

A Short Introduction to Project Management

SFWR ENG 2B03

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Why Project Management?

Why manage a project, why not just do it?

- need to know what to do before trying to do it
- ensure that goals achieved
- detect deviations from plan early in order to take remedial action (or to take advantage of positive deviations)
- increase overall efficiency in performing project
- reduce risk of failure, cost or time overrun

What is a Project?

A project is defined by:

- unambiguous goal: concrete deliverables
- time deadline: completion date
- resource budget: money, person-days, etc.

Goals: Unambiguous, Clear

Goal, deliverables specified so that it is always *absolutely clear* whether project is:

- not yet started
- started but not yet finished
- finished

“Developing a program for ...” is *not* enough.

- delivery form? how many? where?
- training, other supporting services, etc. etc.?

Activities

Divide and conquer

Subdivide a project into activities, each with

- unambiguous goal: concrete deliverables
- time deadline: completion date
- resource budget: money, person-days, etc.

I.e., each activity is a subproject

Subdivide activities further until each activity is small enough to be understood easily

Activities

An activity

- is performed over an interval of time
- consumes resources

Examples:

- design PlayCard
- review PlayCard
- test PlayCard
- document the player module

Events

An event

- takes place at a point in time
- does not consume resources

Examples:

- source code for PlayCard completed and submitted to reviewer
- source code for player module submitted to TAs
- project report submitted to client

Milestones

A milestone is a particularly important event,
a significant accomplishment

Example:

- completion of the design, review and testing of the PlayCard and InformMove access routines
- completion of the design, review and testing of the InitGame, DealCard and ReportPoints access routines

Project Planning

For each activity determine:

- prerequisite activities (which other activities must be finished before this activity can start)
- when to perform (schedule activities)
- who will perform (estimate and coordinate personnel allocation)
- what other resources needed (estimate and coordinate resource allocation)

Resolve resource allocation conflicts (iteratively)

Planning Aids

PERT plan

- shows interdependencies between activities
- does not show time scale

Gantt chart

- shows time scale clearly
- does not show interdependencies between activities

Use both. Neither is enough.

Execute, Monitor and Control

Let the project members do their work

— For a while —

Then monitor progress

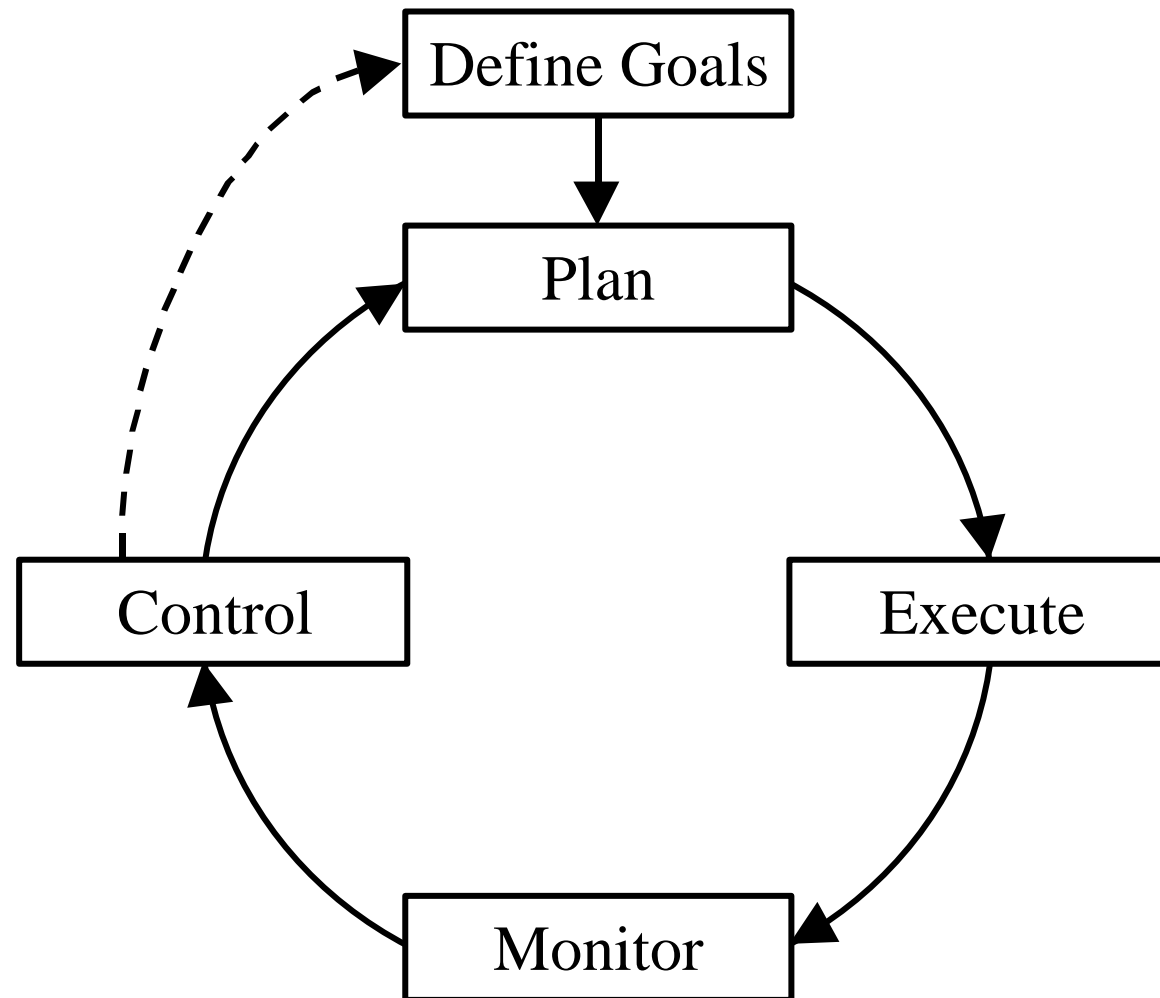
Control actual progress against plan, evaluate

