

Project Management

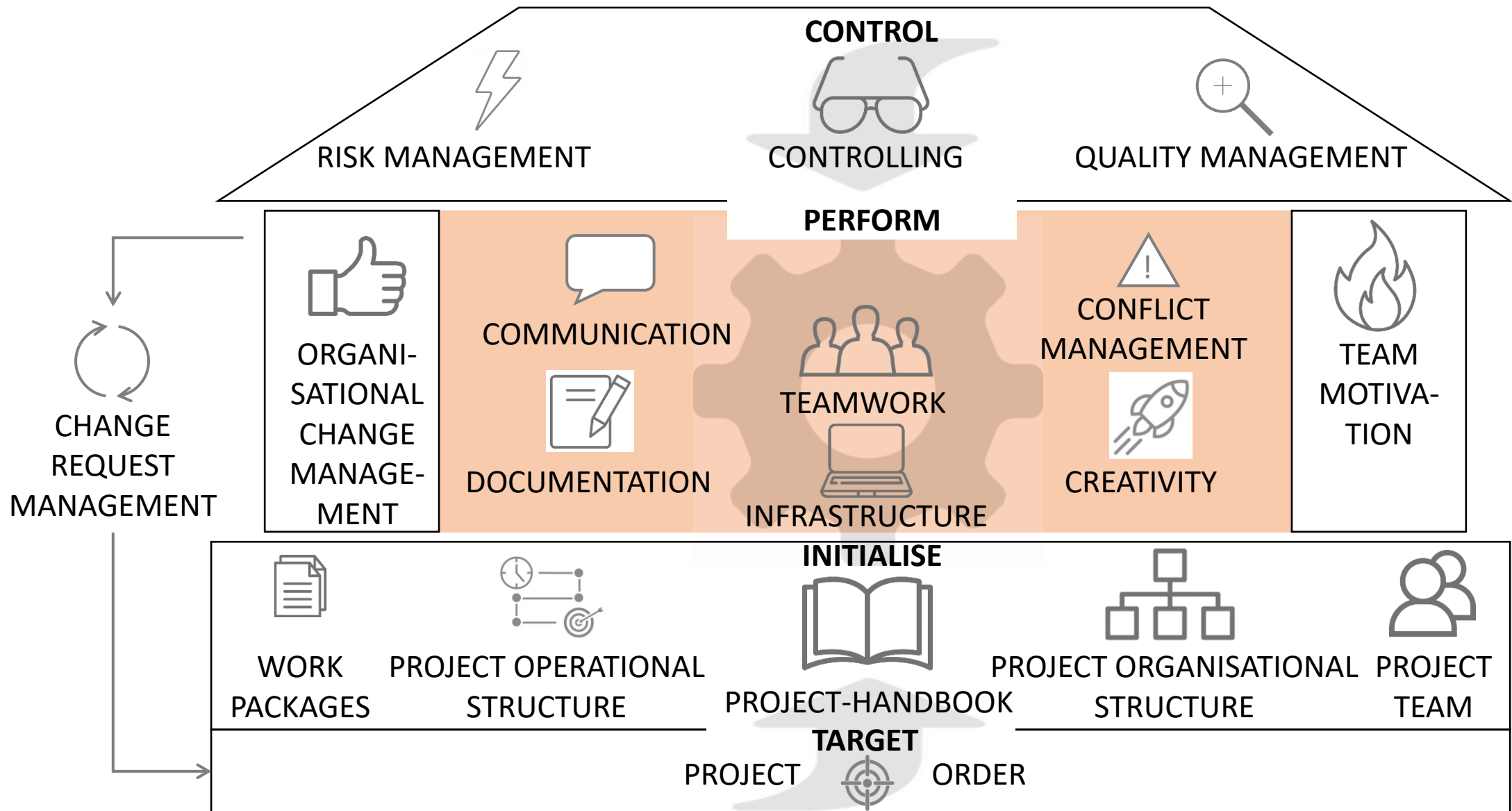
Part 8

- 1. Introduction
- 2. People & Teams
- ▶ 3. Classical Project Management
- 4. Agile Project Management
- 5. Hybrid Project Management

