Resource management

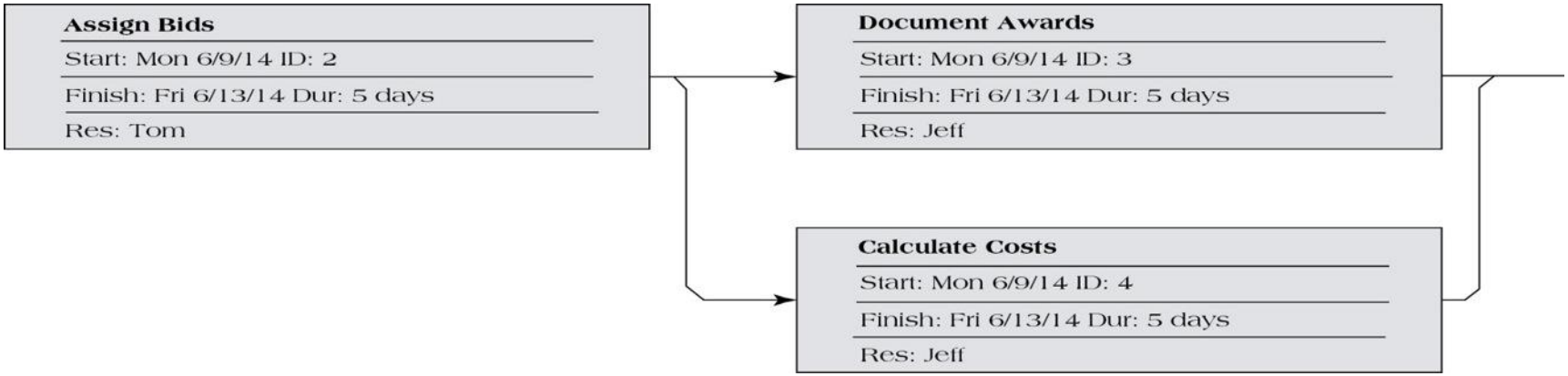
Chapter 12

Types of Constraints

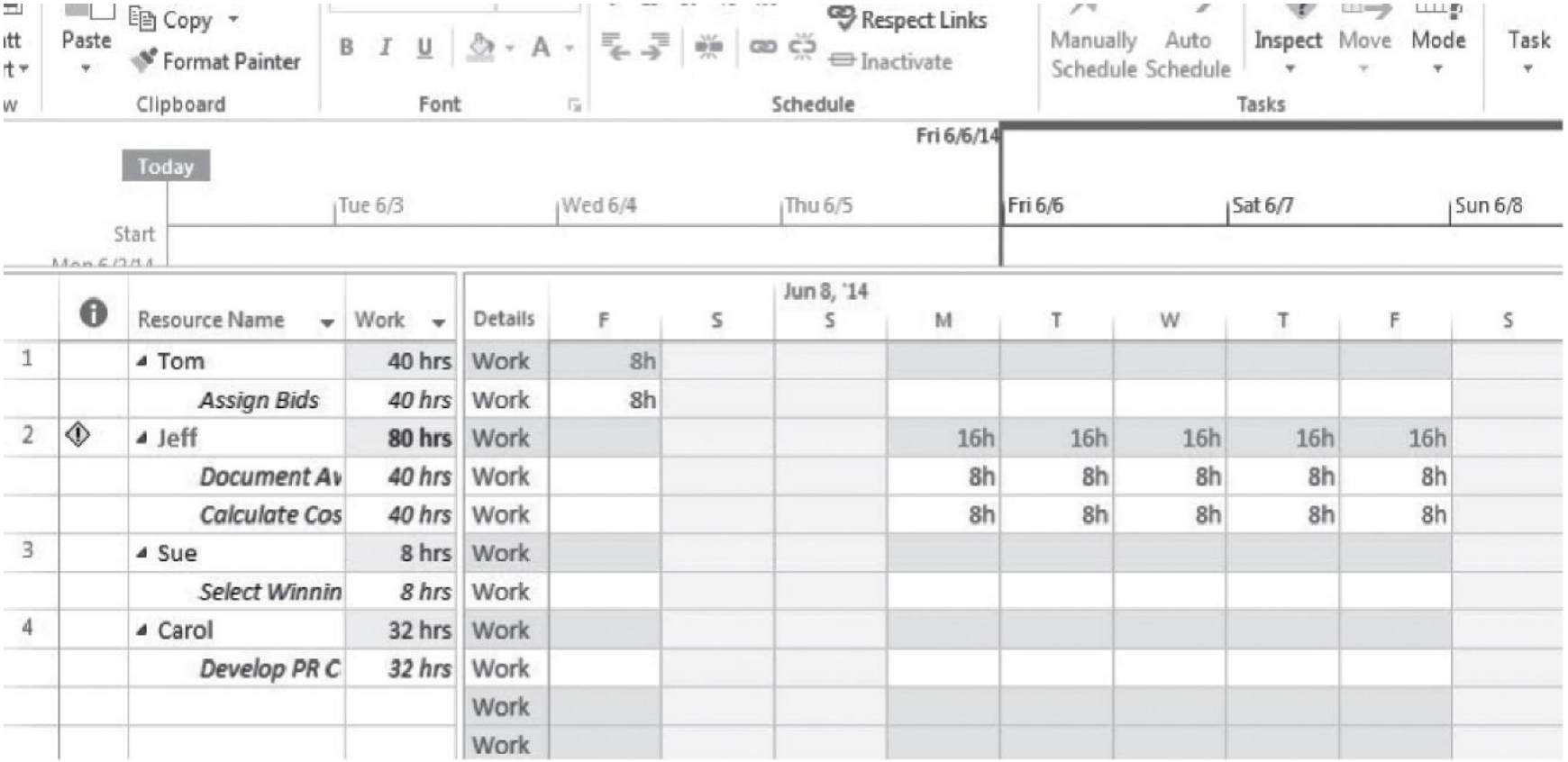
- Physical
- Time
- Resource
- Mixed

Activity precedence example

Activity	Description	Duration	Predecessors	Member Assigned
A	Assign Bids	5 days	None	Tom
B	Document Awards	5 days	A	Jeff
C	Calculate Costs	5 days	A	Jeff
D	Select Winning Bid	1 day	B, C	Sue
E	Develop PR Campaign	4 days	D	Carol



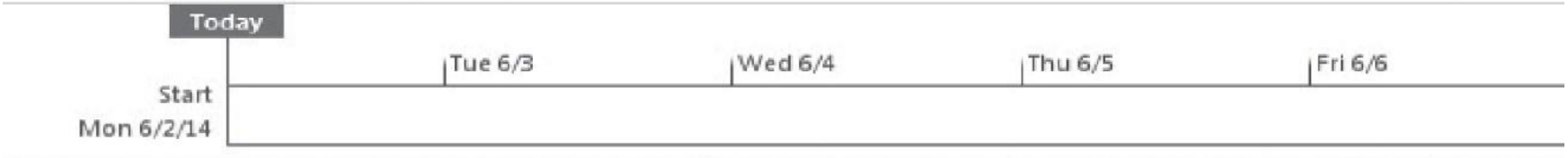
Resource-Loading Chart Demonstrating Overallocation



Resource Usage Table

		Resource Name	Work	Details	June 1 6/1	June 11 6/8	June 21 6/15	6/22	July 1 6/29
1		Tom	40 hrs	Work	40h				
		Assign Bids	*40 hrs*	Work	40h				
2		Jeff	40 hrs	Work		40h			
		Document Awards	*40 hrs*	Work		40h			
3		Sue	8 hrs	Work			8h		
		Select Winning Bid	*8 hrs*	Work			8h		
4		Carol	32 hrs	Work			32h		
		Develop PR Campaign	*32 hrs*	Work			32h		
5		Bob	40 hrs	Work		40h			
		Calculate Costs	*40 hrs*	Work		40h			
				Work					

Example of Resource Usage Table with Overallocation



		Resource Name	Work	Details	June 1 6/1	June 11 6/8	6/15	June 21 6/22	July 1 6/29
1		Tom	40 hrs	Work	40h				
		Assign Bids	*40 hrs*	Work	40h				
2	⚠	Jeff	80 hrs	Work		80h			
		Document Awards	*40 hrs*	Work		40h			
		Calculate Costs	*40 hrs*	Work		40h			
3		Sue	8 hrs	Work			8h		
		Select Winning Bid	*8 hrs*	Work			8h		
4		Carol	32 hrs	Work			32h		
		Develop PR Campaign	*32 hrs*	Work			32h		
5		Bob	0 hrs	Work					
				Work					

