Managing the Design Process

ECE Senior Design

16 November 17

Definition of a Project

- A project is a quantifiable piece of work, with a defined start and end, and with expectations of specific deliverables.

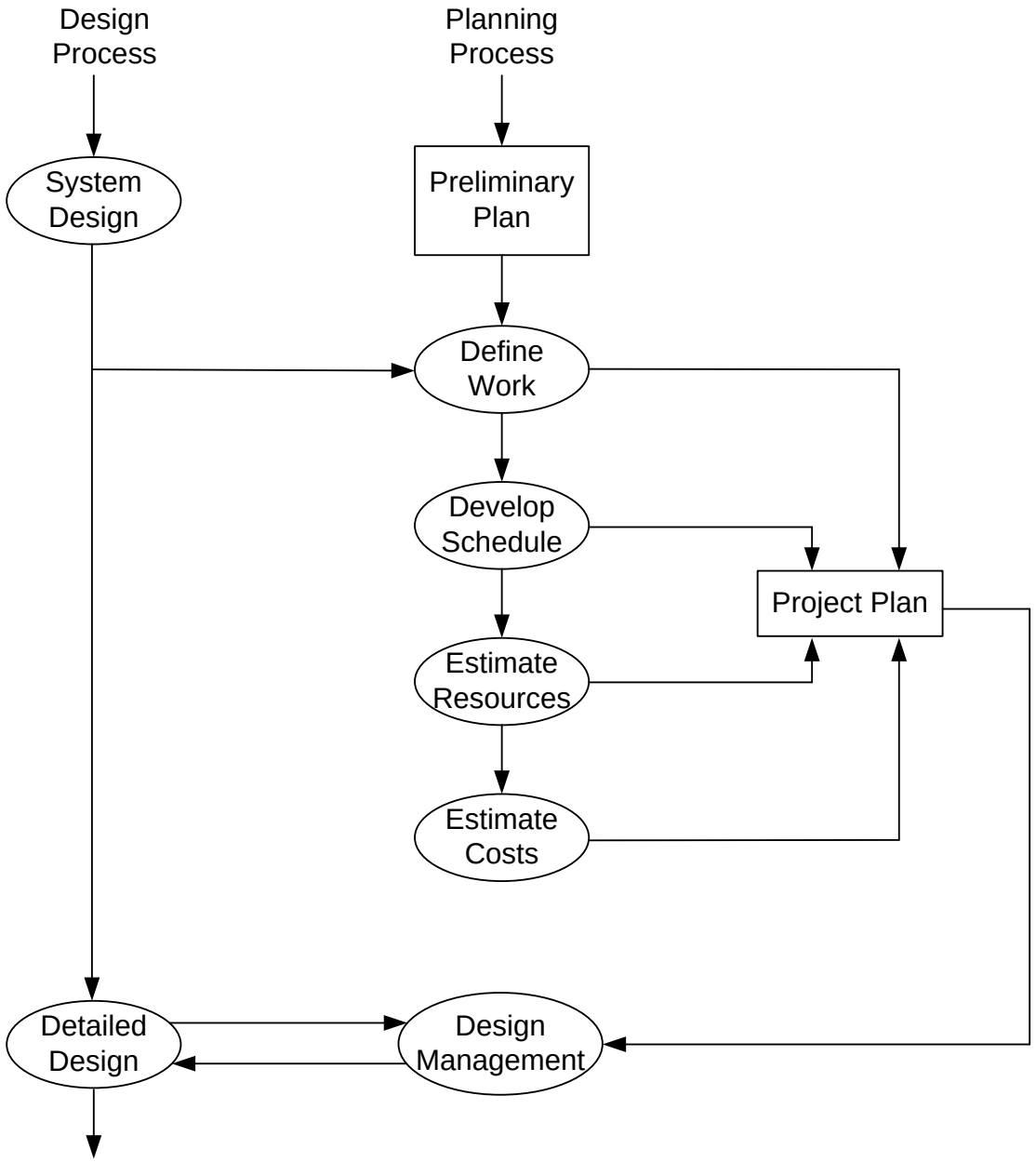
Managing a Project

- Planning
  - Work to be done
  - Budget
  - Resources Available
    - Materials
    - People
    - Equipment
- Monitoring
  - Deadlines Met
  - Funds Expended
  - Resources Fully Utilized
- Control
  - Adjusting Deadlines
  - Re-allocating Resources