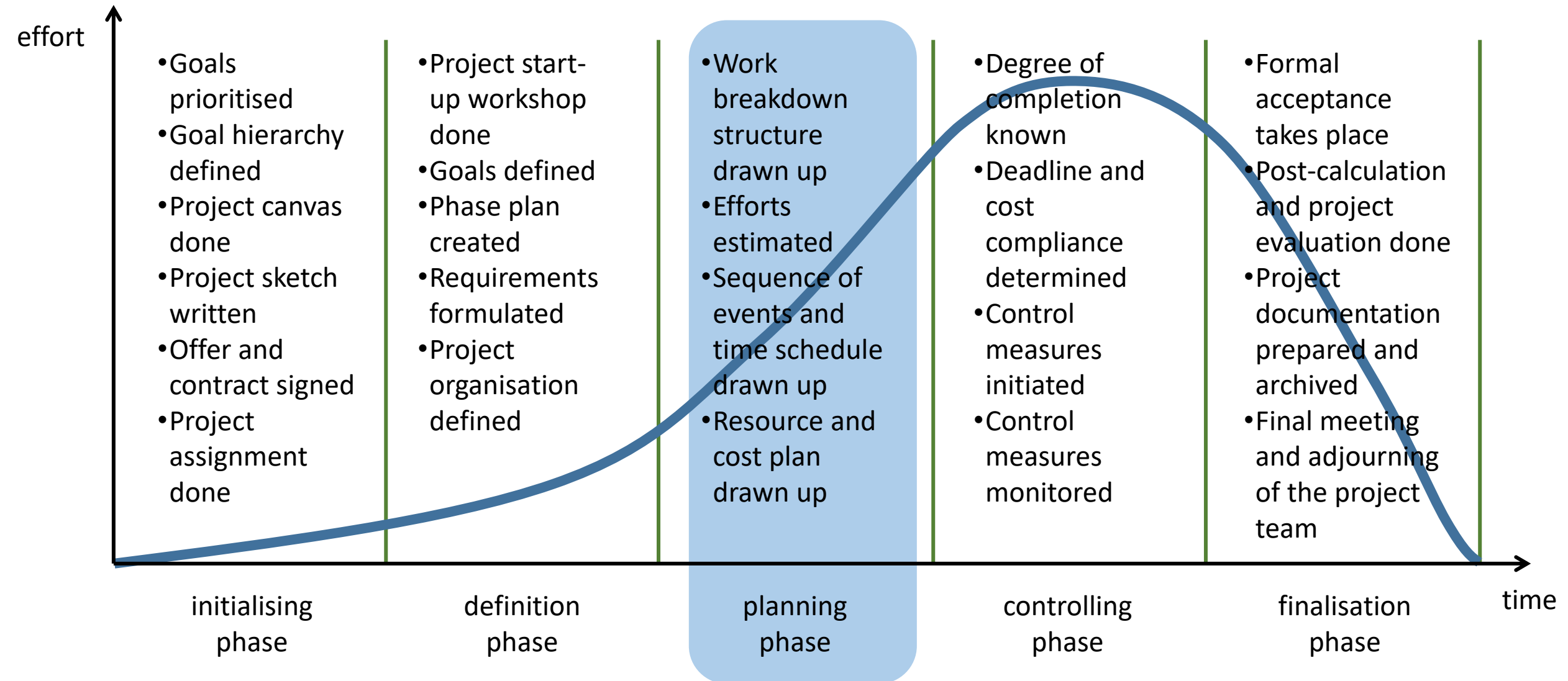


IT-based Network Planning

PM House



Project life cycle



Scheduling Methods

- **Schedule**

List with all dates



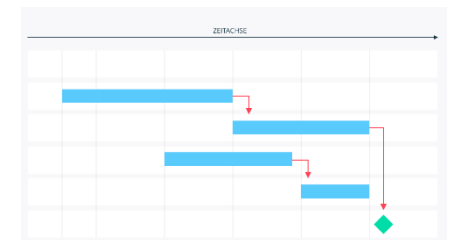
- **Gantt chart**

List of all tasks that are graphically entered in the form of bars along a timeline

Task Name	Q1 2019			Q2 2019		Q3 2019
	Jan 19	Feb 19	Mar 19	Apr 19	Jun 19	Jul 19
Planning						
Research						
Design						
Implementation						
Follow up						

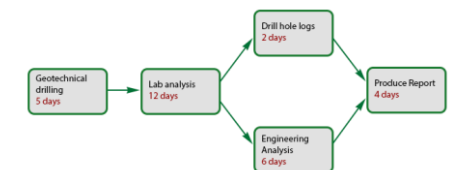
- **Networked Gantt Chart**

Gantt chart showing the interdependencies of the tasks



- **Network plan**

Representation of tasks and their interdependencies



Network planning technique

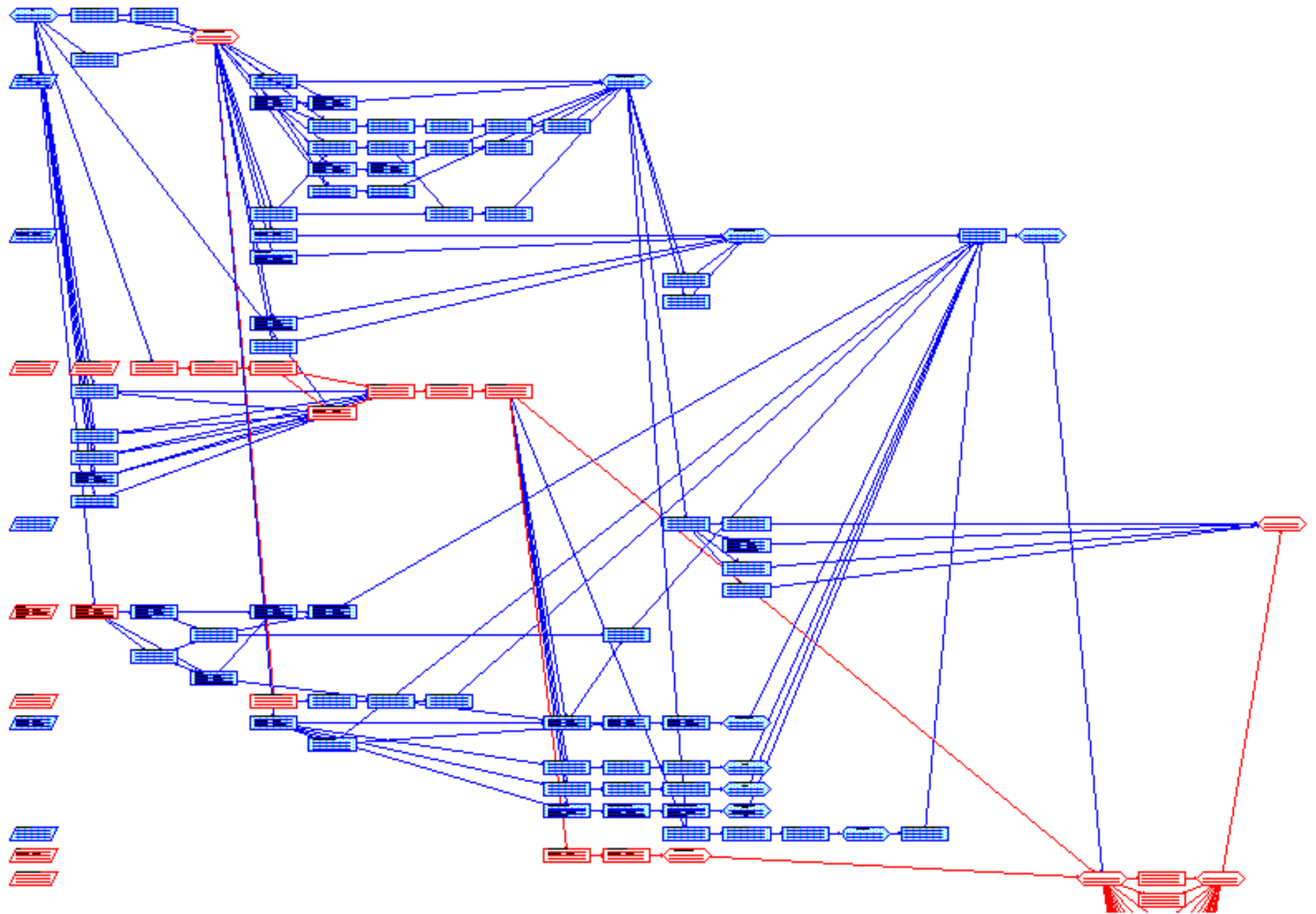
- Developed primarily to simplify the planning and scheduling of large and complex projects
- First used to support the U.S. Navy's Polaris nuclear submarine project 1957 (SS51 Nautilus)
- Used for the U.S. Apollo space program
- Used for the 1968 Winter Olympics in Grenoble which applied it from 1965 until the opening of the 1968 Games.



