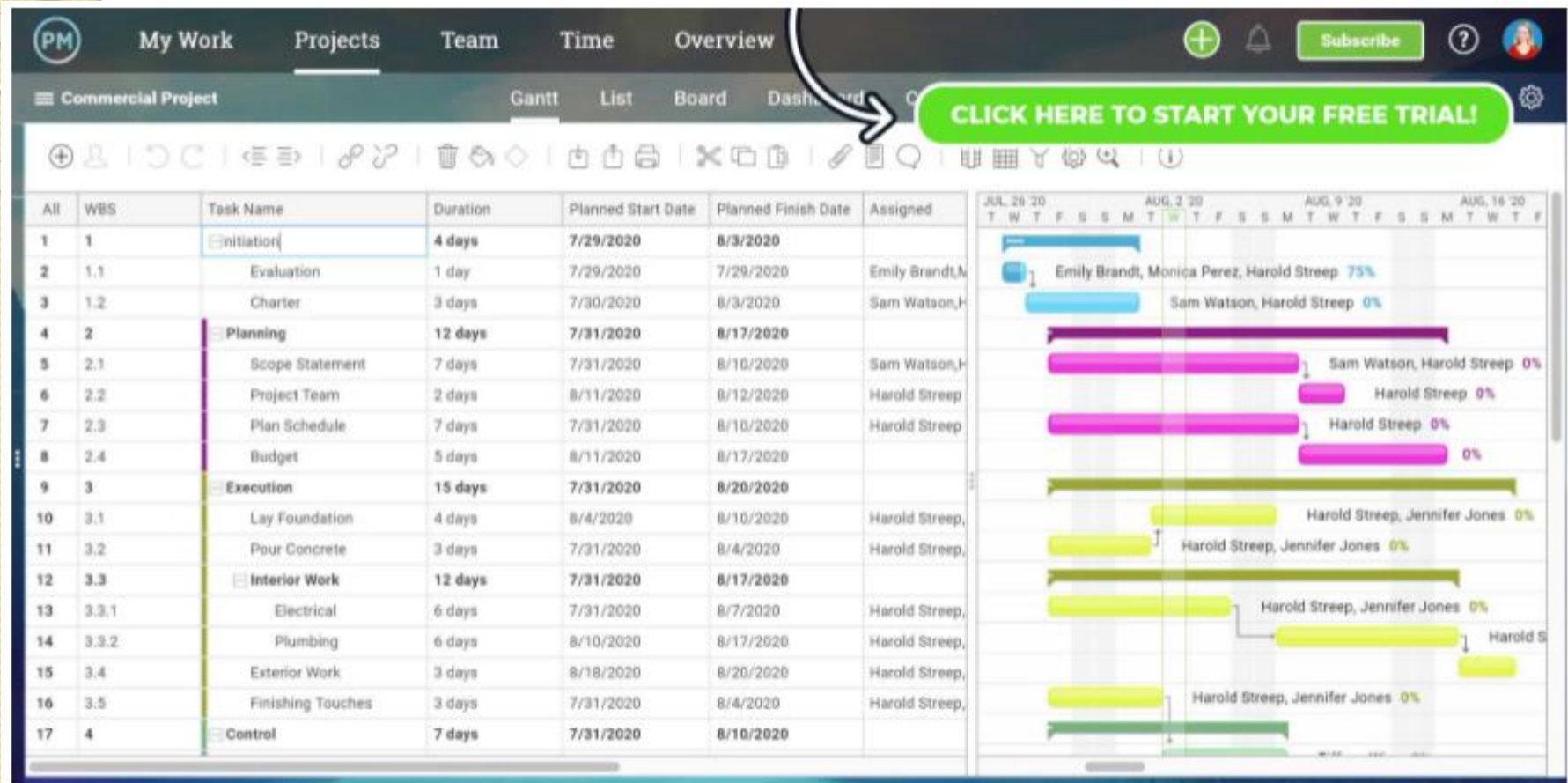
- Developed by Henry L. Gantt in 1917 for Project Scheduling.
- Clearly to see that when the tasks will be started and ended.
- Can not show the relationship between tasks clearly.
- Can not tell the effect if the tasks delay.
- It is not suitable with the big SW project which has many of subsystems or complex process.