Contents of a Project Plan

- Definition of Work
  - Breakdown the Task that Must be Completed
- Schedule
  - Allocation of Time and Resources for each Task
- Resource Requirements
  - Personnel, Materials and Equipment Needed
- Cost Estimate
  - Cost of Supplies and Services Required

Planning Process



Example:
RPM Measuring Device
Block Diagram

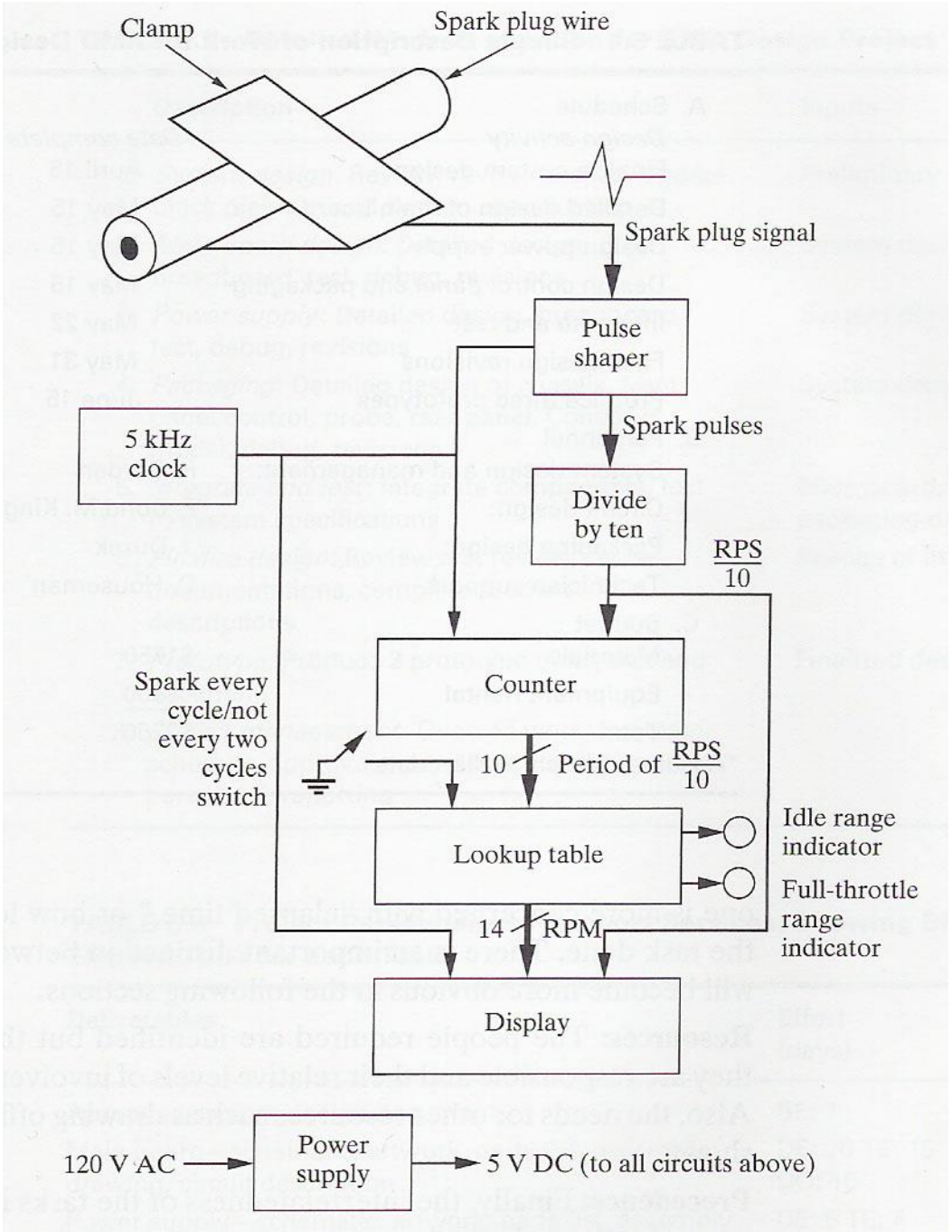


TABLE 5.1 Simple Description of Work for RMD Design Project

A. Schedule

Design activity	*Date complete*
Finalize system design	April 15
Detailed design of main board	May 15
Design power supply	May 15
Design control panel and packaging	May 15
Integrate and test	May 22
Final design revisions	May 31
Produce three prototypes	June 15