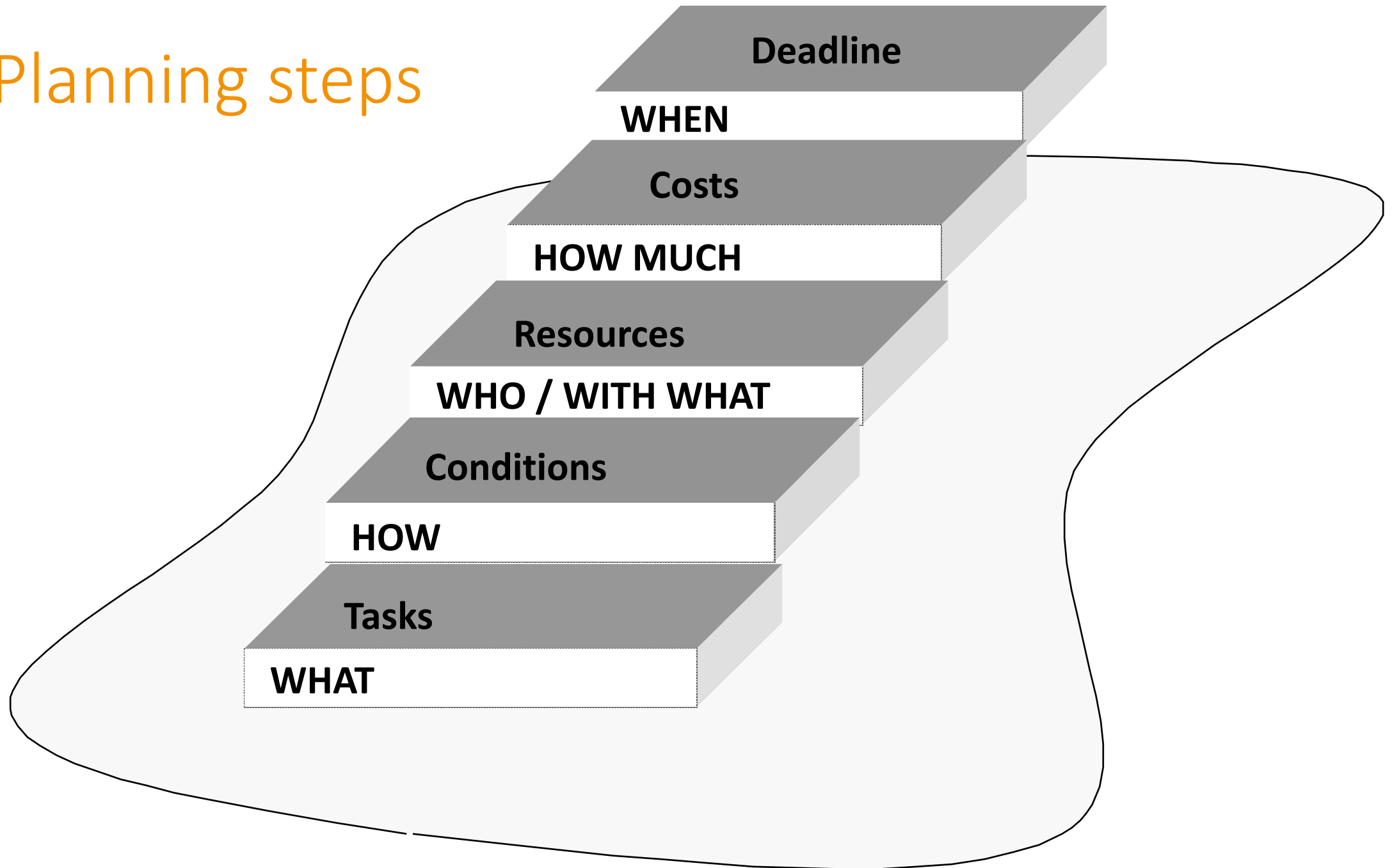
Example: Activity list with networked Gantt chart

Activities and dates					Date:													
Nr.	activities measures task	Res- pon- sible	Pre- con- dition	Dura- tion in weeks	Scheduling or Gantt chart													
					1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Project																	
2	Phase 1																	
3	Task A	MM	-	6														
4	Task B	MM	3	1														
5	Task D	PP	-	2														
6	Task E	PP	5	3														
7	Task C	MM	3;6	2														
8	Task F	TT	7	3														
9	Task G	MM	8	1														
10	Prepare MS	PL	4;9	1														
11	MS-decision	AG	10	0														
12	Phase 2																	
13	Task H	MM																

