Project Management

Project Planning

INTRODUCTION

- Why plan?
  - To eliminate or reduce uncertainty
  - To improve efficiency of the operation
  - To obtain a better understanding of the objectives
  - To provide a basis for monitoring and controlling work

Consequences of poor planning

- premature project initiation
- disappointment
- Victimization of the innocent
- promotion of the non-participants
- Poor definition of requirements

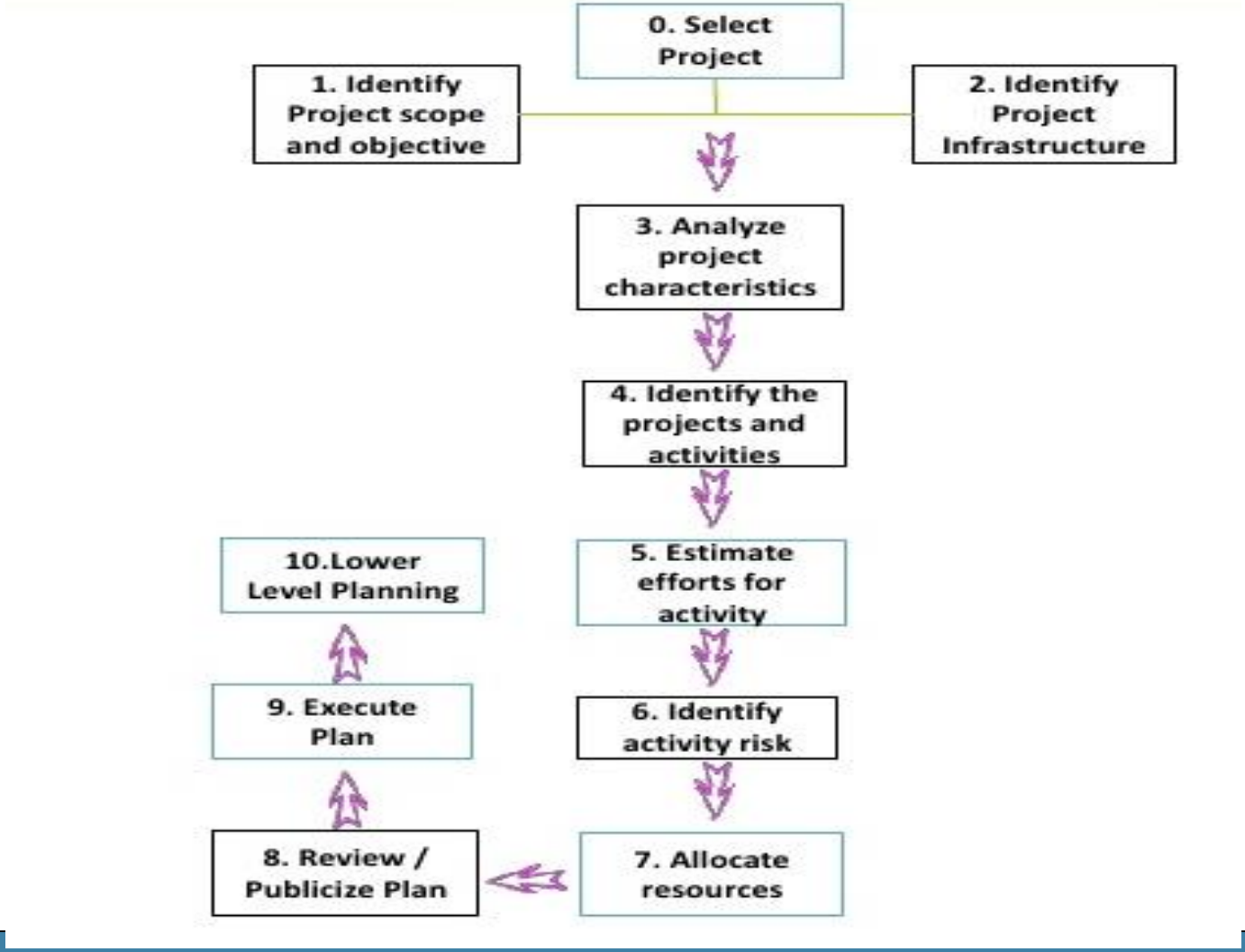
PLANNING COMPONENTS

- Objectives -a goal, target or quota to be achieved
- Programme -strategy and major action to achieve objectives
- Schedule -a plan to show when milestones will be reached
- Budget -planned expenditure for the project

Planning components

- Forecast/prediction-a projection of what may happen
- Organisation-the projects management and personnel structure
- Policy-a general guide to decision making and individual actions
- Procedures-a detailed method for carrying out policy/activity…
- Standards-performance defined as adequate

PLANNING STEPS



Planning Steps

- Step 0: Select a Project
- Step 1: Identify project scope and objectives
  - Identify objectives and measures of effectiveness in meeting them
  - Establish a project authority for unity of purpose
  - Identify stakeholders and their interests-
  - Modify objectives in line with stakeholder's requirements and expectations
  - Establish communication methods

Planning Steps

- Step 2: Identify project infrastructure
  - Establish relationships between project and strategic planning
  - Identify installation standards and procedures
  - Identify project team organisation with project leader at the top

Planning Steps

- Step 3: Analyse project characteristics
  - Distinguish the project as either objective or product-driven
  - Identify high level project risk: Operational, technical, environmental, type of product.
  - Take into account user requirements concerning implementation
  - Select development and life-cycle approach
  - Review overall resource estimates

Planning Steps

- Step 4: Identify project products and activities
  - Identify and describe project products (or deliverables)
  - Document generic product flows
  - Recognise product instances
  - Produce ideal activity network
  - Modify ideal to take into account need for stages and checkpoints

Planning Steps

- Step 5: Estimate effort for each activity
  - Carry out bottom-up estimates
  - Revise plans to create controllable activities
- Step 6: Identify activity risk
  - Identify and quantify activity-based risks
  - Plan risk reduction and contingency measures where appropriate
  - Adjust plans and estimates to take account of risk

Planning Steps

- Step 7: Allocate resources
  - Identify and allocate all resources: use Gantt
  - Revise plans and estimates to account for resource constraints
- Step 8: Review/publicise plan
  - Review quality aspects of project plan
  - Document plans and obtain agreement

Planning Steps

- Step 9: Execute plan- Once underway, put up evaluation, monitoring and control mechanisms

- Step 10: Lower levels of planning: such as integration tests for system modules, Training, handover

ACTIVITY PLANNING

- Activity Planning will help to:
  - ensure that the appropriate resources will be available precisely when required
  - avoid different activities competing for the same resource at the same time
  - produce a detailed schedule showing which staff carry out each activity
  - Produce a detailed plan against which actual achievement may be measured
  - produce a timed forecast
  - re-plan the project during its life to correct drift from a target