B. Personnel

System design and management:	R. Borden
Circuit design:	F. Bond/M. King
Packaging design:	J. Duzek
Technician support:	D. Houseman

C. Budget

Materials	$1750
Equipment Rental	$500
Total	$2250

*Assumes March 25 start date

TABLE 5.2 Detailed Work Description for RMD Design Project

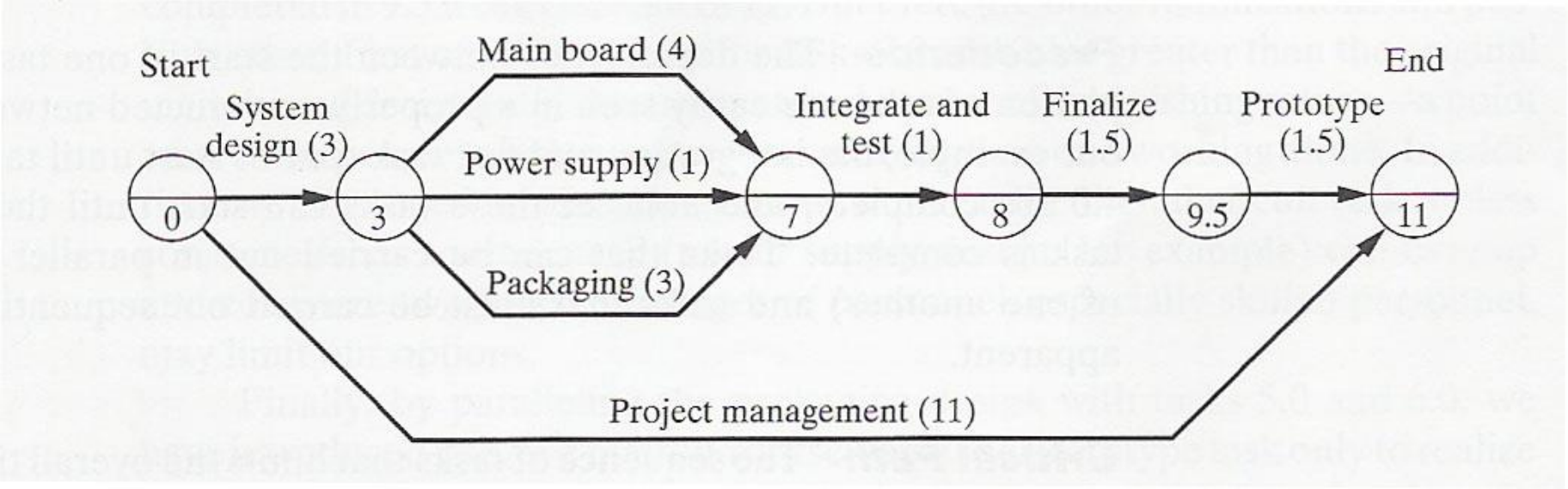
	Description	Inputs
1.	*System design*: Review, revise, finalize. Update block diagram and system specification	Preliminary system design
2.	*Main board design*: Detailed design, breadboard, test, debug, revisions	System design specifications
3.	*Power supply*: Detailed design, breadboard, test, debug, revisions	System design specifications
4.	*Packaging*: Detailed design of chassis, front panel/control, probe, rear panel. Construct model, debug, revisions	System design specifications
5.	*Integrate and test*: Integrate components, test to system specifications	Main board, power supply, packaging design
6.	*Finalize design*: Review test results, revise documentations, complete product descriptions	Results of integrate and test
7.	*Prototype*: Produce 3 prototype units, test and document	Finalized design
8.	*Project management*: Oversee work, maintain schedule, approve expenditures, assign personnel, reporting	

TABLE 5.3 Project Personnel and Support Services, Showing Effort and Elapsed Time for Each Task