Example: network plan

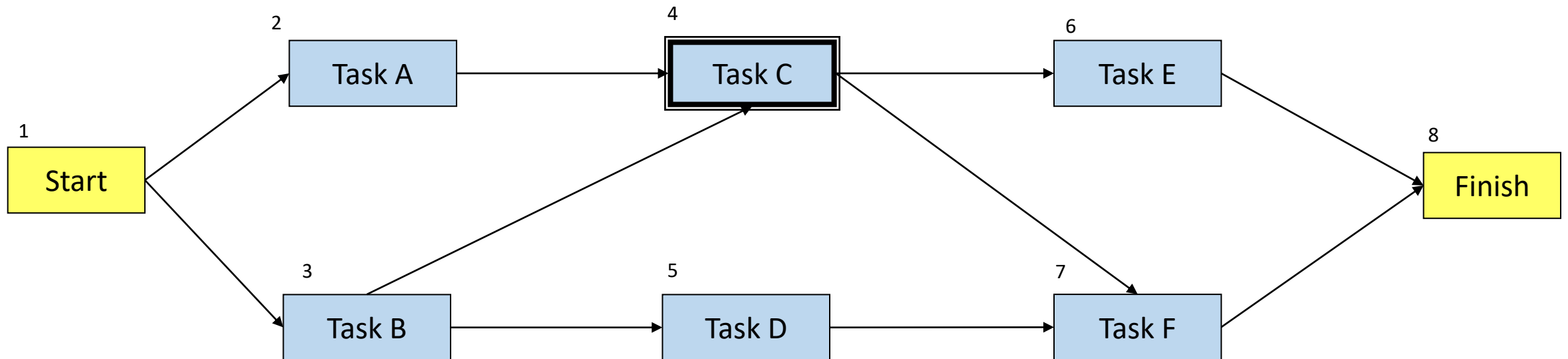


Planning steps

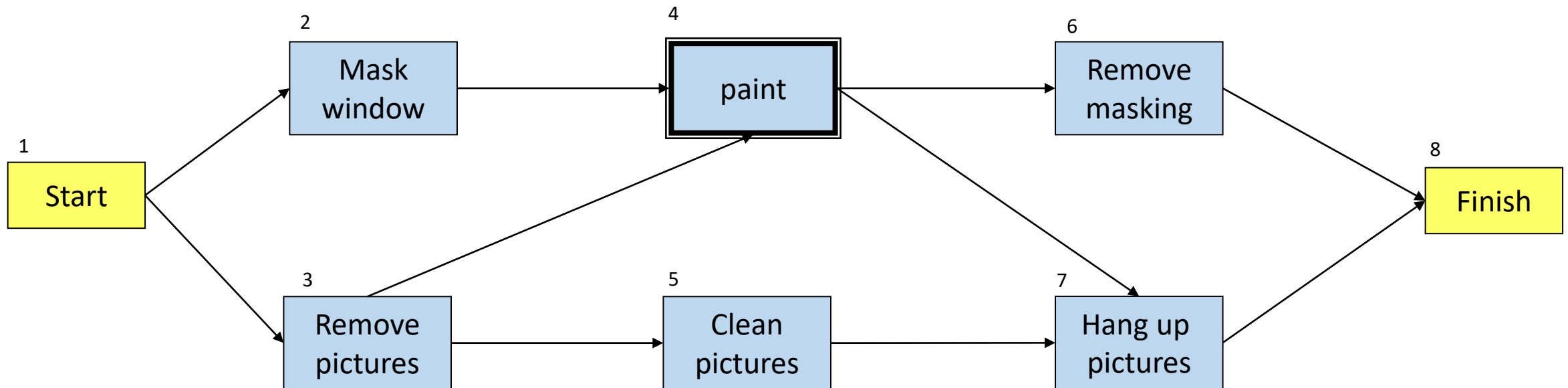


Network planning technique

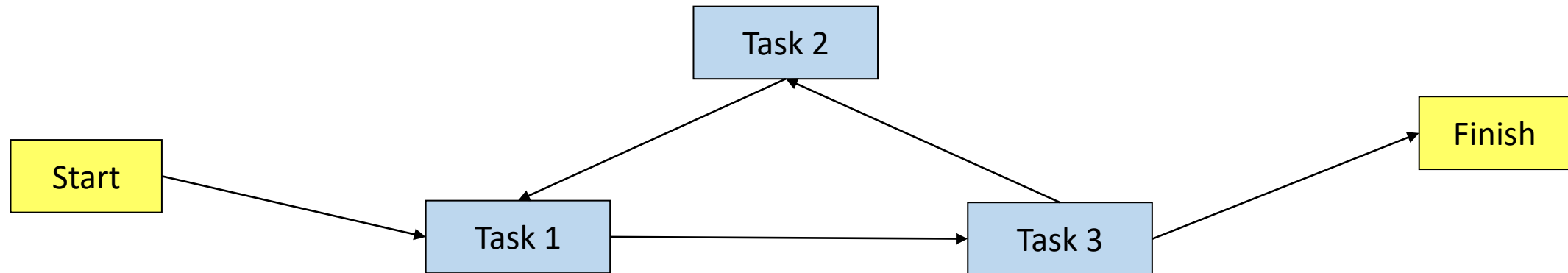
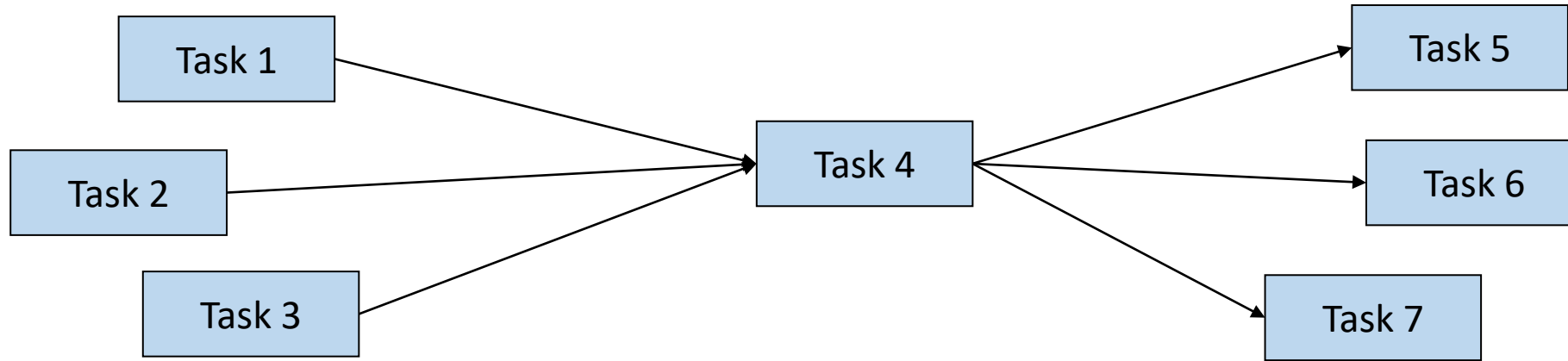
- Presentation of the logical relationships
- Developing a timeline
- Finding the critical points
- Ongoing control and deadline monitoring



