

CIS 8150  
Information Technology  
Project Management

Resource Loading and Leveling

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Project Planning: A Roadmap

- Develop project charter
- Establish work breakdown structure
- Analyze sequencing relationships
- Estimate "normal" activity durations
- Perform network calculations and validate/revise initial schedule
- Perform time-cost tradeoff analysis
- • **Load resources to activities and resolve any resource/workload imbalances**
- Develop budget and cash flow plan based on analysis of direct and indirect costs
- Analyze schedule risk
- Monitor and control project

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What is a Resource?

- What's a resource?
- A resource is any entity that contributes to the accomplishment of project activities
  - Personnel
  - Equipment
  - Contractors
  - Space
  - Materials

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## Resource Planning

- Resource planning is the process of making sure resources are available as required to execute the project according to schedule
- Questions to ask:
  - *What type* of resource is required?
  - *How much* resource is required?
  - *When and how long* is the resource needed?
  - *Where* is the resource required?

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## Resource Loading

- Resource loading involves specifying the types and quantities of resources required to complete each activity in a project
- Note that resources are loaded not at the project level, but at the activity level
- Resources can be identified
  - By name (if you have individual professionals with unique skills, this is a reasonable approach)
  - By generic type (e.g., system analysts)

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## How Do We Quantify Resources Used?

- One way is to use some measure of resource usage
  - Programmer days
  - Staff hours
  - Equipment hours
- Another way is to indicate the number of units of resource assigned
  - Programmers
  - Workstations

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## Scheduling Resources

- A resource requirements list can be constructed by listing each activity and the resources that will be required

- Example

Activity	Resource	Days	Notes
Design database	Systems Analyst	7 F/T	

- Required resources are then mapped to the activity plan to assess the distribution of resources required over the duration of the project

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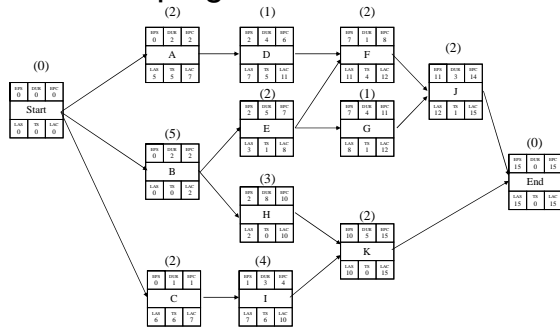
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## Developing a Resource Profile




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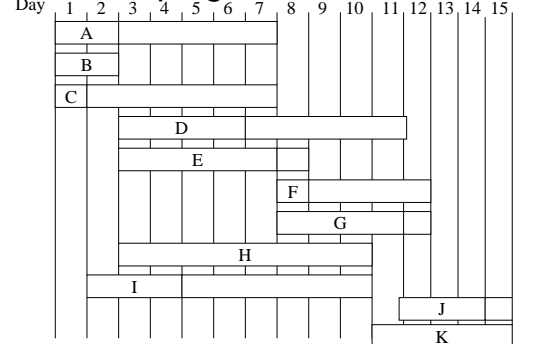
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## Developing a Resource Profile




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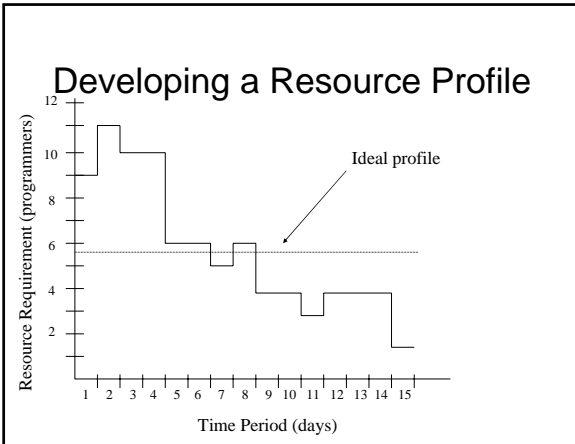
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- ### Resolving Workload/Resource Imbalances
- Request additional resources
  - Plan to work overtime
  - Contract out work
  - Delay start or extend durations of non-critical activities
  - Change the approach used to perform the work
  - Reduce project scope or extend project deadline

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- ### Resource Leveling
- Scheduling resources by earliest possible start date often leads to an uneven resource profile that is more likely to call for levels of resource beyond those available
  - By adjusting the start date of some activities and splitting others, we can achieve a more level resource profile, reducing the maximum level of demand for limited resources

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## Resource Leveling

- Allocating a resource to one activity limits the flexibility for resource allocation and scheduling of other activities
- Resources should be allocated to activities in some rational order
- The priority must always be to allocate resources to critical path activities and then to those activities that are most likely to affect others
- In this way, lower priority activities are made to fit around the more critical, already scheduled activities

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## Approaches for Prioritizing Activities

- Total slack priority
  - Activities are ordered according to their total slack, those with the smallest total slack having the highest priority
- Ordered list priority
  1. Shortest critical activity
  2. Critical activities
  3. Shortest non-critical activity
  4. Non-critical activity with least slack
  5. Non-critical activities

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