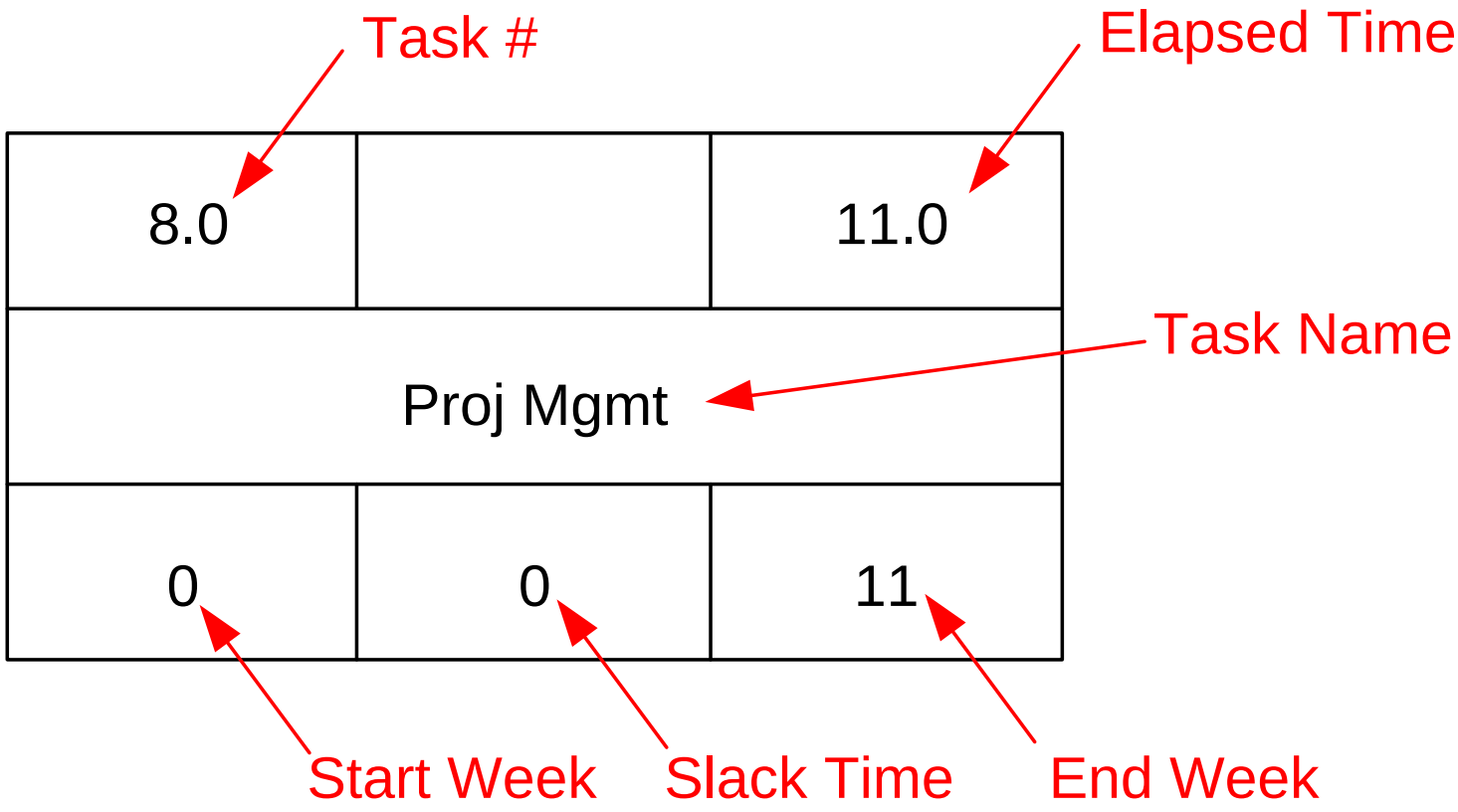
Deliverables	Effort (days)	Elapsed Time (weeks)
Approved system design document	SE: 7	3.0
Main board—schematic, artwork, parts list, assembly drawing, circuit description	DE: 20 TE: 15 DO: 15	4.0
Power supply—schematic, artwork, parts list, assembly drawing, circuit description	DE: 5 TE: 4 DO:2	1.0
Packaging design—machine drawings, silk screen, parts list, assembly drawings, circuit description	PE: 10 TE: 4 DO: 2	3.0
Complete tested unit, test results, as-built documentation	SE: 1 PE: 1 DE: 2 PS: 1 TE: 3	1.0
Revised documentation package, product description	SE: 2 PE: 1 DE: 1 PS: 1 TE: 3 DO: 5	1.5
3 working prototype units with test results	PS: 5 TE: 2 DE: 1	1.5
Project management	SE : 20	11.0