Example in Network Planning: Painting a room

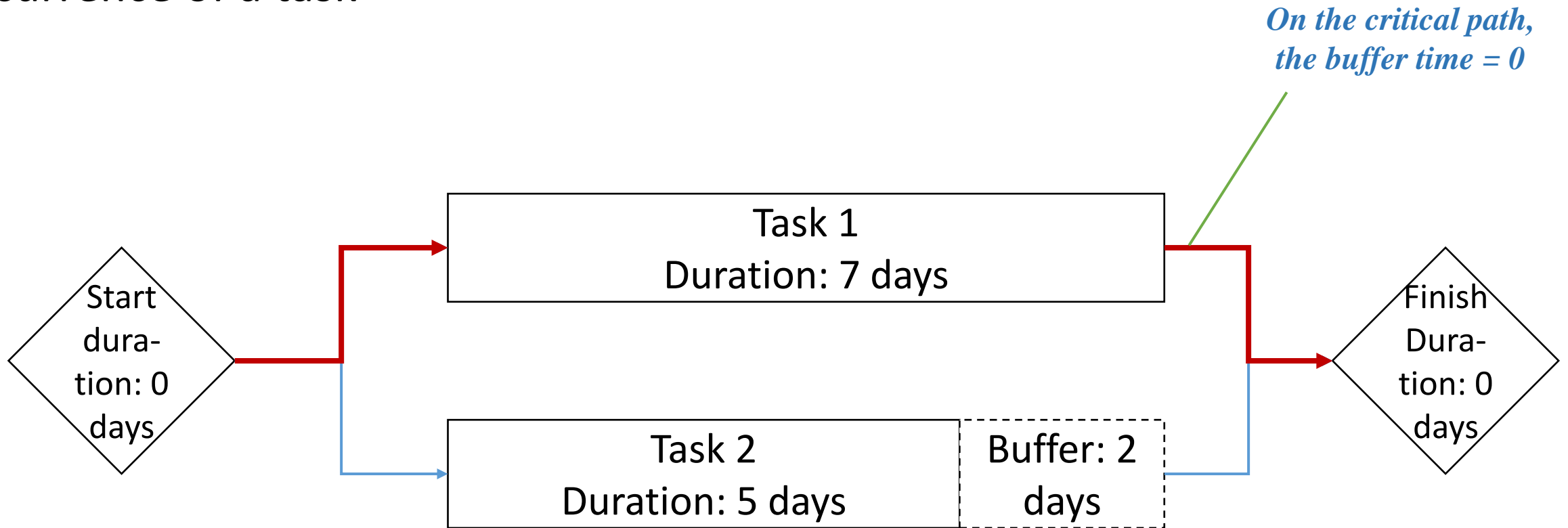


Network planning technique – mistakes



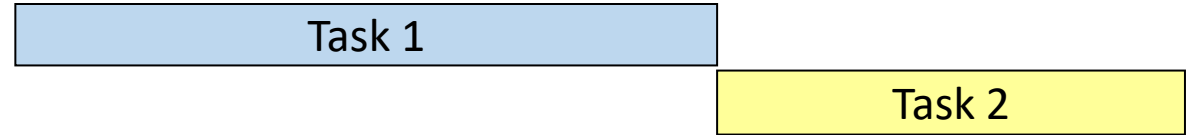
Buffer Time and Critical Path

Buffer time = time between the earliest possible and the latest possible occurrence of a task

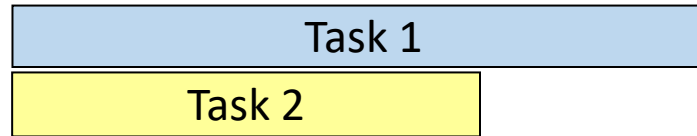


Network: Temporal dependencies

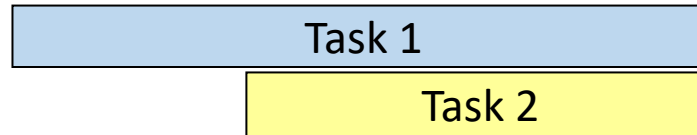
- Finish – Start (FS)



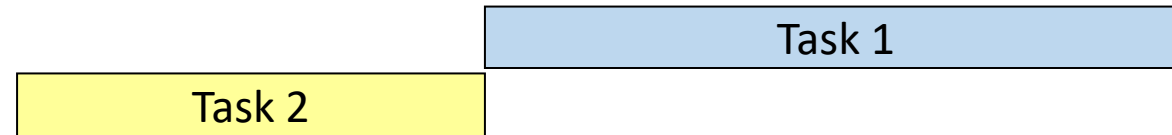
- Start – Start (SS)



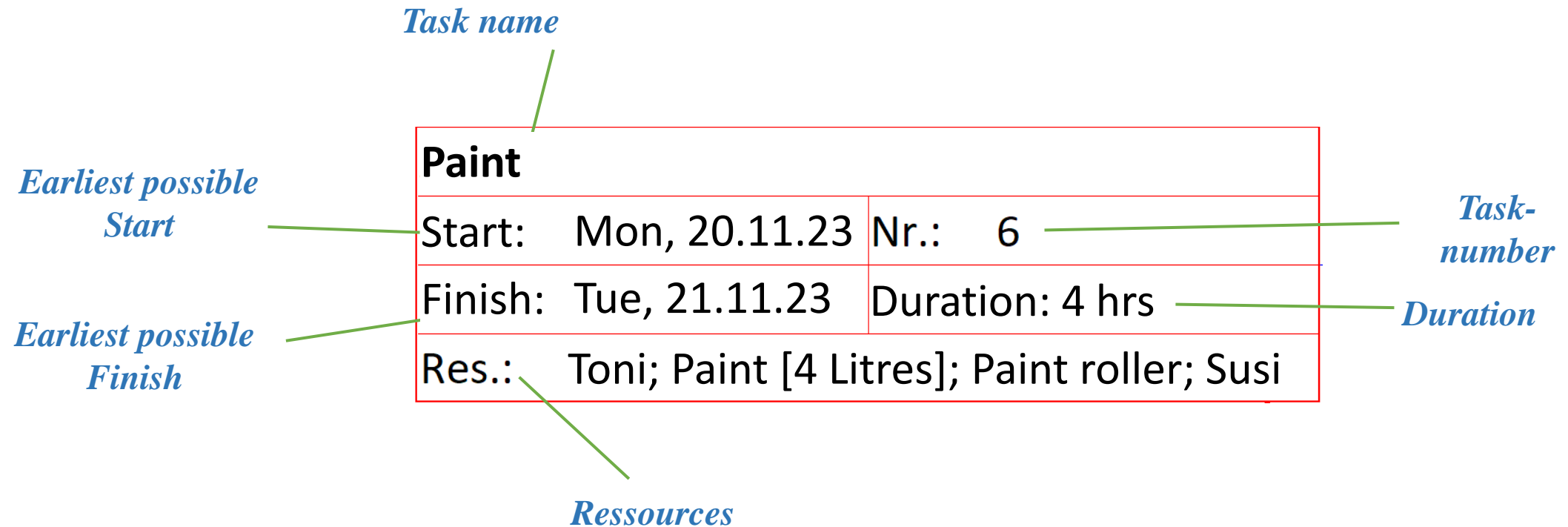
- Finish – Finish (FF)