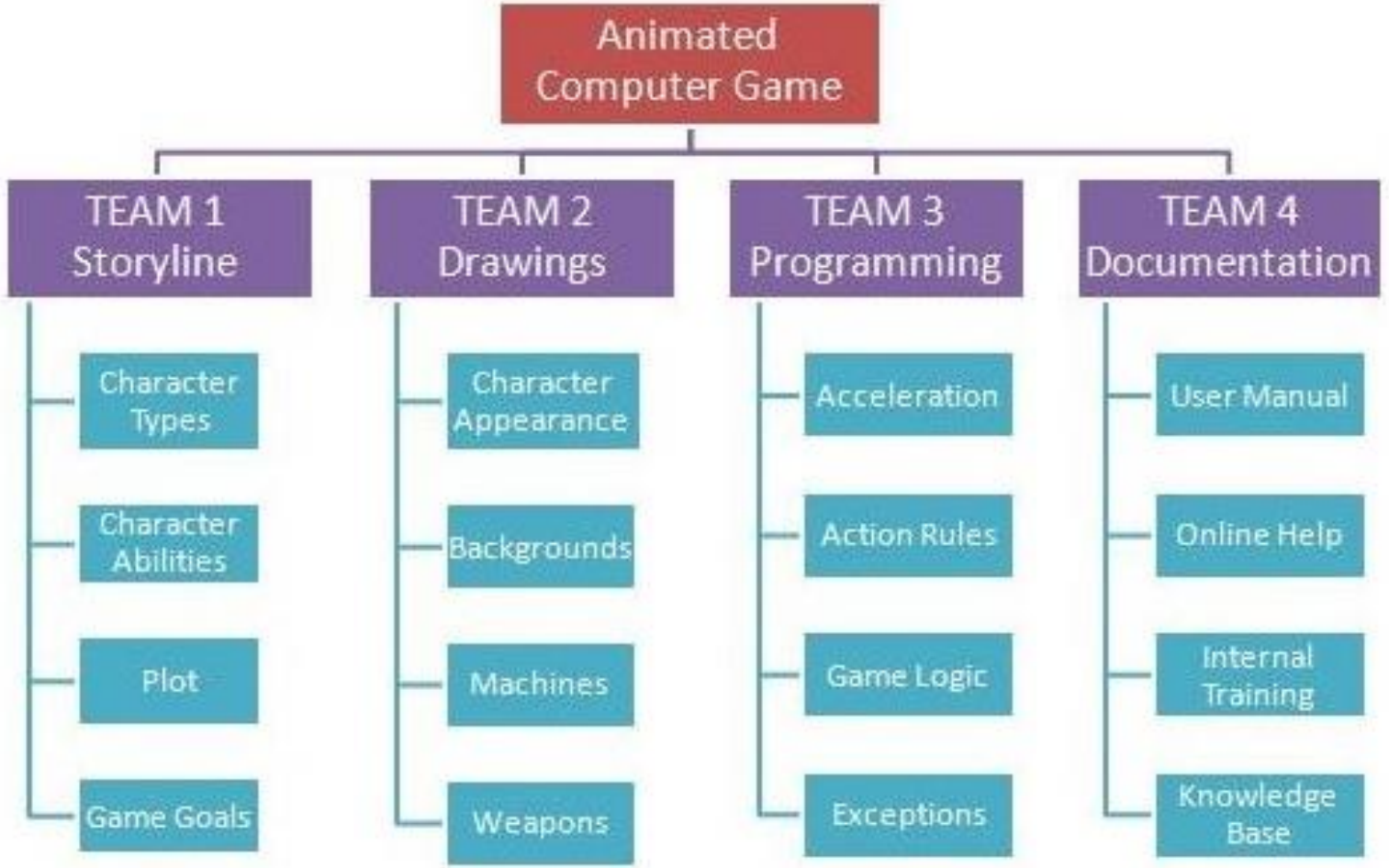
Activity Planning

- In activity planning we identify activities and create:
  - Work breakdown structure (WBS)
  - Product breakdown Structure (PBS)
  - Precedence analysis
  - Gantt Charts
  - Network diagrams - On Arrow Networks and Precedence Networks

1. Work Breakdown Structure

- WBS is the decomposition of work into progressively smaller and smaller chunks of work.
- The logical conclusion is when work cannot be usefully broken down any further for the tasks being undertaken
- A WBS is often shown as a task-oriented family tree of activities, similar to an organizational chart.

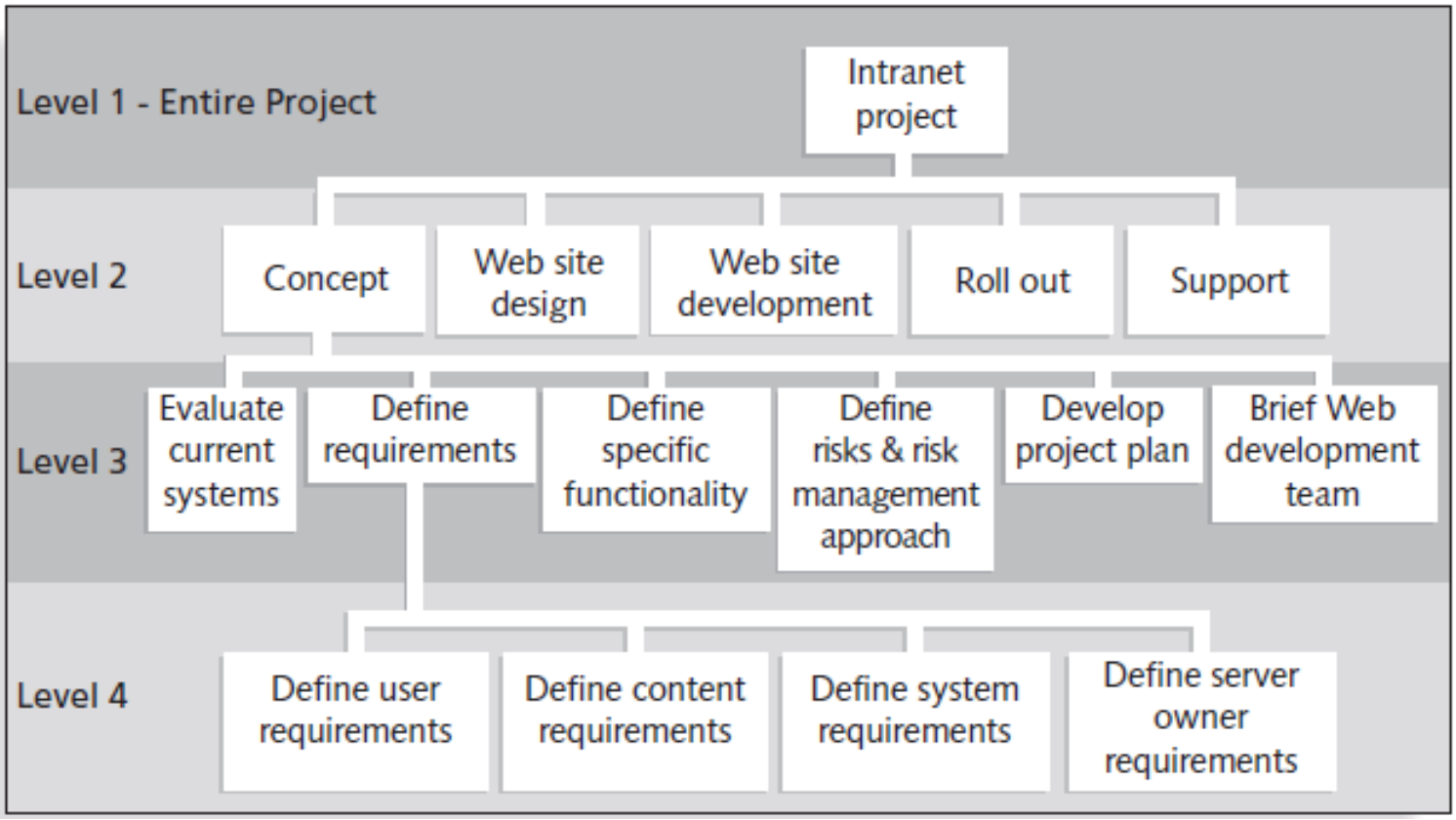
Work Breakdown Structure



- A project team often organizes the WBS around project products, project phases, or using the project management process groups e.g. design of a website

