

Project Planning

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Project planning

- Project planning involves breaking down the entire work into parts and assign these to project team members, anticipate problems (risks) that might arise and prepare tentative solutions to those problems.
- The project plan, which is created at the start of a project, is used to communicate how the work will be done to the project team and customers, and to help assess progress on the project.

Planning stages

- The proposal stage, where a contract is bidden to develop or provide a software system.
- During the project startup phase, a plan needs to be made, e.g., who will work on the project, how the project will be broken down into increments, how resources will be allocated across an organization, etc.
- Periodically throughout the project, the plan will be revised in the light of experience gained and information from monitoring the progress of the work.

Proposal planning

- Planning may be necessary with only outline software requirements.
- The aim of planning at this stage is to provide information that will be used in setting a price for the system to customers.

Software pricing

- Estimates are made to discover the cost of producing a software system.
 - Hardware, software, travel, training and effort costs.
- There is no simple relationship between the development cost and the price charged to the customer.
- Broader organizational, 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

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.

Plan-driven development

- Plan-driven or plan-based development is an approach to software engineering where the development process is planned in detail.
 - Plan-driven development is based on engineering project management techniques and is the 'traditional' way of managing large software development projects.
- A project plan is created that records the work to be done, who will do it, the development schedule and the work products.
- Managers use the plan to support project decision making and as a way of measuring progress.

Plan-driven development – pros and cons

- Pro: early planning allows organizational issues (availability of staff, other projects, etc.) to be closely taken into account, and that potential problems and dependencies are discovered before the project starts, rather than once the project is underway.
- Con: many early decisions have to be revised because of changes to the environment in which the software is to be developed and used.

Project plans

- In a plan-driven development project, a project plan sets out the resources available to the project, the work breakdown and a schedule for carrying out the work.
- Plan sections
 - Introduction
 - Project organization
 - Risk analysis
 - Hardware and software resource requirements
 - Work breakdown
 - Project schedule
 - Monitoring and reporting mechanisms