Resource Leveling

A process that address the complex challenges of project constraints

Objectives:

- To determine the resource requirements so that they will be available *at the right time*
- To allow each activity to be scheduled with the *smoothest possible transition* across resource usage levels

Prioritization Rules for Leveling

1. Smallest amount of *slack*
2. Smallest *duration*
3. Lowest ID number *(FCFS)*
4. Greatest number of *successor tasks*
5. Requiring the *most resources*

General Procedure for Leveling

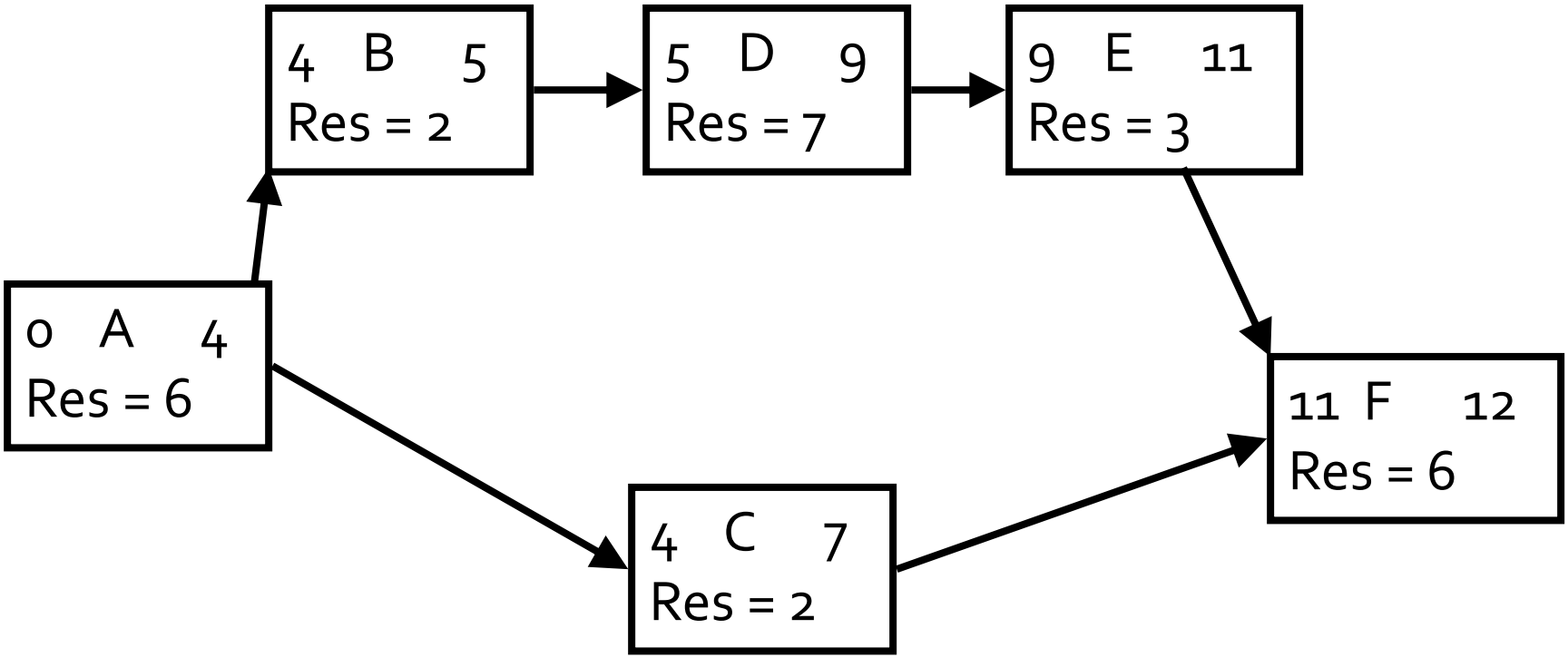
1. Create a project activity *network diagram*.
2. Develop resource *loading table*.
3. Determine activity *late finish* dates.
4. Identify resource *overallocation*.
5. *Level* the resource loading table.

Construct a resource-loading chart

To construct a time-limited resource loading chart for resource scheduling, there are six main steps to follow:

1. Create activity network.
2. Produce table for each activity, resource requirements, duration, early start time, slack, and late finish time.
3. List activities in order of increasing slack.
4. Draw an initial resource-loading chart with each activity scheduled at its earliest start time.
5. Rearrange activities within their slack to create a profile that is as level as possible
6. Use judgment to interpret and improve activity leveling.