Detailed WBS

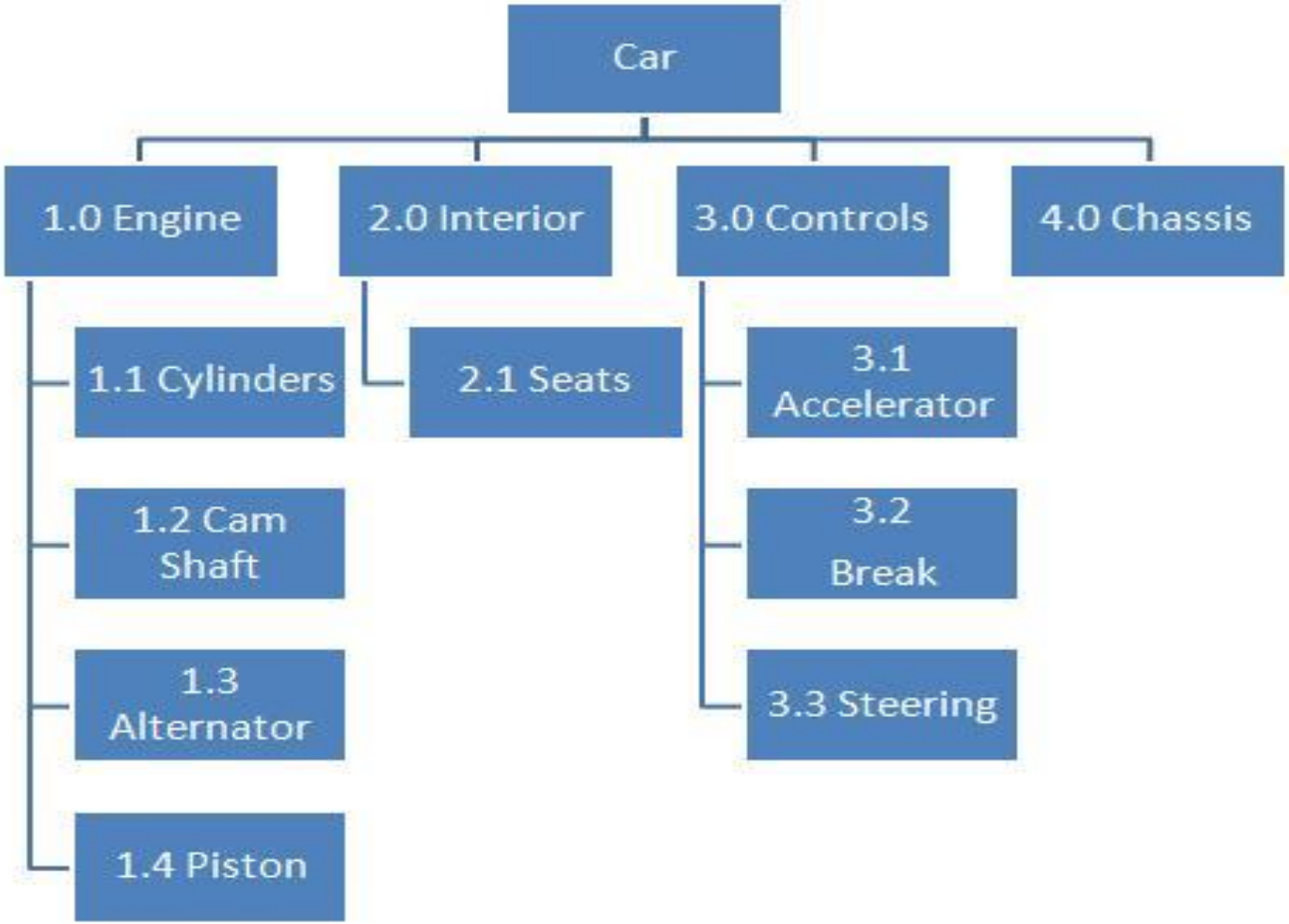
Chart form →



2. Product Breakdown Structure

- Product Breakdown Structure (PBS) is similar to WBS
- PBS is the break down of a product into it's discrete components.
- a PBS can be included as part of a WBS

Product Breakdown Structure



WBS and PBS

- WBS, PBS and system modelling will assist in understanding of the project
- WBS and PBS must be done to allow Precedence analysis to take place
- WBS and PBS do not necessarily set precedence of a project
- Precedence (scheduling activities) within a project should be based on what is best for the timely and economic completion of the project

3. Precedence Analysis

- Must be done before an activity plan can be produced
- Reviews the activities that are to be carried out
- Decides what activities must be carried out before particular activity can start

4. Gantt Charts

- Gantt charts are easy to use and produce
- They are very useful for use on less complex projects
- Commonly used due to there simplicity
- Gantt charts are easily understood and easy to read

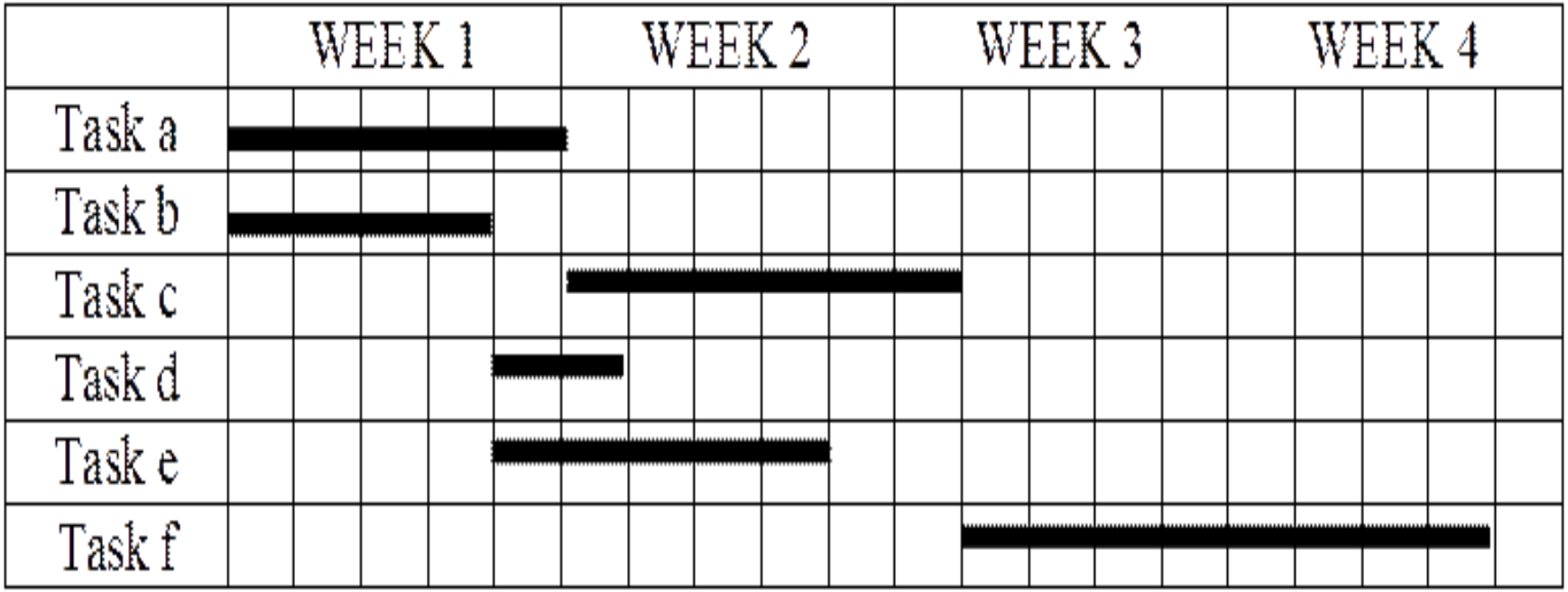
Gantt Charts

Gantt Charts

- Draw the following Gantt chart

Tasks	Precedence	Time
a	-	5 days
b	-	4 days
c	a	6 days
d	b	2 days
e	b	5 days
f	c,d	8 days

Gantt Charts



NETWORK DIAGRAMMING

Introduction

- In the late 1950s, the Program Evaluation and Review Technique (PERT) and the Critical Path Method (CPM) were independently developed.
- When they were developed, PERT used probabilistic (or uncertain) estimates of activity durations while CPM used deterministic (or certain) estimates but included both time and cost estimates to allow time/cost trade - offs to be used.

Network Models: PERT

- The Program Evaluation and Review Technique (PERT) was Developed by the US Navy, BOOZ-Allen Hamilton (a business consulting firm) and Lockheed Aircraft (Now Lockheed Martins)

Network models: CPM

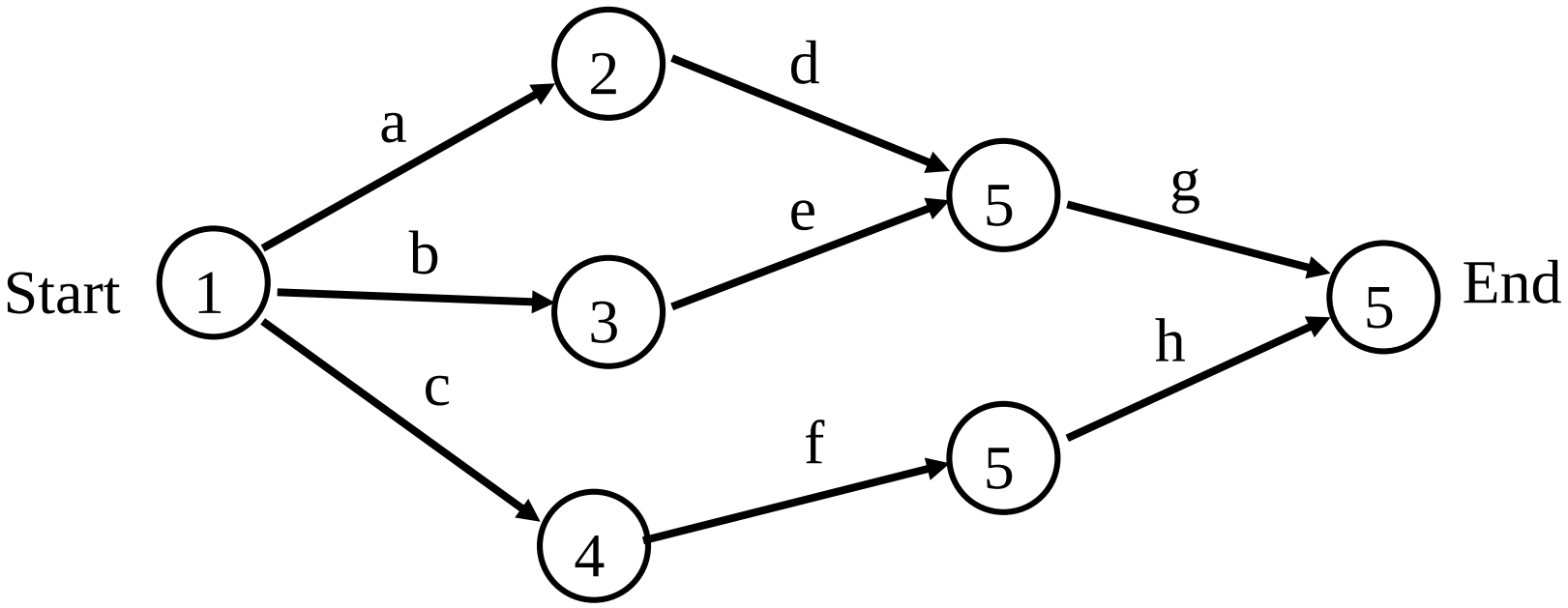
- Critical Path Method (CPM) is also known as Critical Path Analysis (CPA)
- CPM was Developed by Dupont De Nemours in the Late fifties early sixties to facilitate building of complex processing plant

PERT and CPM

- Both methods employed networks to schedule and display task sequences. They also identified a *critical path* of tasks that could not be delayed without delaying the project.