Modify plan as appropriate

(Modify goals if necessary and possible)

Repeat this cycle

Feedback Loop of Project Management



Monitor and Review: How Often?

- frequently enough to give time to take corrective action
- effort for monitoring and replanning should pay off in increased overall efficiency and reduced risk of cost or time overrun — or failure
- rule of thumb:
 - informally: continually
 - formally: 1 to 10% of project time between reviews

PERT Charts

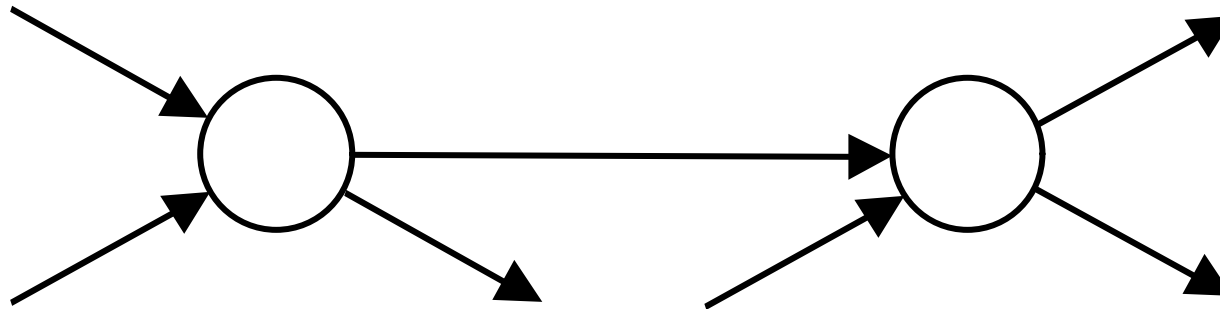
Program Evaluation and Review Technique

- One (of several) conventions for drawing PERT charts:
 - event = circle
 - activity = arrow
- an arrow is drawn between two circles
- start circle has outgoing arrows, end circle has incoming arrows, other circles have both