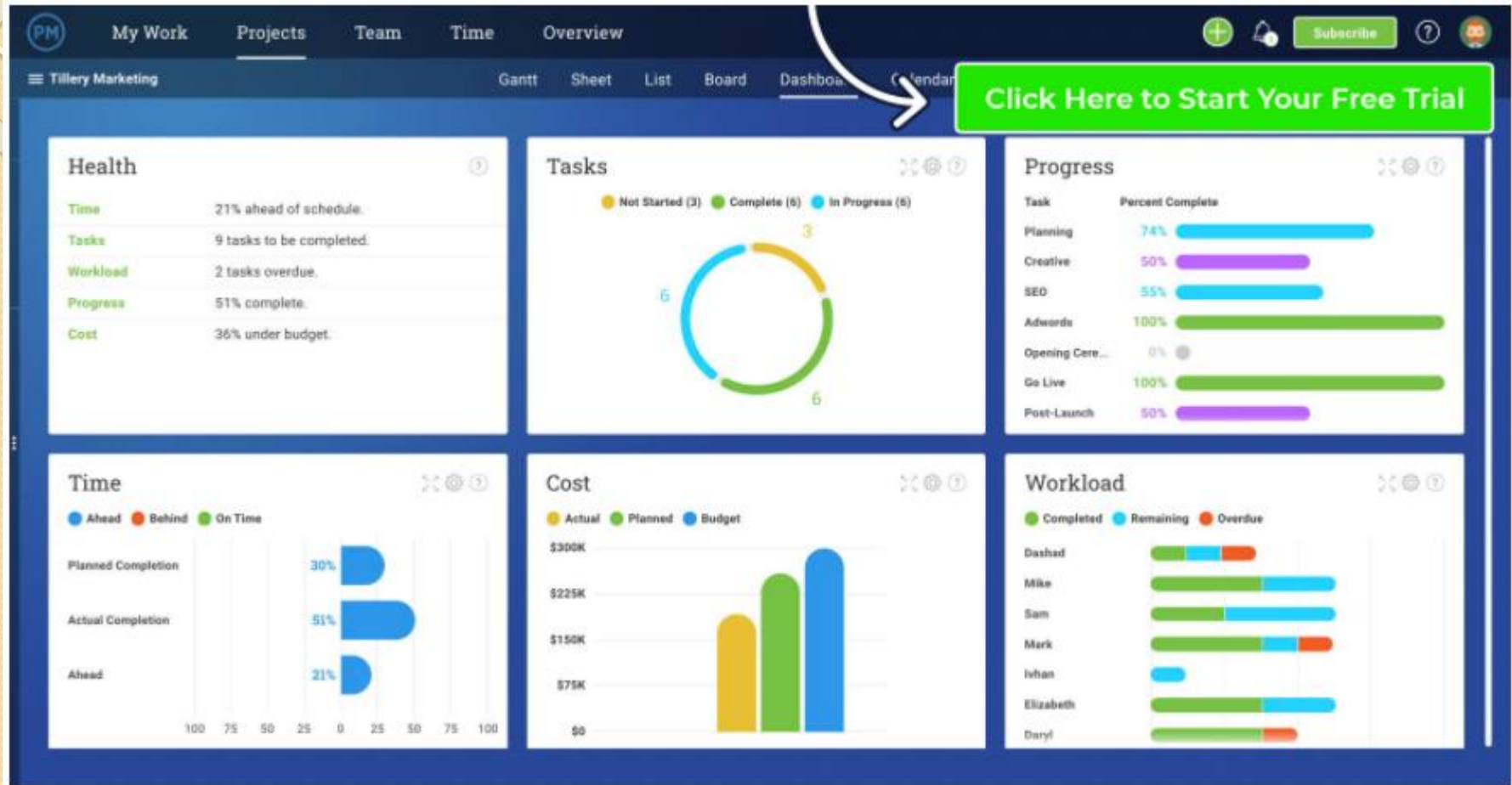
Gantt Chart (2)

งาน	งานที่ต้องเสร็จก่อน	เวลา(สัปดาห์)
A	-	3
B	-	5
C	B	3
D	A, C	4
E	D	8
F	C	2
G	F	4
H	F	2
I	B	5
J	E, G, H	3

Gantt Chart (3)

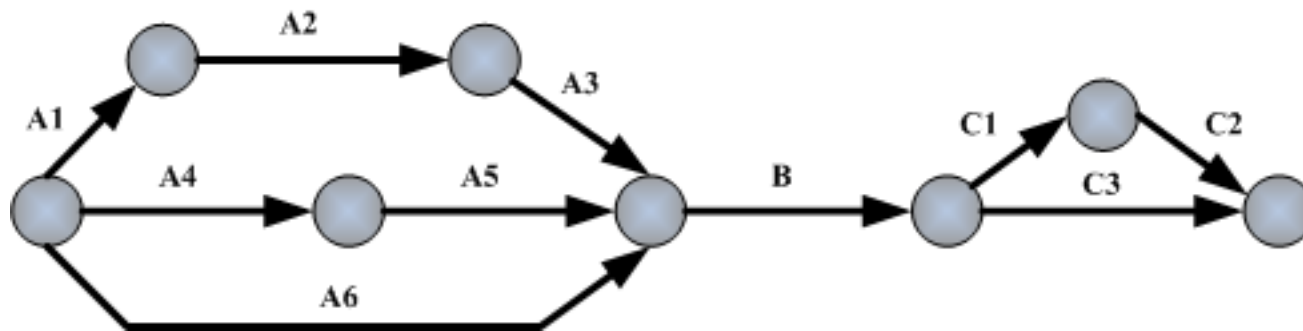






PERT and CPM

- PERT (Program Evaluation and Review Technique)
 - Focus on development time
 - Suitable for big SW projects



Use arrow for task => Activity On Arrow (AOA)

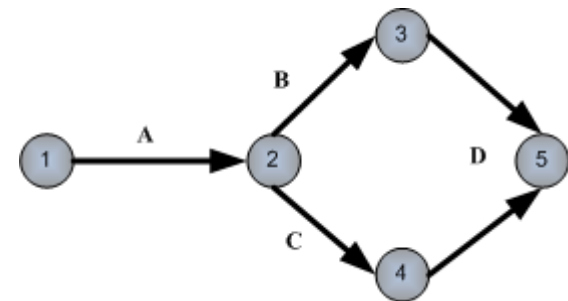
- CPM (Critical Path Method)
 - Focus on development cost

PERT and CPM (2)

- PERT uses Network to indicate the tasks in the project, tasks scheduling and activities or tasks relationship with the following objectives;
 1. **Project Planning** : Calculate time should spend on processing in the tasks. When to start or end the tasks. Which tasks are important or critical.
 2. **Project Control** : Control the tasks as in the scheduling.
 3. **Resource** : Cost, Teamwork, Tools, etc.
 4. **Project Management** : Which task should reduce the development time?

PERT and CPM (3)

งาน	งานที่ต้องเสร็จก่อน
A	-
B	A
C	A
D	B, C



งาน	งานที่ต้องเสร็จก่อน
A	-
B	-
C	A
D	B
E	C, D