Network planning models

- A simple activity-on-arrow (AOA) network diagram associated with PERT



Network Model Concepts

- Activity- A specific task, uses resources takes time to complete
- Event
  - The result of completing an activity
  - Events use no resources
  - They are instances in time, points on the network, conditions of a system that can be recognised

Network Model Concepts

- Network - The combination or all activities (often drawn as lines) and events (often drawn as nodes at the beginning and end of each line).
- This defines the project and the activity precedence relationship.
  - Arrow heads placed on the lines indicate direction of flow. Before and an event can be realised all the activities that immediately precede it must be completed

Network Model Concepts

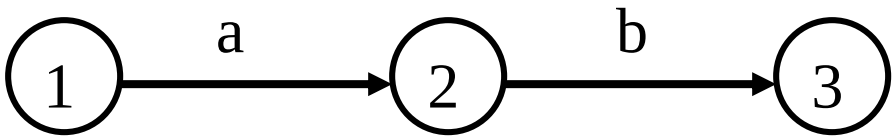
- Path - The series of connected activities between any two events in a network
- A critical path is a set of activities from start to end, if delayed, delays project completion date.
- Critical time — The time required to complete all activities on the critical path.
- Milestones - Identifiable and noteworthy events marking significant progress on the project.

Network syntax

- Time moves from left to right
- Nodes are numbered sequentially
- A network may not contain loops
- A network may not contain dangles
- Precedents are the immediate preceding activities
- Dummy activities can be used to indicate a particular precedence

Network syntax

- Time moves from left to right
- Nodes are numbered sequentially



Network syntax

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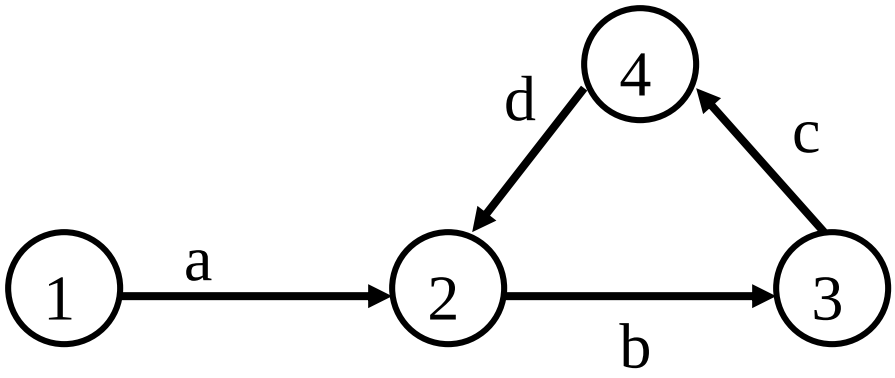
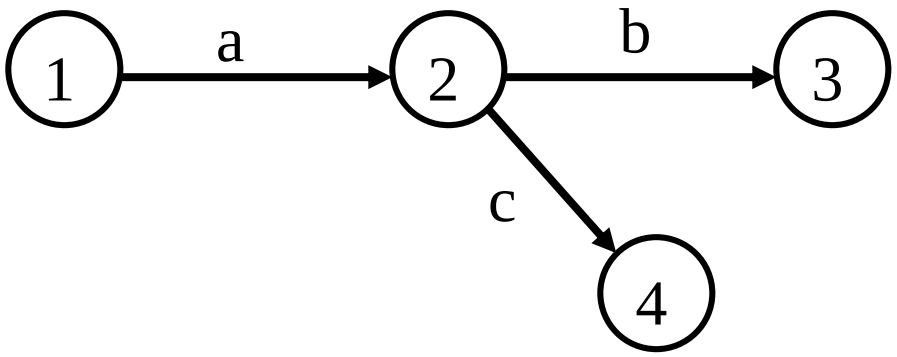


This is not allowed

Network syntax

- A network may not contain dangles



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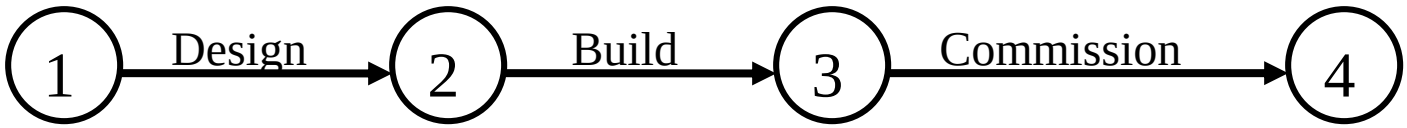
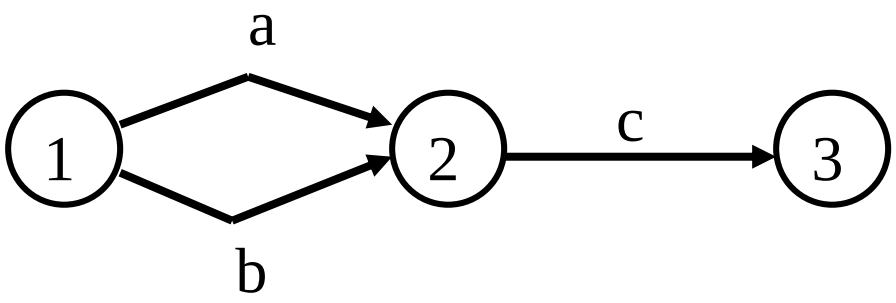
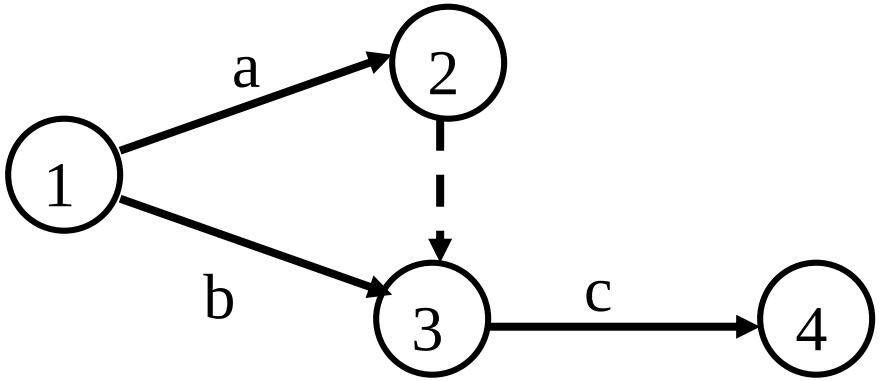


Network syntax

- Dummy activities can be used to indicate a particular precedence



Wrong



Right

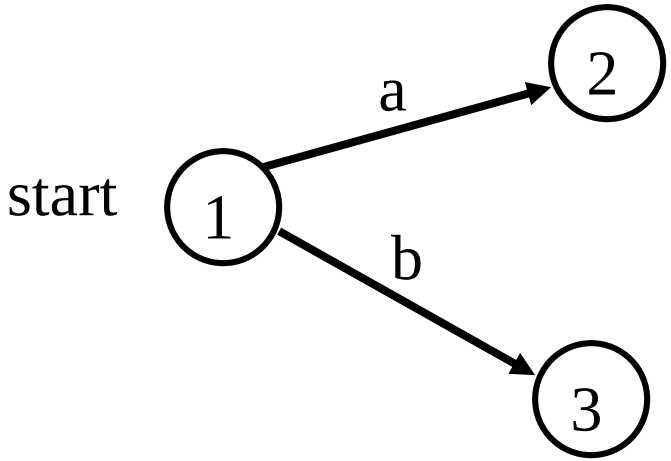
On Arrow Networks

- Draw the following as on arrow network

Tasks	Precedence	Time
a	-	5 days
b	-	4 days
c	a	6 days
d	b	2 days
e	b	5 days
f	c,d	8 days