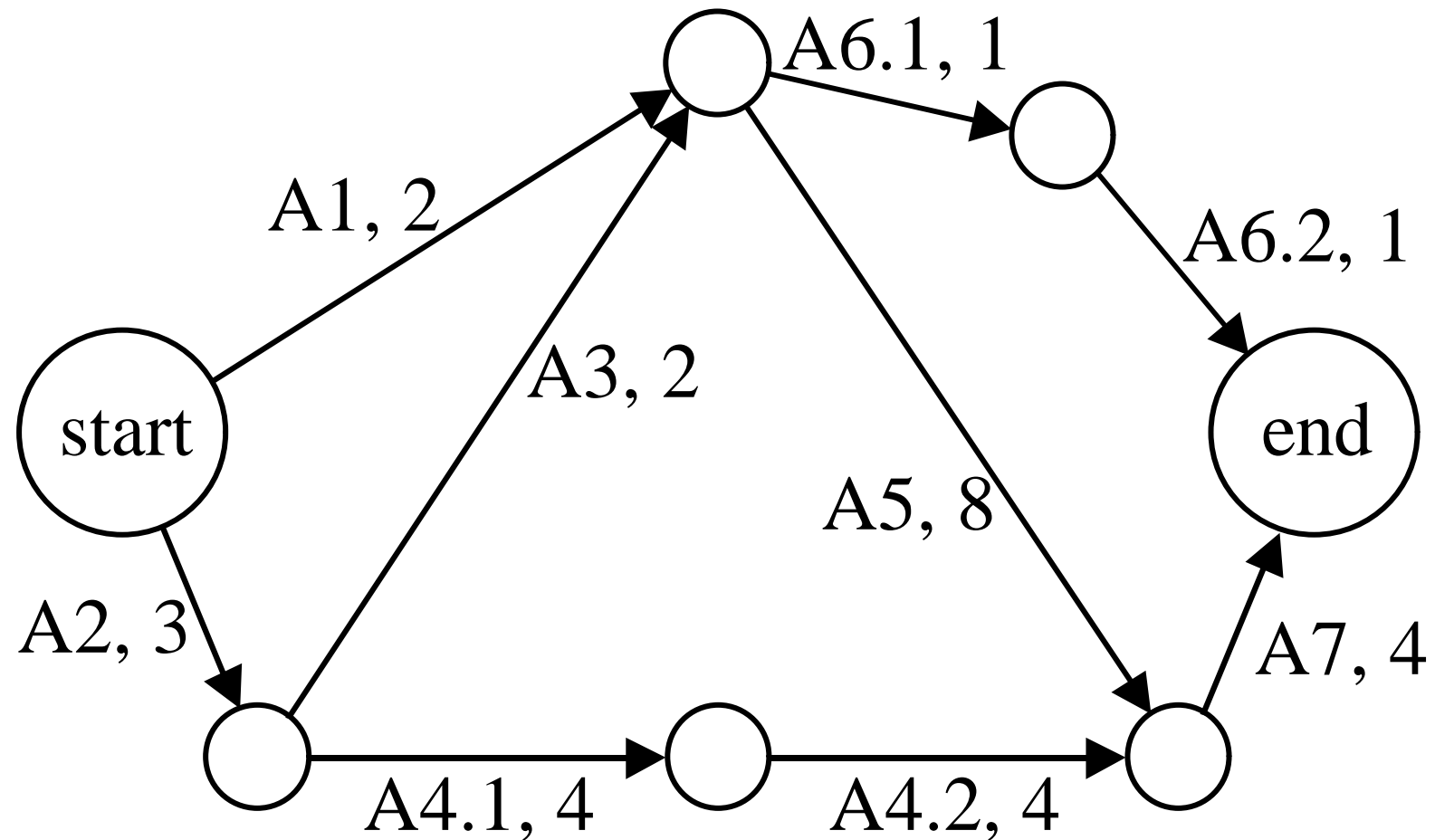
PERT Charts

PERT chart

- an event (circle) *occurs* when *all* incoming activities (arrows) are finished
- an activity (arrow) can start only when its preceding event (circle) has occurred



Example PERT Chart



PERT Chart Calculations

Forward calculation: earliest possible times for each activity and event:

- begin at start circle at current time
- earliest possible activity start time
- earliest possible activity completion time
- earliest possible event time

PERT Chart Calculations

Reverse calculation: latest permissible times for each activity and event:

- begin at end circle at planned completion time
- latest permissible activity completion time
- latest permissible activity start time
- latest permissible event time

Slack is the difference between earliest possible and latest permissible times for an activity, event

Critical Path

The path along which the slack is zero (or minimum) is the *critical path*

Any delay on the critical path will delay project completion

Project manager must monitor activities on the critical path especially carefully and critically