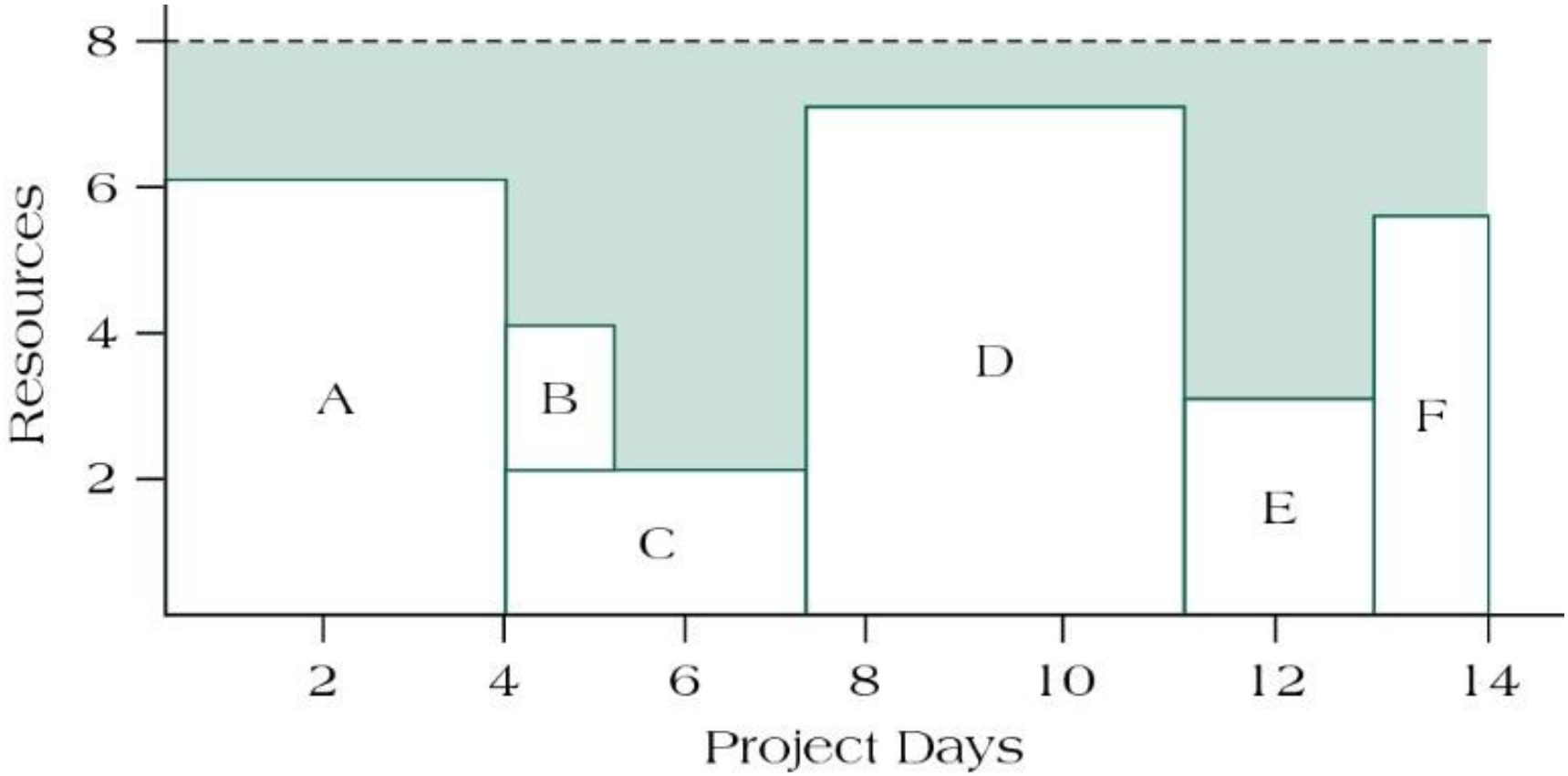
Sample project network



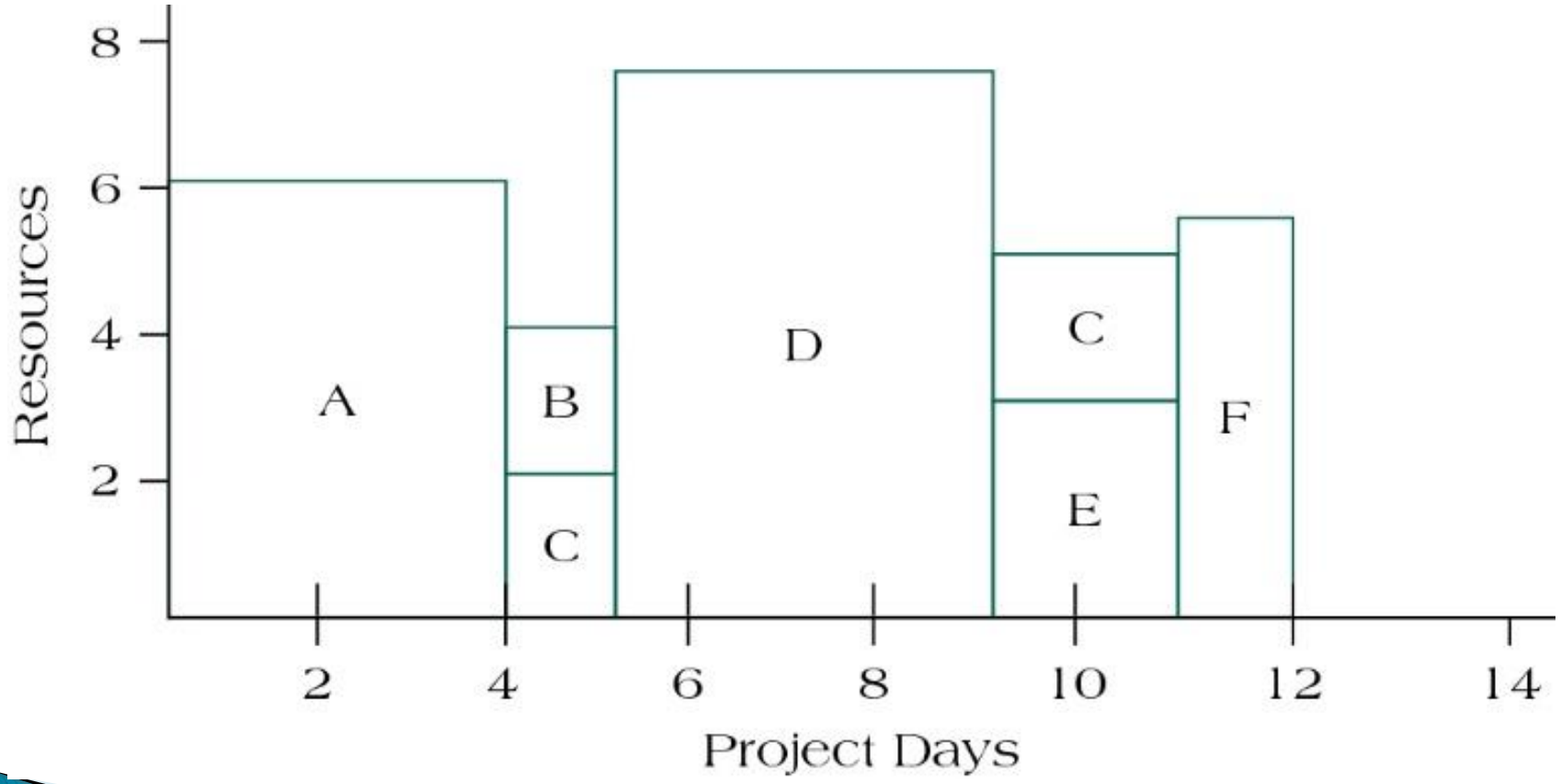
Creating Resource Loading Charts

Activity	Resource	Duration	ES	Slack	LF
A	6	4	0	0	4
B	2	1	4	0	5
C	2	3	4	4	11
D	7	4	5	0	9
E	3	2	9	0	11
F	6	1	11	0	12

Resource-loading chart



Modified resource-loading chart when splitting task c



Managing resources in multiproject environments

- Schedule Slippage
- Resource Utilization
- In-Process Inventory
- Resolving Resource Decisions in Multiproject Environments
  - First In Line
  - Greatest Resource Demand
  - Greatest Resource Utilization
  - Minimum Late Finish Time
  - Mathematical Programming