Abbreviations: SE = Senior Engineer; DE = Design Engineer; PE = Packaging Engineer; TE = lab Technician; DO = Drawing Office; PS = Prototype Shop

Network Diagram
Activity on Arrow (AOA)

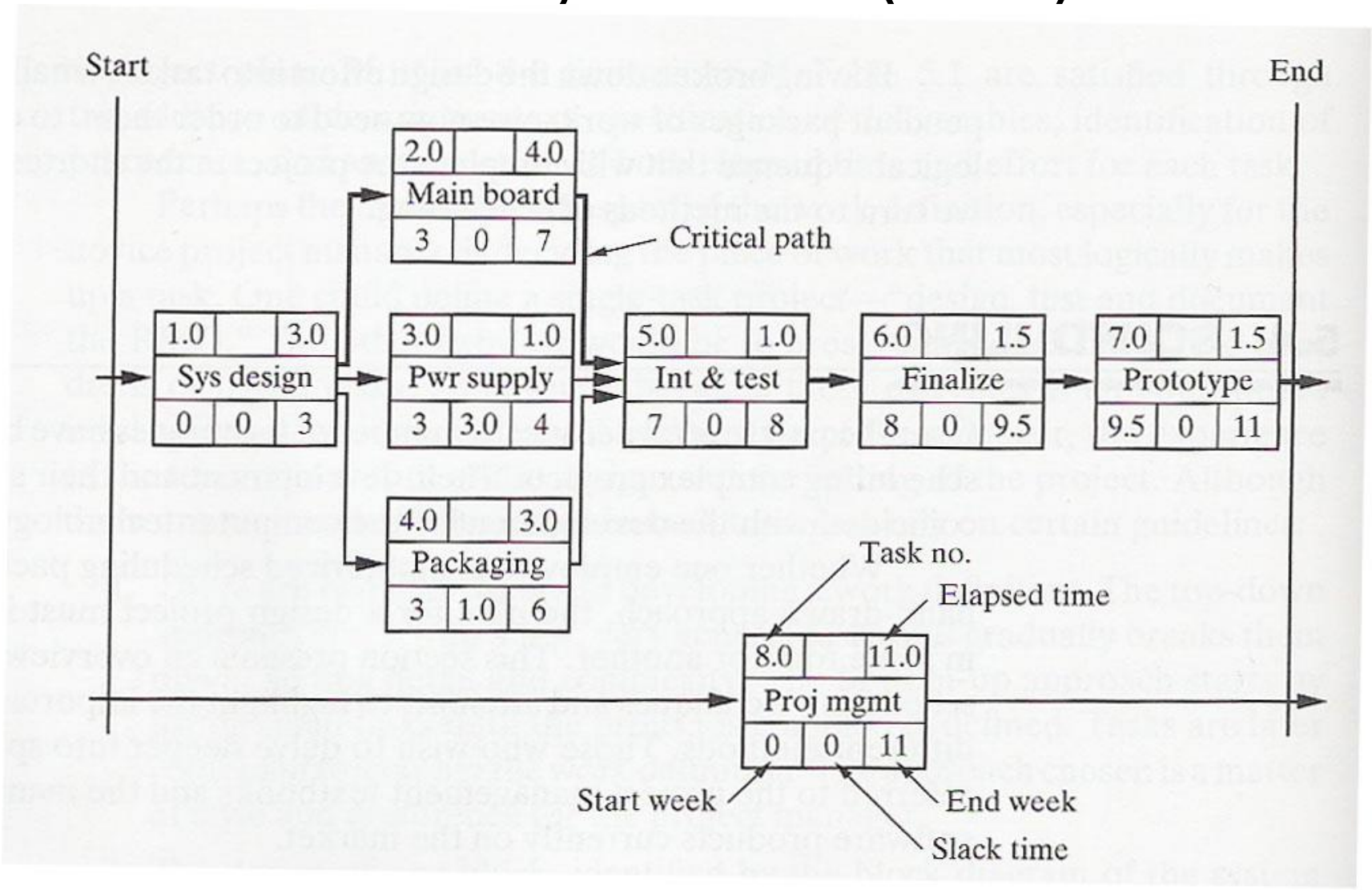


Activity on Node
Box Description

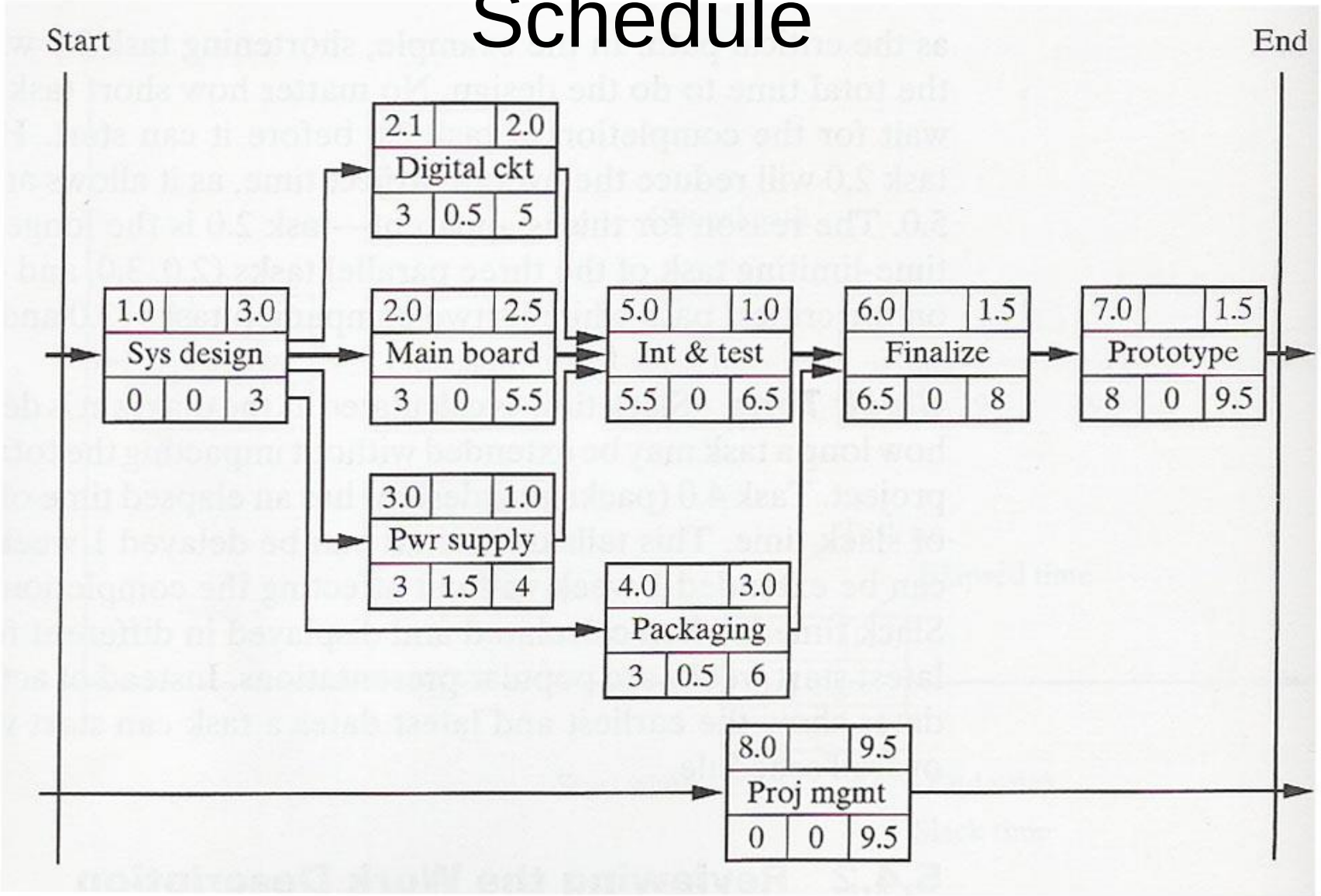