Gantt Charts

Horizontal bar chart

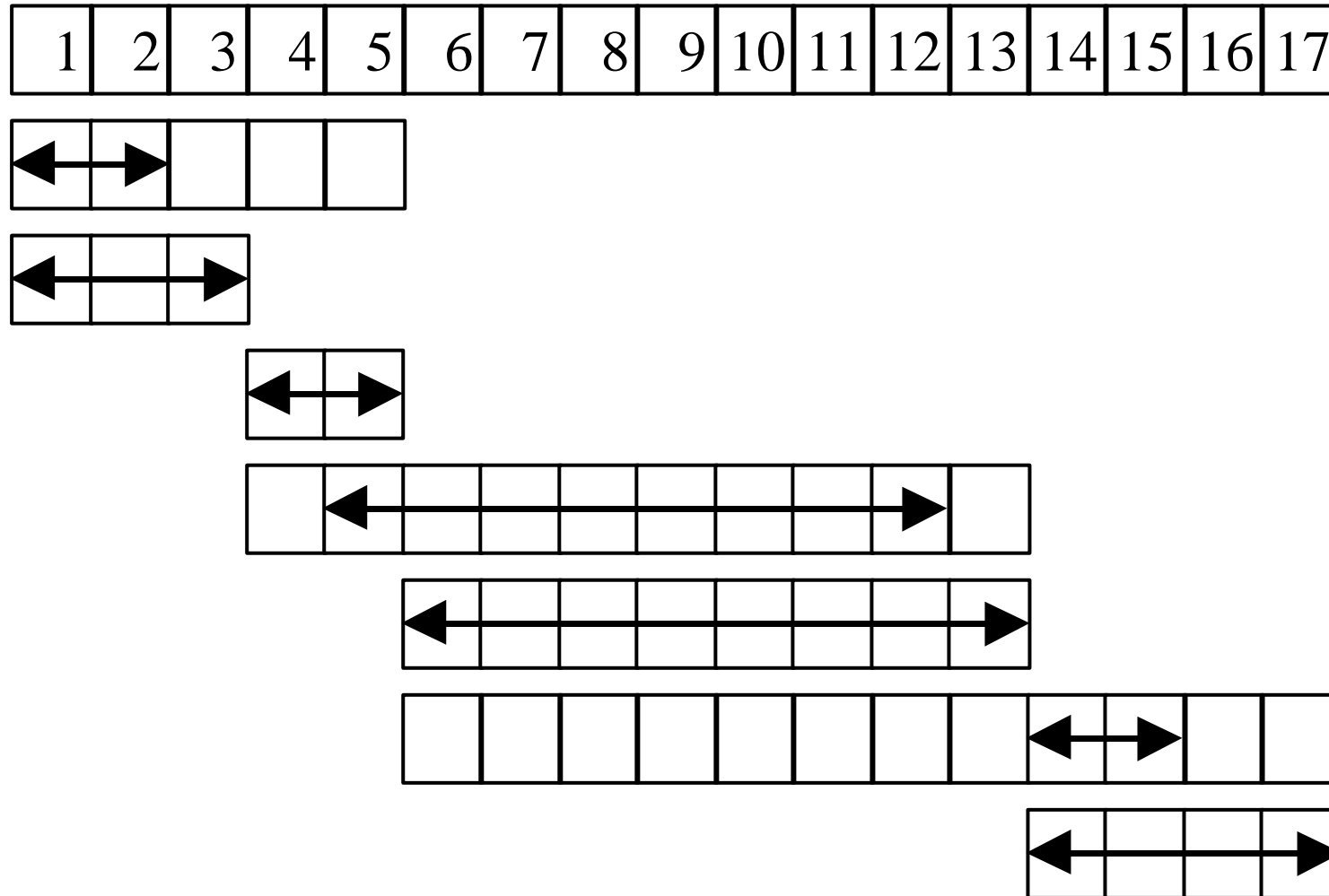
Gantt chart for *activities*, another for *resources*

Horizontal scale is *calendar* time

Each bar shows

- earliest possible start to latest permissible completion
- planned start to planned completion
- or planned utilization of a particular resource

Example Gantt Chart



Conclusions

Successfully completed projects: *not luck*
but due to good

- planning
- execution
- monitoring
- control

i.e. good project management is necessary if the
goal is to be achieved on time and in budget