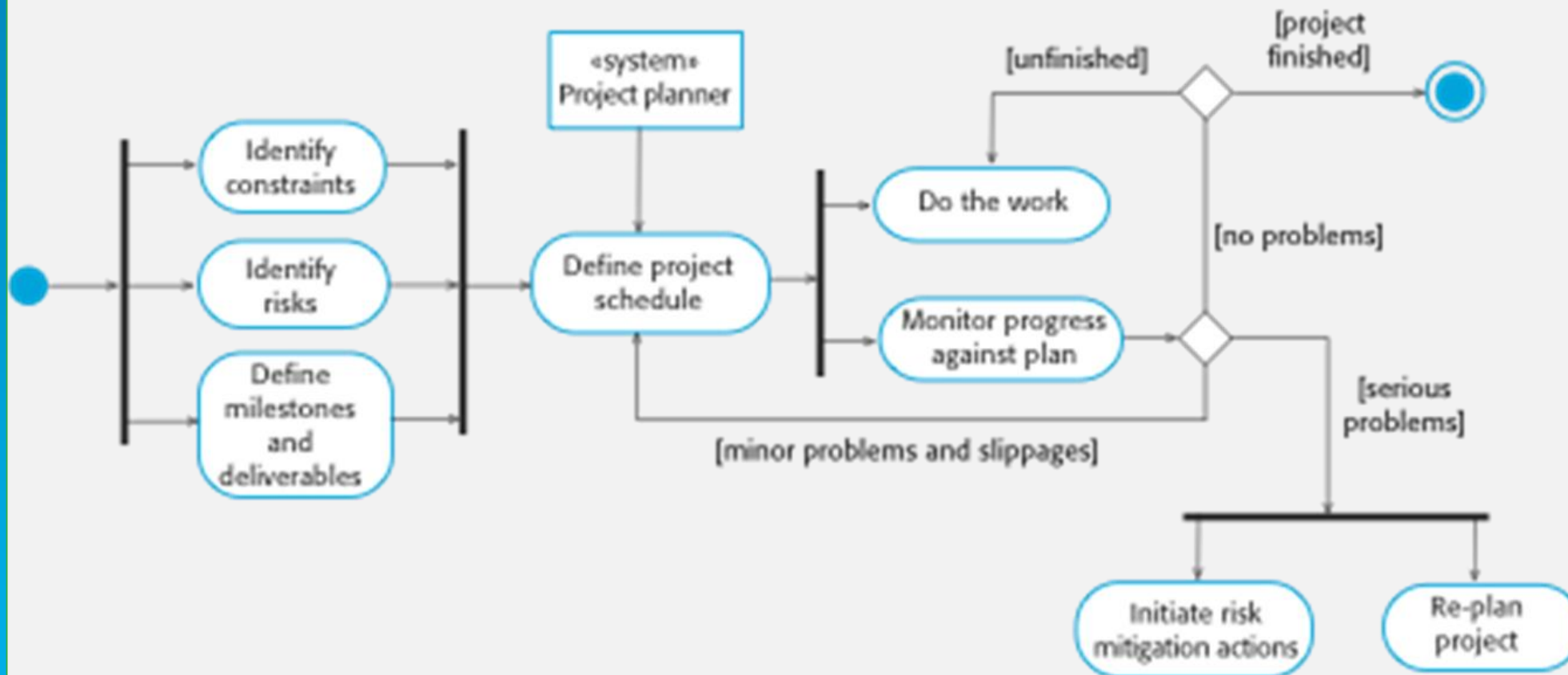
Project plan supplements

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, costs, and effort.
Staff development plan	Describes how the skills and experience of the project team members will be developed.

The planning process

- Project planning is an iterative process that starts when you create an initial project plan during the project startup phase.
- Plan changes are inevitable.
 - As more information about the system and the project team becomes available during the project, you should regularly revise the plan to reflect requirements, schedule and risk changes.
 - Changing business goals also leads to changes in project plans. As business goals change, this could affect all projects leading to re-planning.

The project planning process



Project scheduling

- Project scheduling is the process of deciding how the work in a project will be organized as separate tasks, and when and how these tasks will be executed.
- The calendar time for completing each task will be estimated, the effort required and who will work on the tasks that have been identified.
- The resources needed to complete each task need to be estimated, e.g. the disk space required on a server, the time required on specialized hardware, and what the travel budget will be, etc.

Project scheduling activities

- 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.

Milestones and deliverables

- Milestones are points in the schedule against which you can assess progress, for example, the handover of the system for testing.
- Deliverables are work products that are delivered to the customer, e.g. a requirements document for the system.

The project scheduling process



Scheduling problems

- Estimating the difficulty/complexity 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.