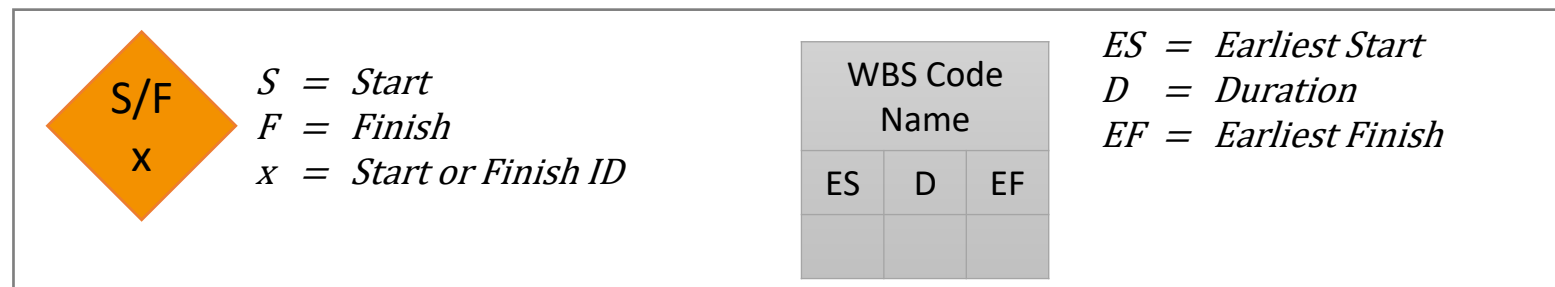
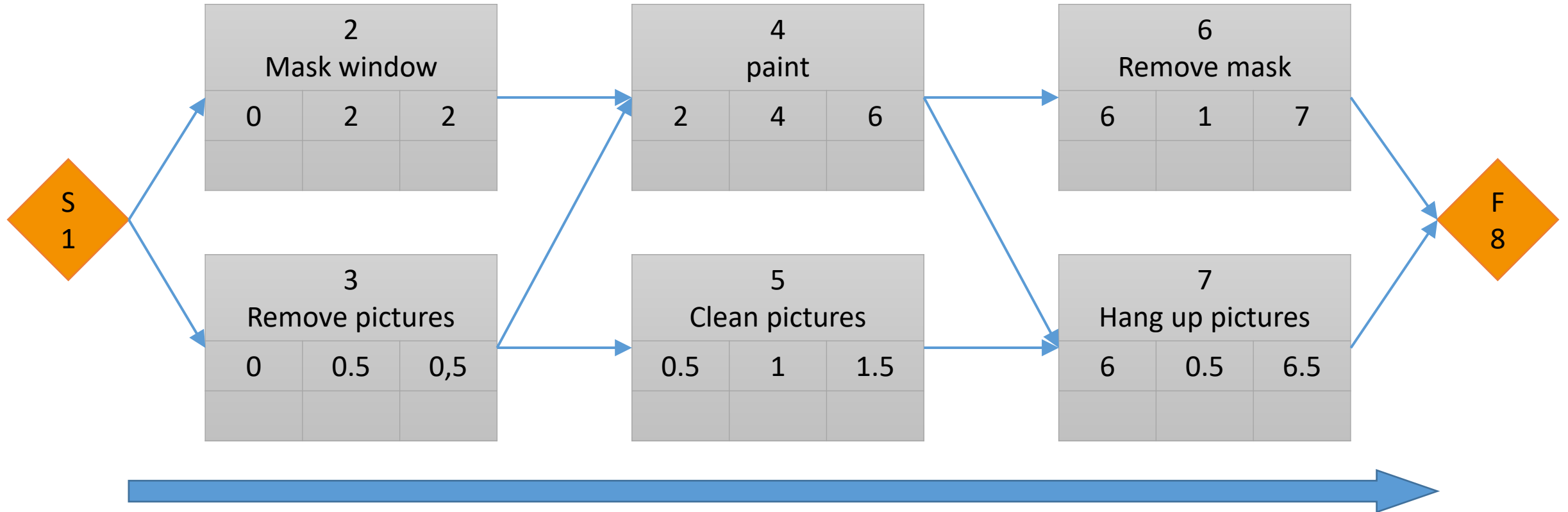
- Start – Finish (SF)



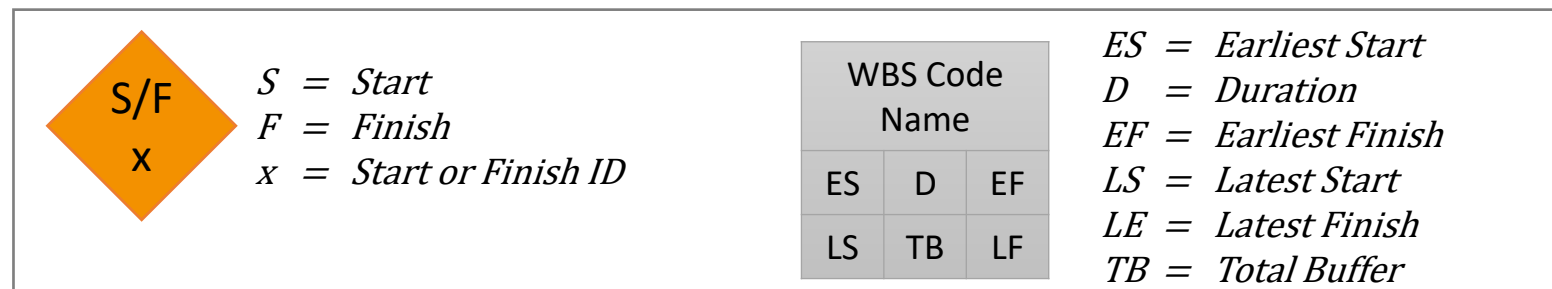
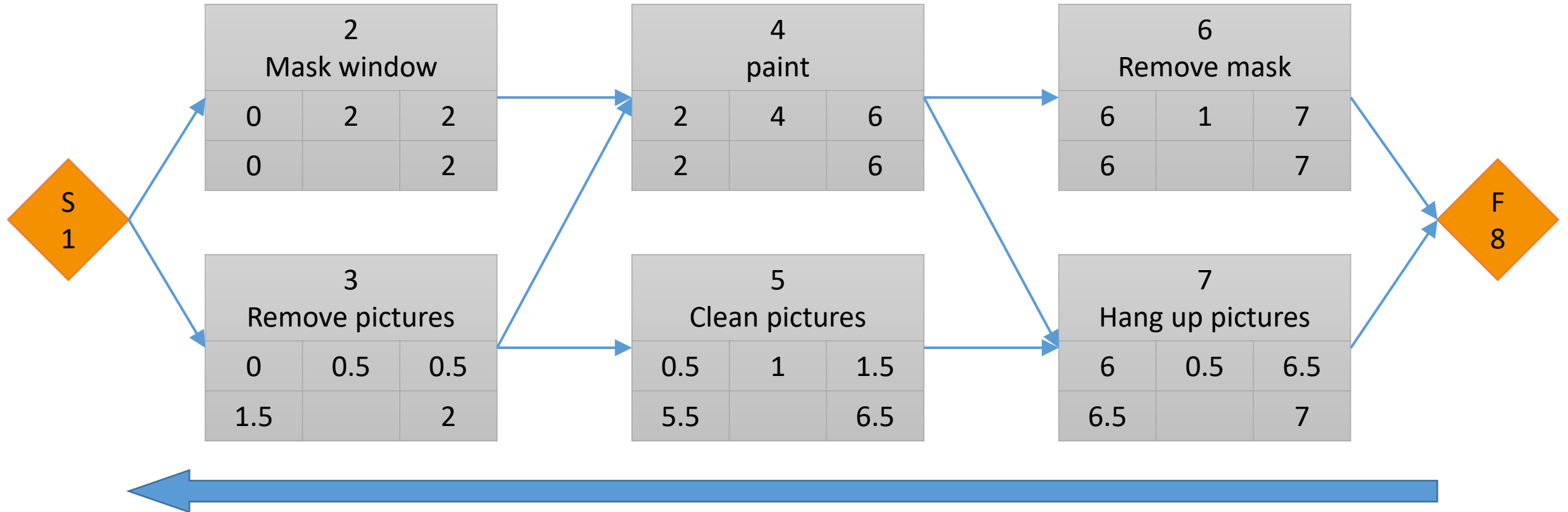
Network planning - precedent presentation