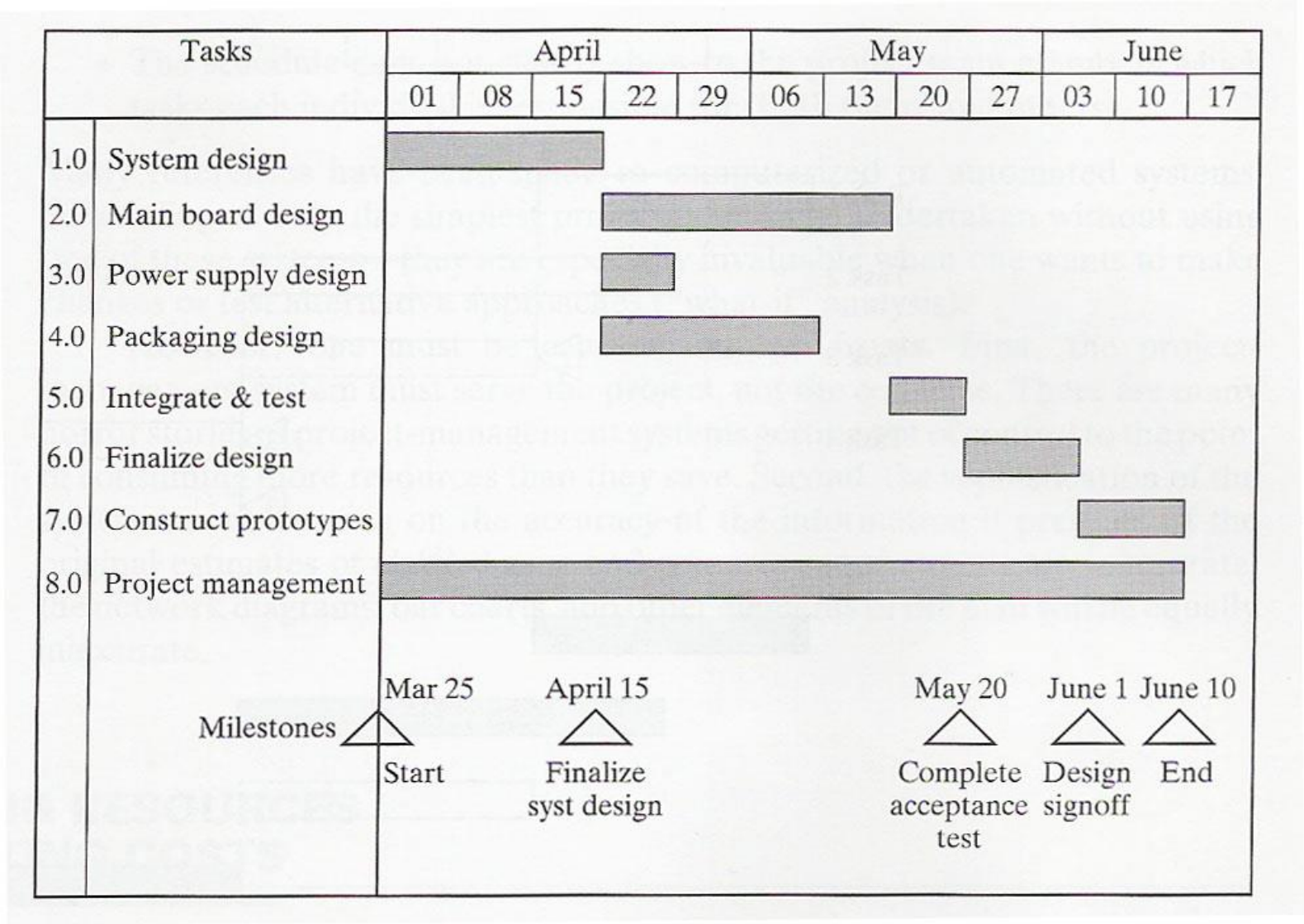


Network Diagram

Activity on Node (AON)



Network Diagram Compressed Schedule



Bar Chart (Gantt Chart)