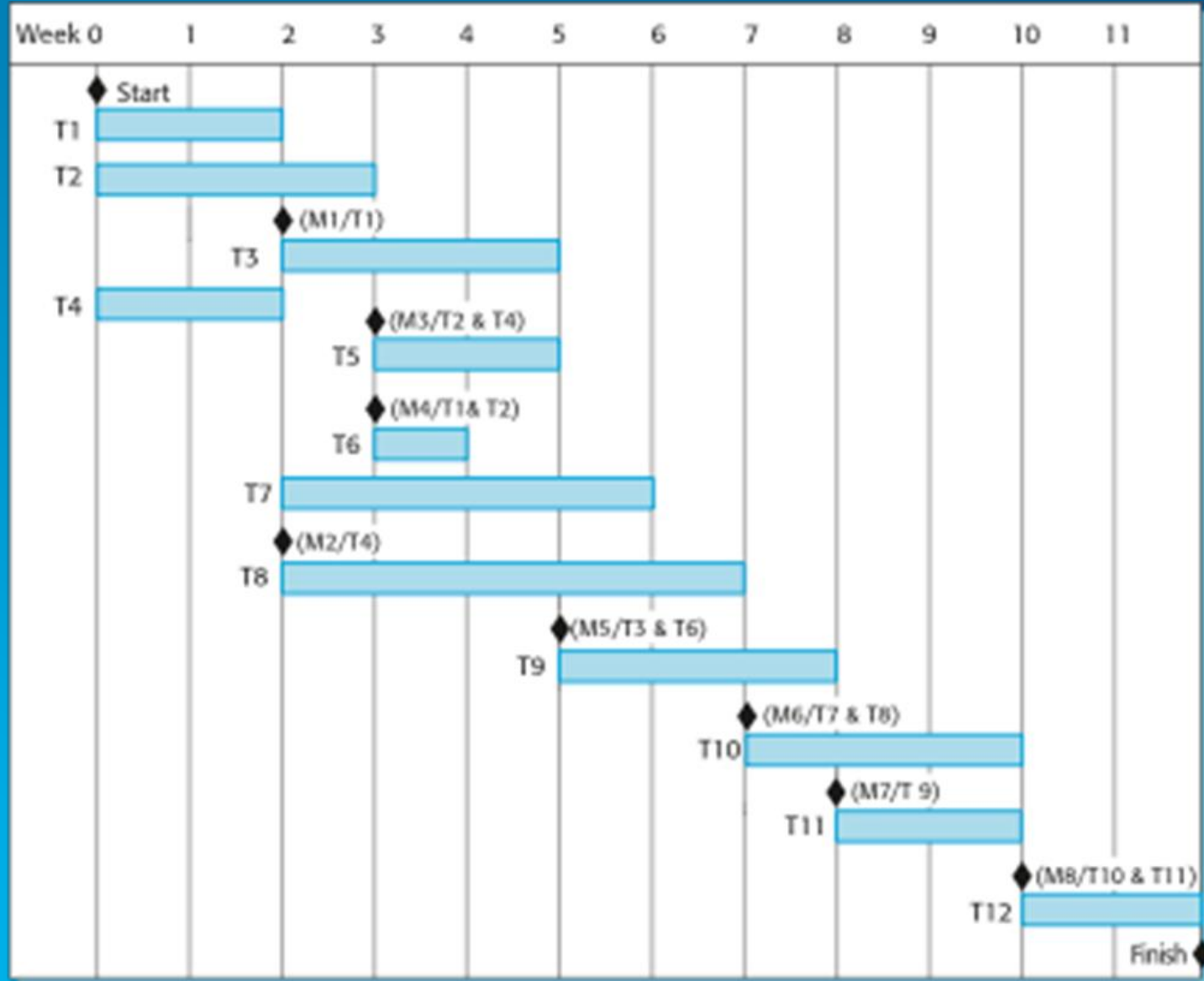
Schedule representation

- Graphical notations are normally used to illustrate the project schedule.
- These show the project breakdown into tasks. Tasks should not be too small. They should take about a week or two.
- Bar charts are the most commonly used representation for project schedules. They show the schedule as activities or resources against time.