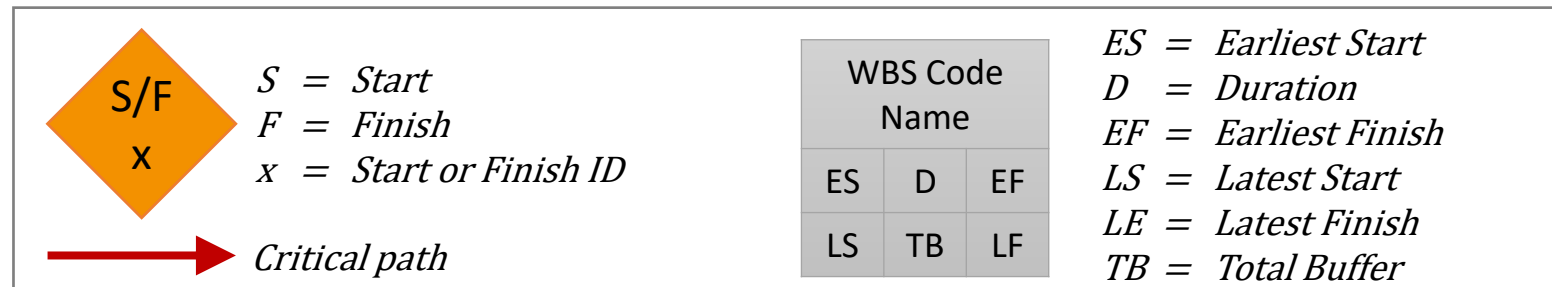
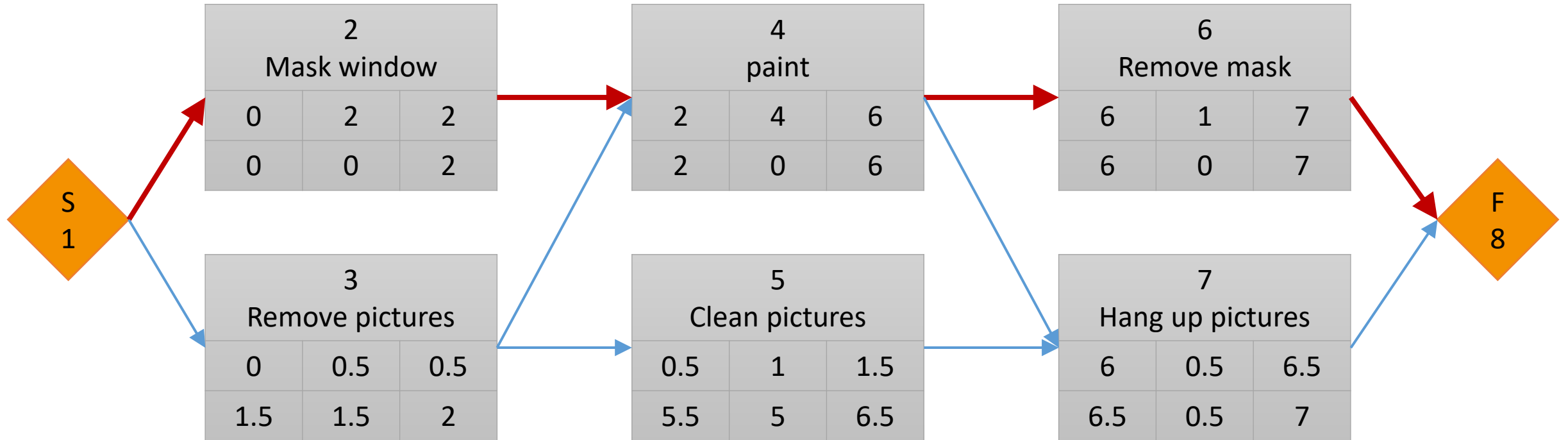
Network Diagram - Forward Scheduling



Network diagram - backward termination



Network Plan – Buffer and Critical Path



Network planning technique - Methods

Critical Path Method (CPM)

- First published 1957
 - standardisable projects
 - High profile
 - Little uncertainty
 - Existing experience
-
- Process-oriented
 - Estimation of a duration

Program Evaluation and Review Technique (PERT)

- First published 1958
 - Projects that are difficult to standardise
 - Low awareness
 - Great uncertainty
 - Little experience
-
- event-oriented
 - Determination with probabilities

Network planning technique

CPM calculation method

Forward calculation

Task	Task name	Duration	Earliest possible start	Earliest possible finish
1-2	mask window	2 h	0.0 h	2.0 h
1-3	remove pictures	0.5 h	0.0 h	0.5 h
2-4	paint	4 h	2.0 h	6 h
3-5	clean pictures	1 h	0.5 h	1.5 h
4-7	hang up pictures	0.5 h	6.0 h	6.5 h
4-6	remove mask	1 h	6.0 h	7 h

Backward calculation

Task	Task name	Duration	latest possible finish	latest possible start
8-6	remove mask	1.0 h	7.0 h	6.0 h
8-7	hang up pictures	0.5 h	7.0 h	6.5 h
7-5	clean pictures	1.0 h	6.5 h	5.5 h
6-4	paint	4.0 h	6.0 h	2.0 h
4-3	remove pictures	0.5 h	2.0 h	1.5 h
4-2	mask window	2.0 h	2.0 h	0.0 h