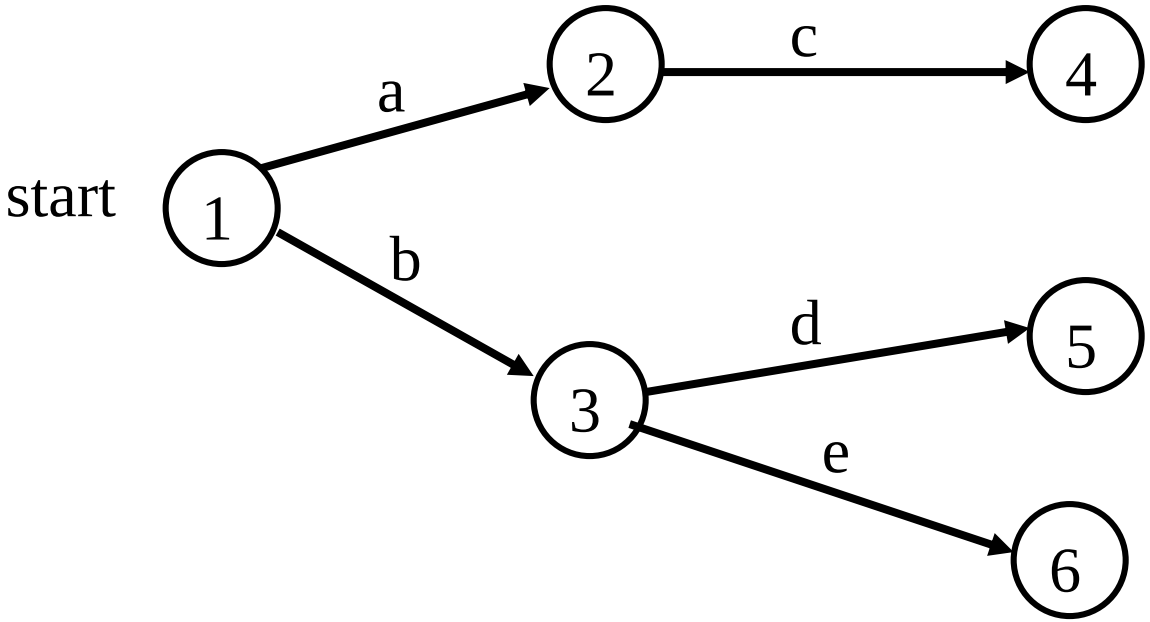
On Arrow Networks

- How to start …..



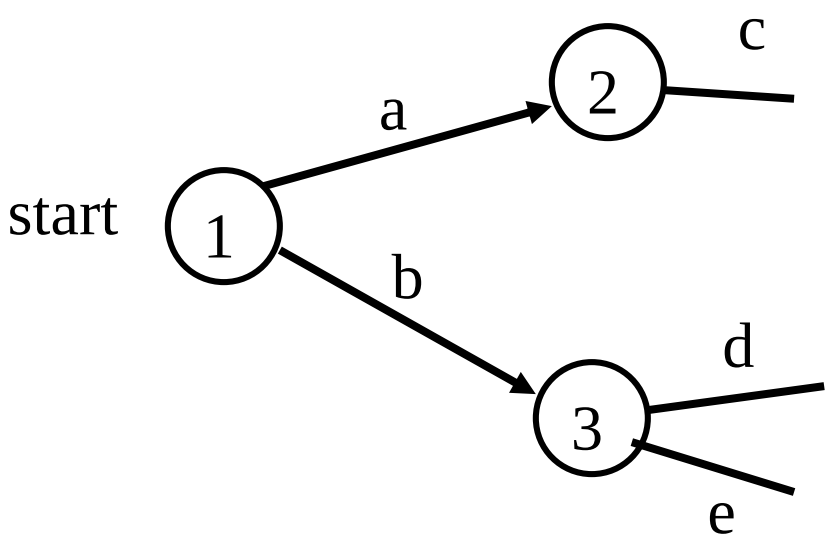
On Arrow Networks

- What not to do



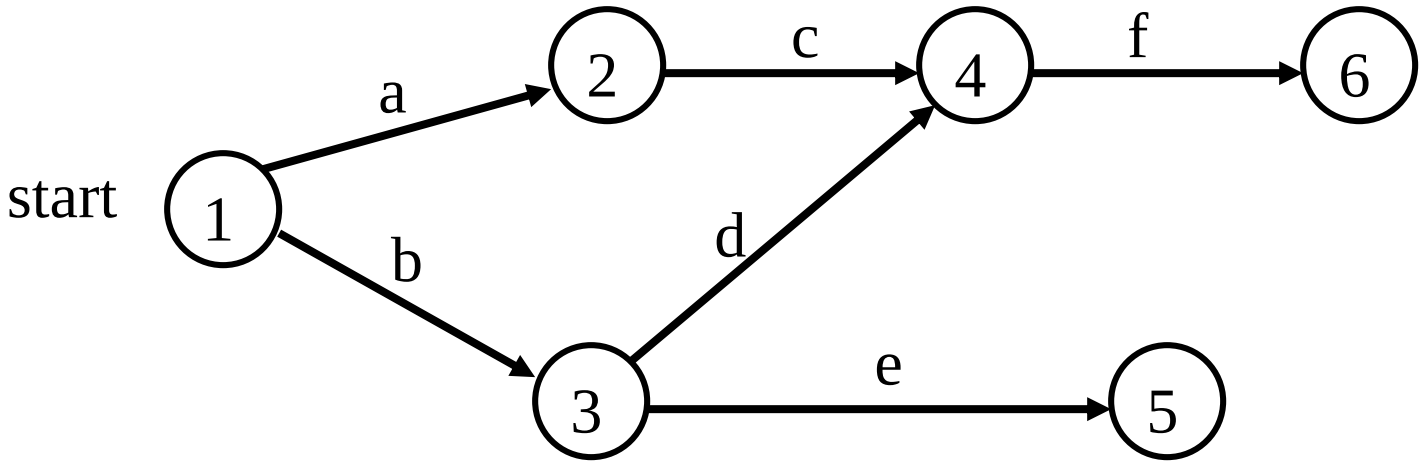
On Arrow Networks

- A better way ……



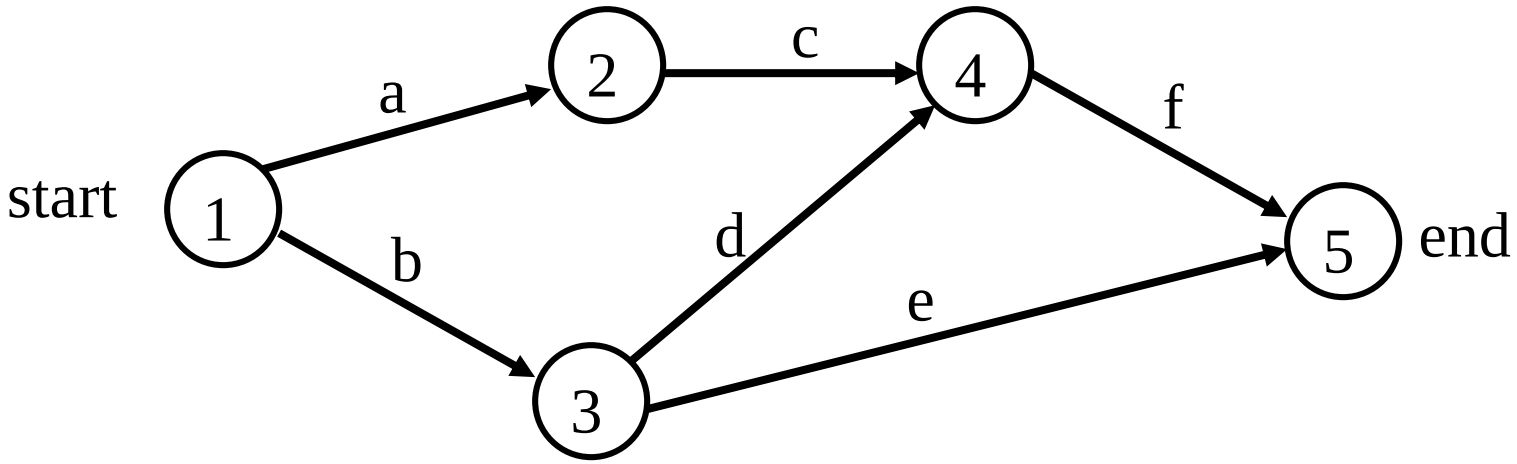
On Arrow Networks

- It is less confusing that c & d go to the same event … but what about e & f ?