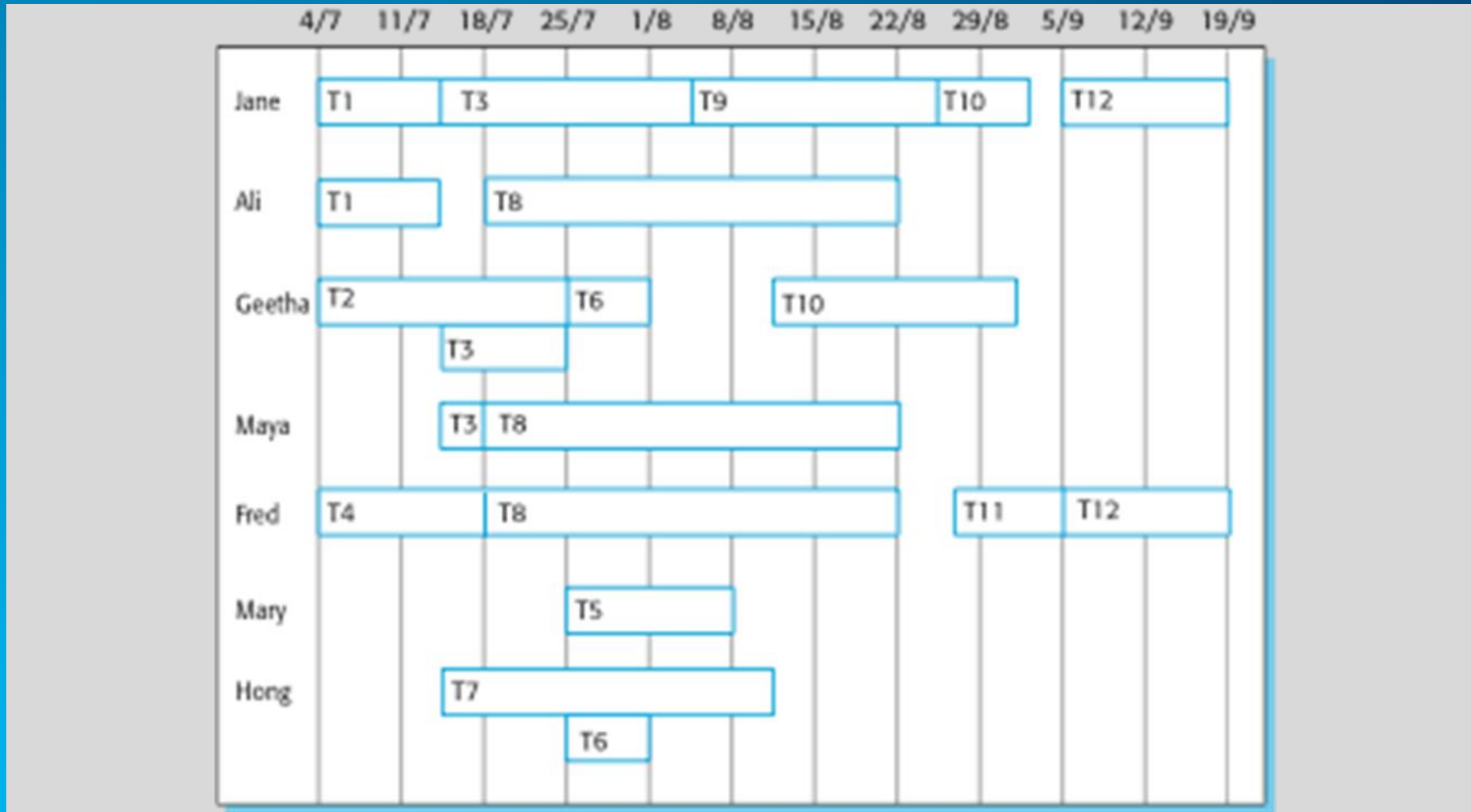
Tasks, durations, and dependencies

Task	Effort (person-days)	Duration (days)	Dependencies
T1	15	10	
T2	8	15	
T3	20	15	T1 (M1)
T4	5	10	
T5	5	10	T2, T4 (M3)
T6	10	5	T1, T2 (M4)
T7	25	20	T1 (M1)
T8	75	25	T4 (M2)
T9	10	15	T3, T6 (M5)
T10	20	15	T7, T8 (M6)
T11	10	10	T9 (M7)
T12	20	10	T10, T11 (M8)

Activity bar chart



Staff allocation chart



Agile planning

- Agile methods of software development are iterative approaches where the software is developed and delivered to customers in increments.
- The functionality of these increments is not planned in advance but is decided during the development.
 - The decision on what to include in an increment depends on progress and on the customer's priorities.
- The customer's priorities and requirements change so it makes sense to have a flexible plan that can accommodate these changes.

Agile planning stages

- Release planning, which looks ahead for several months and decides on the features that should be included in a release of a system.
- Iteration planning, which has a shorter term outlook, and focuses on planning the next increment of a system. This is typically 2-4 weeks of work for the team.

Key points

- The price charged for a system does not just depend on its estimated development costs; it may be adjusted depending on the market and organizational priorities.
- Plan-driven development is organized around a complete project plan that defines the project activities, the planned effort, the activity schedule and who is responsible for each activity.
- Project scheduling involves the creation of graphical representations the project plan. Bar charts show the activity duration and staffing timelines, are the most commonly used schedule representations.
- The agile plan is developed incrementally and, if problems arise, is adjusted. Software functionality is reduced instead of delaying delivery of an increment.