PERT: estimation of time

$$T_e = \frac{T_o + 4 \cdot T_m + T_p}{6}$$

T_e = Estimated duration of a task

T_o = Duration of the task in the best case / optimistic estimate

T_p = Duration of the task in the worst case / pessimistic estimate

T_m = Duration of the task in the most probable case / most probable estimate

Network planning technique

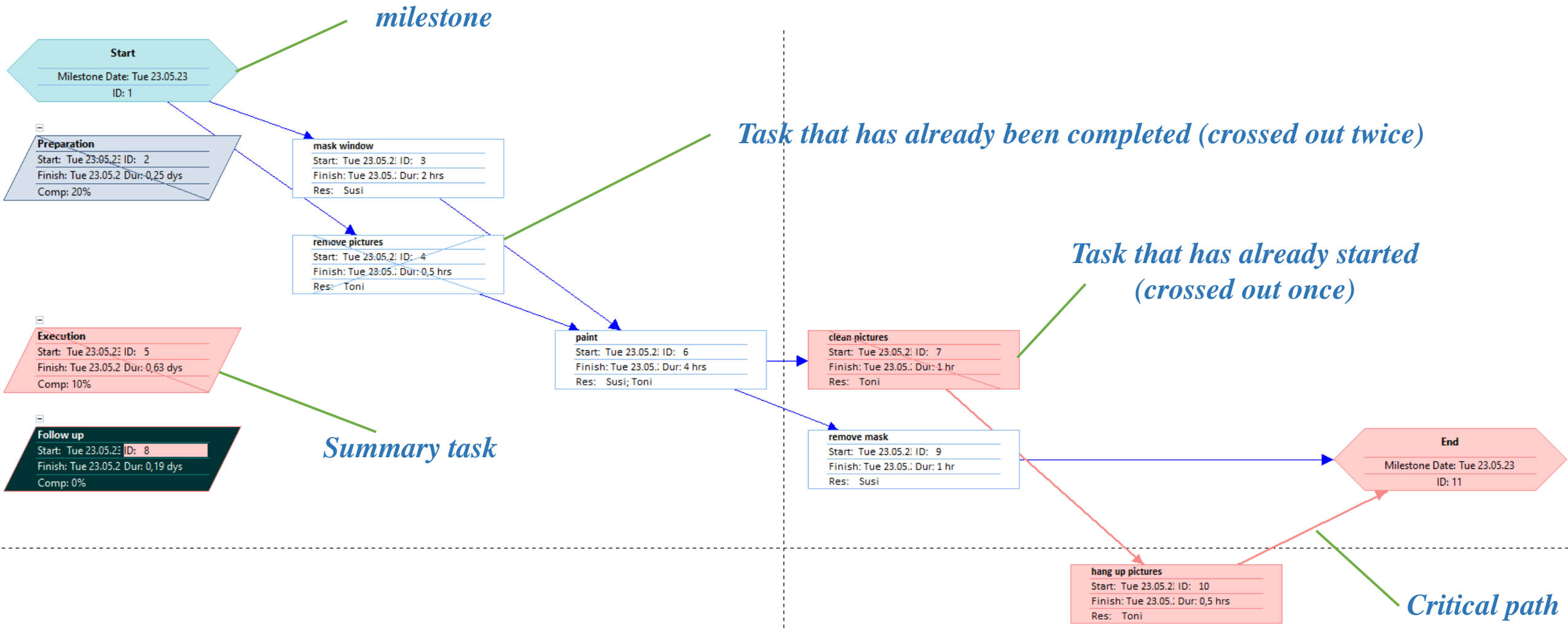
PERT calculation method

Forward calculation

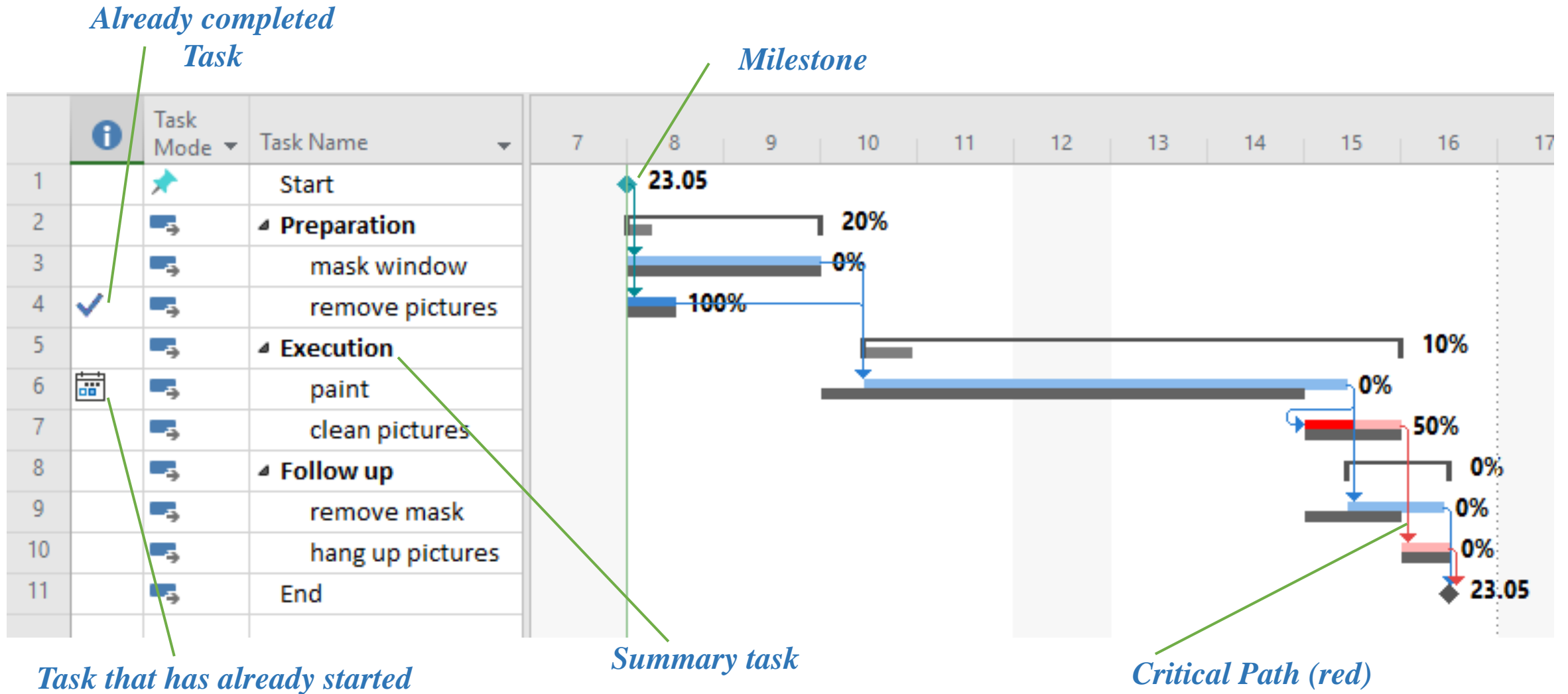
Backward calculation

Event						
Nr	Name	earliest possible entry		latest possible entry		buffer time
1	Start	0.0 h		0.0 h	↑	0.0 h
2	window masked	0.0 h		0.0 h		0.0 h
3	pictures removed	0.0 h		1.5 h		1.5 h
4	painted	2.0 h		5.0 h		3.0 h
5	pictures cleaned	0.5 h		5.5 h		5.0 h
6	mask removed	6.0 h		6.0 h		0.0 h
7	pictures hang up	6.0 h		6.5 h		0.5 h
8	End	7.0 h	↓	7.0 h		0.0 h

Example Network Planning - Controlling



Example: Gantt Chart with Controlling



Procedure

1. Creating a new project
2. Entering the operations
3. Link the tasks
4. Set the duration of the tasks
5. Setting milestones
6. Entering and assigning resources
7. Resolving resource conflicts and scheduling conflicts
8. Enter the cost