On Arrow Networks

- The completed on arrow network ….



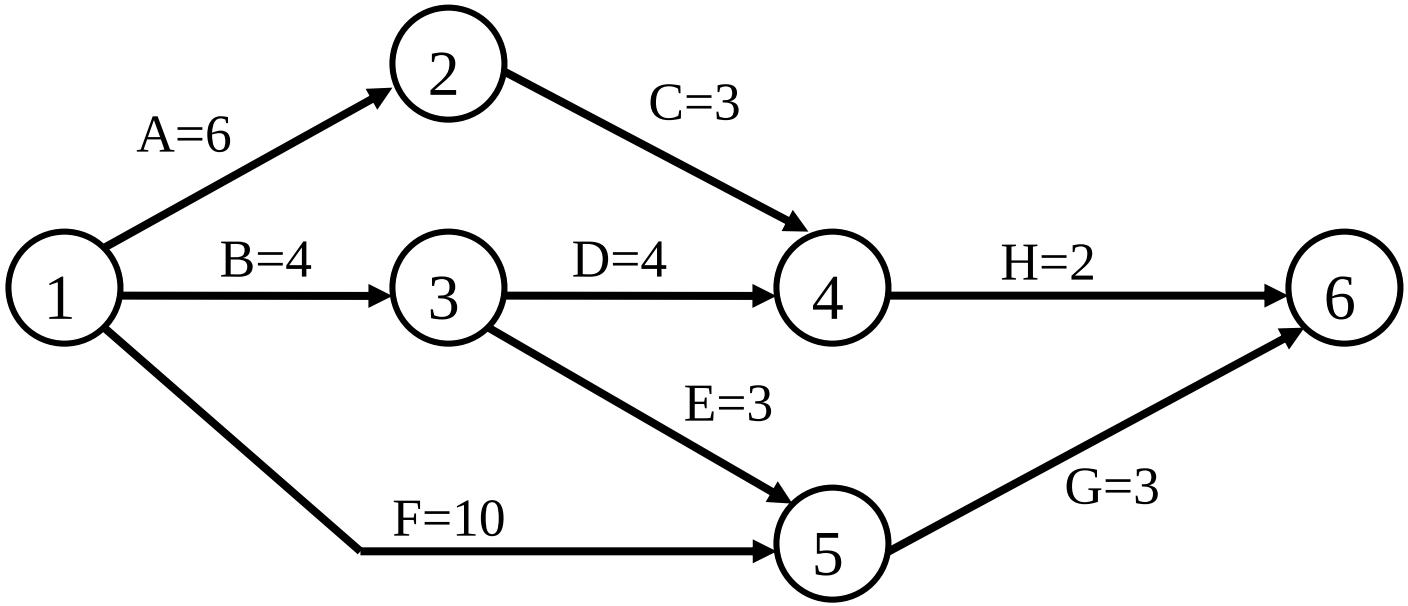
On Arrow Networks

- Another on arrow network to draw

Tasks	Precedence	Time
a	-	6 weeks
b	-	4 weeks
c	a	3 weeks
d	b	4 weeks
e	b	3 weeks
f	-	10 weeks
g	e,f	3 weeks
h	c,d	2 weeks

On Arrow Networks

- The network with activity times added



Precedence Networks

- Precedence network also known as Activity on Node
- Becoming more common as it is used by many project planning software packages
- Often preferred by project managers

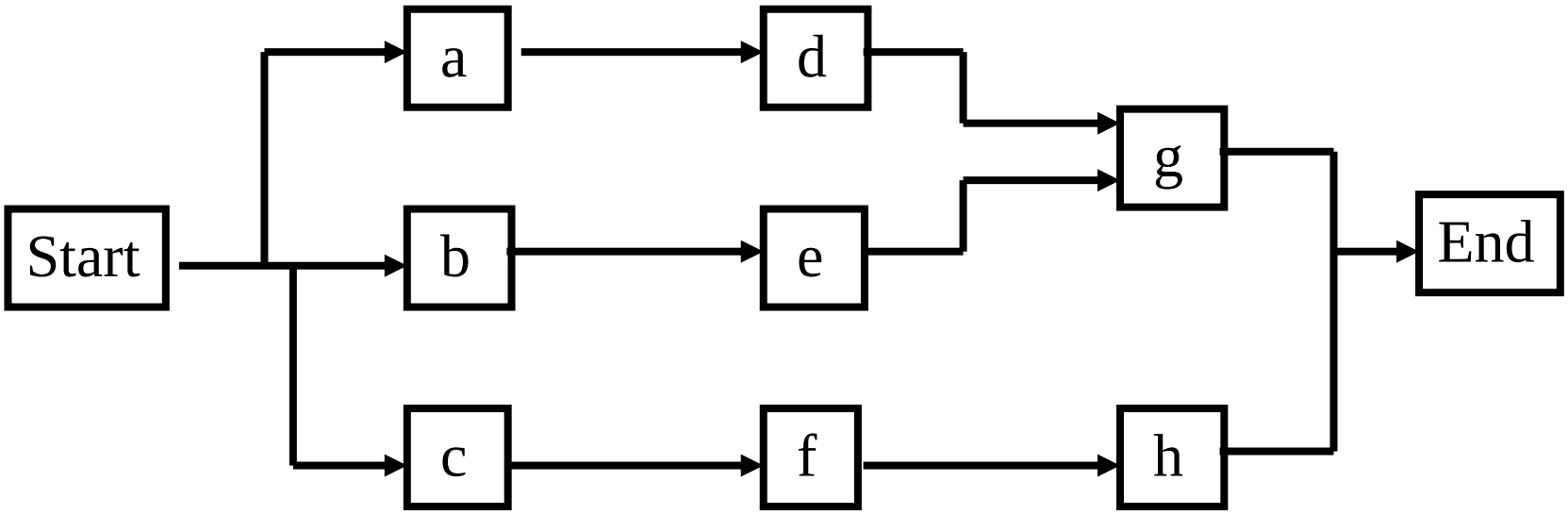
Precedence Networks

- Syntax the same as for On Arrow networks
  - ***Except*** there are no dummy activities

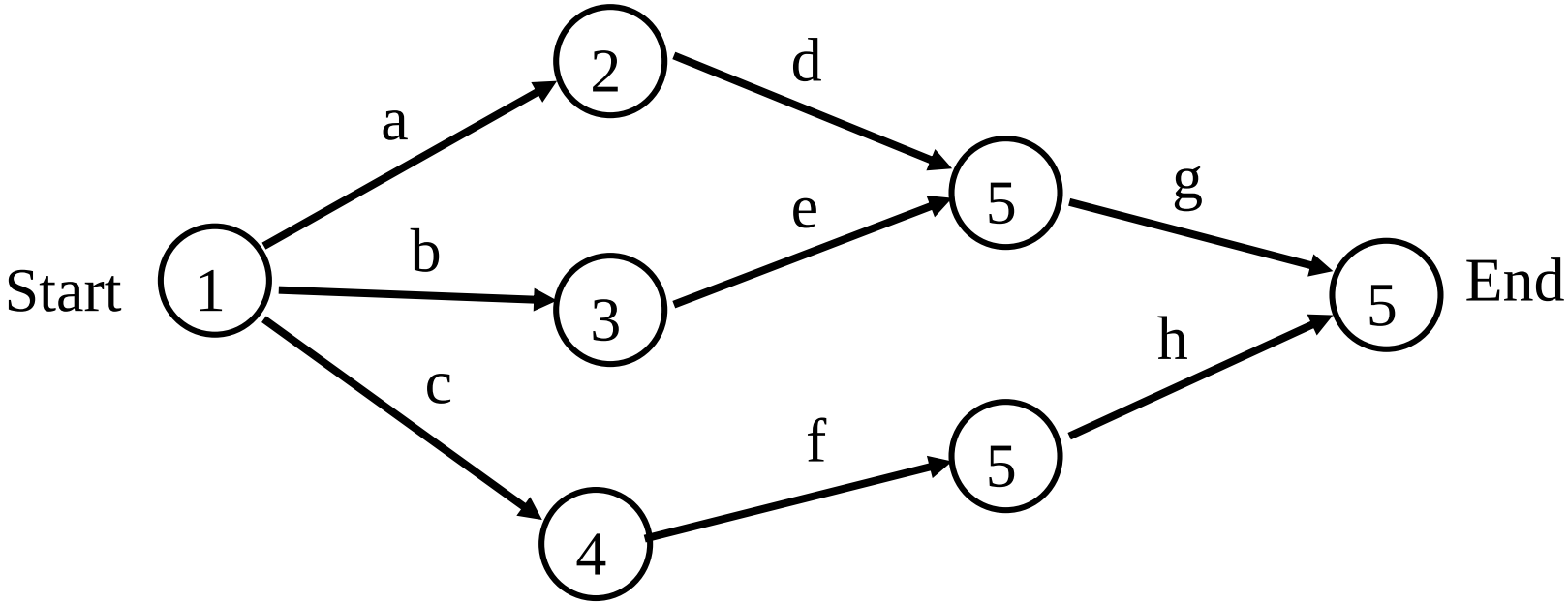
- Precedence networks must start with a start node and end with a end node

Precedence Networks

- A simple precedence network



- This is the same network drawn as an On Arrow network



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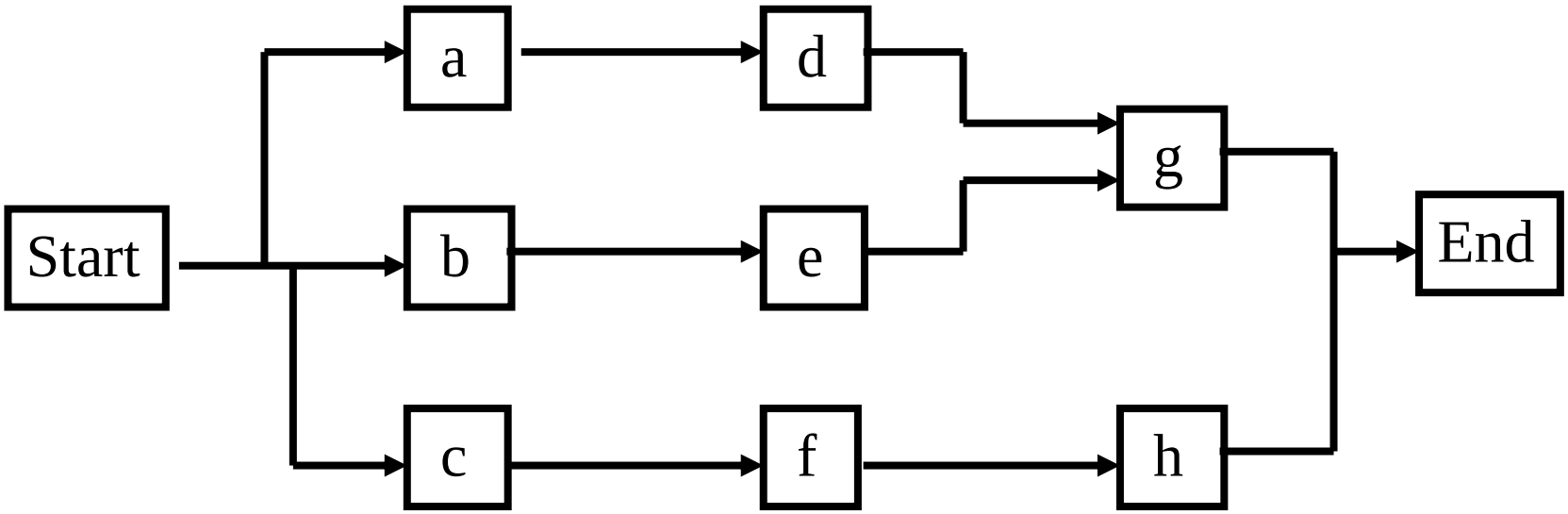

Precedence Networks

- Draw the following as Precedence network

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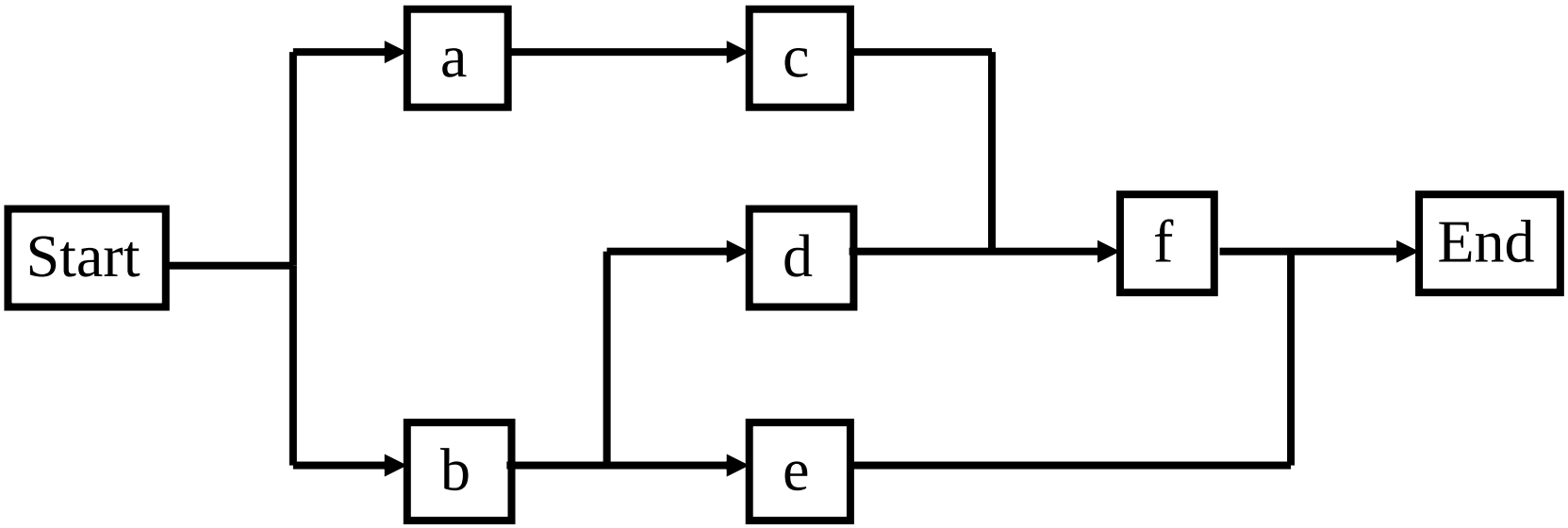
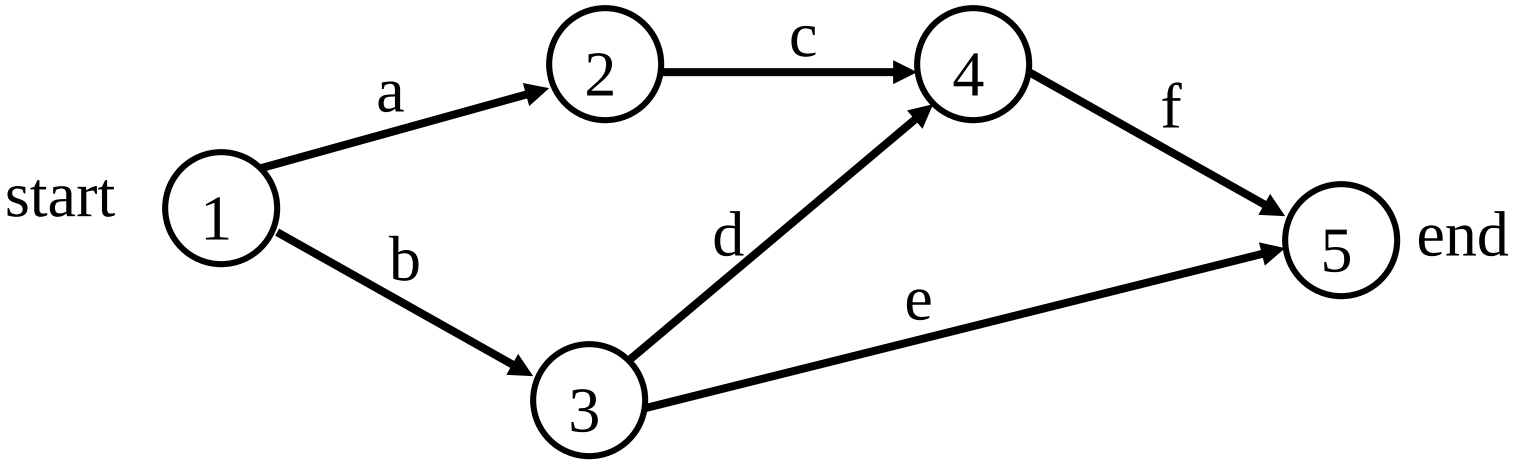
Precedence Networks

- The completed Precedence Network



- The same network drawn as an On Arrow Network



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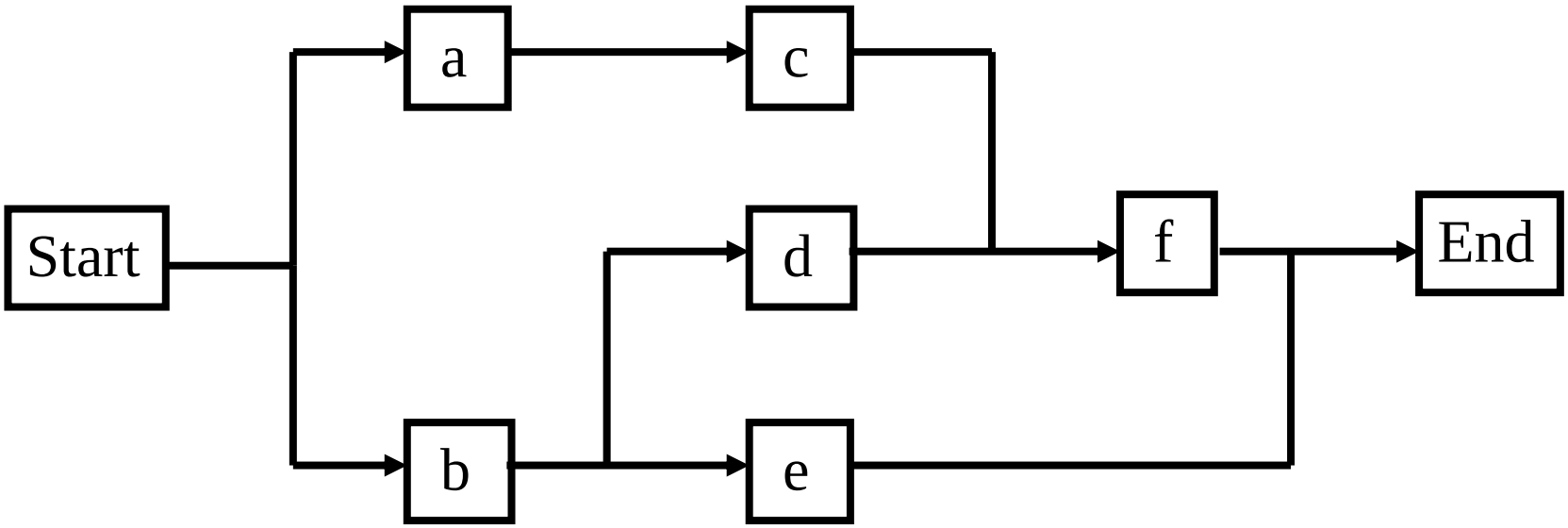

Precedence Networks

- Another on precedence network to draw

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Precedence Networks

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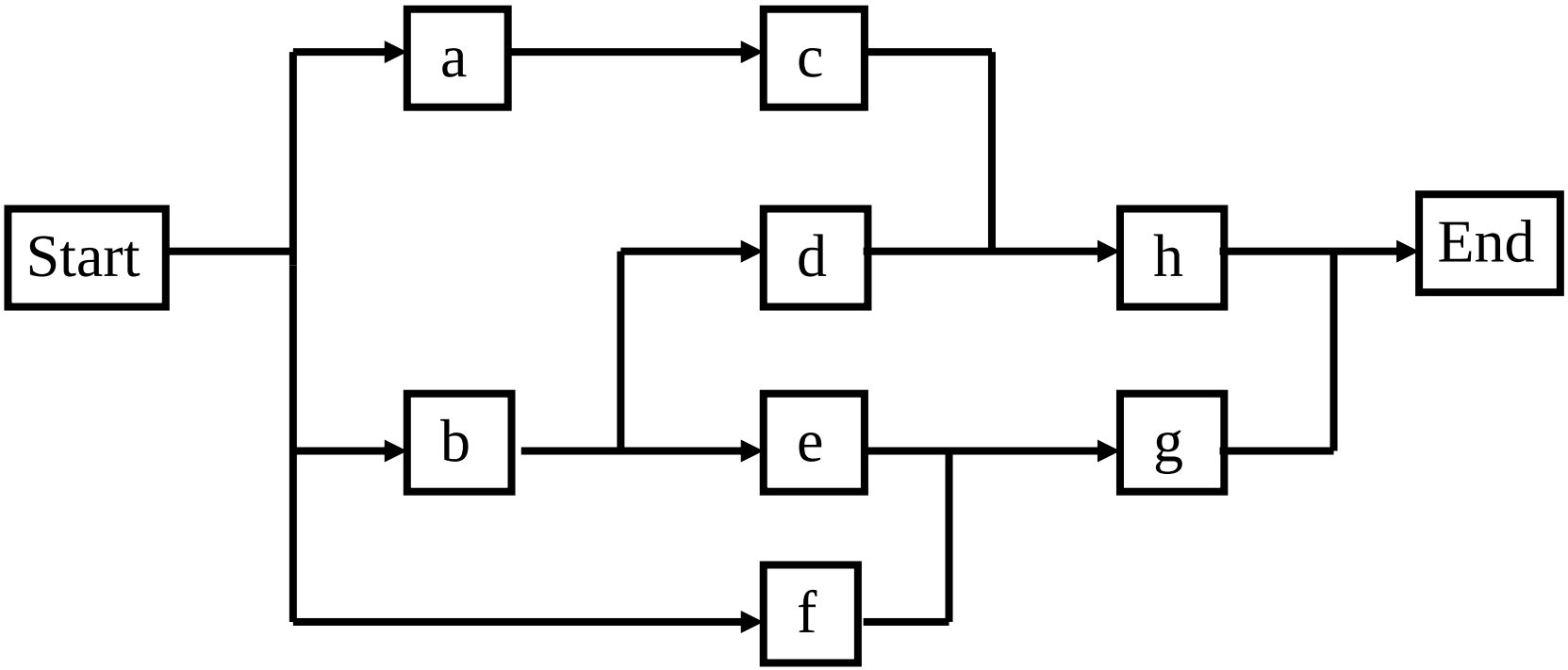

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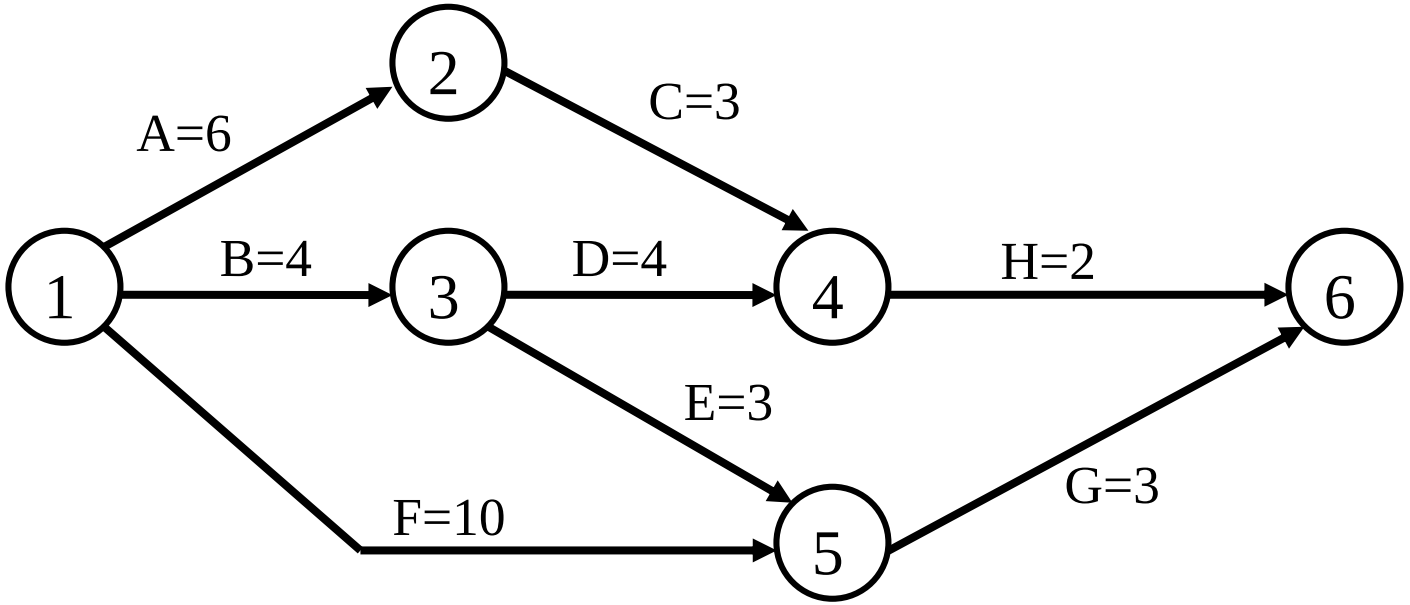

Precedence Networks

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