UNIT 5: RESOURCE ALLOCATION

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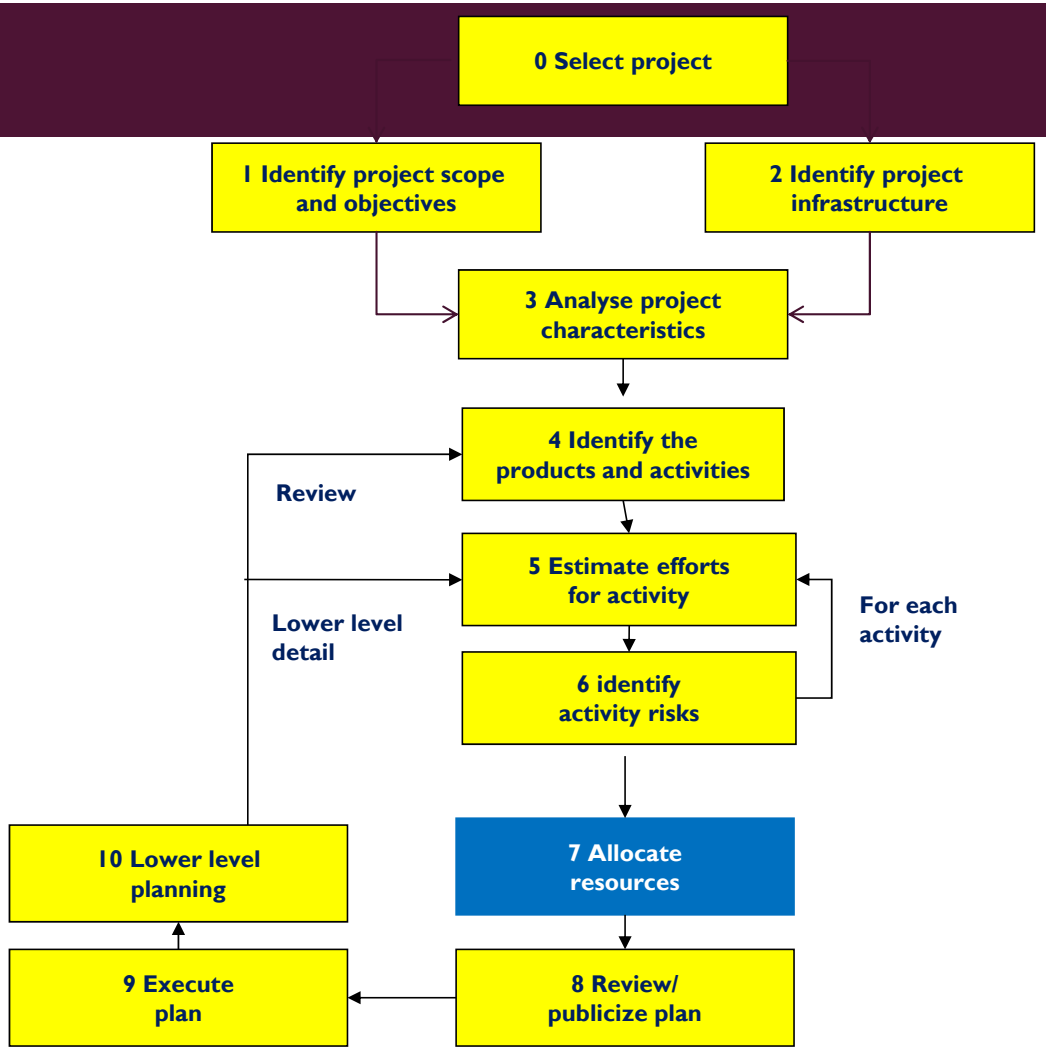
Includes…

1. Prelude, The nature of resources, identifying resource requirements
2. Scheduling resources creating critical paths, counting the cost, being specific
3. Publishing the resource schedule, cost schedule, the schedule sequence

WHAT IS RESOURCE ALLOCATION?

- After the activities have been identified using various techniques and tabulated into a Work-Break-Down the resources need to be allocated to complete the identified tasks. This process is considered resource allocation
- The final result of resource allocation will normally e a number of schedules including……
  - ***Activity schedule >>*** indicating the planned start and completion dates for each activity
  - ***Resource schedule >>*** showing the dates on which each resource will be required and the level of that requirement
  - ***Cost schedule >>*** showing the planned cumulative expenditure incurred by the use of resources over time



WHO ALLOCATES RESOURCES?

- **Project Manager**
  - Concentrate on resources where there is a possibility that, without planning, they might not be sufficiently available when required.
  - Senior Software Developers are the hardest to find – these need to be very carefully planned for in advance.
  - Developers do not like to wait for work, they prefer to be busy with activities and tasks that show clear progress.

RESOURCE ORGANIZATION

- A program organization chart is essential to allocate staff effectively,
  - Develop the hierarchical program organization.
  - Identify Roles and Responsibilities.
  - Plan for number of staff in each role (at a high level).
  - Establish Teams.

RESOURCE REQUIREMENT IDENTIFICATION

- For each activity identify,
  - Work amount required (in work units)
  - Basic skill or experience level required (to even undertake the task)
  - Complexity of the task (this will help to determine the experience required)
  - Task Category (Unskilled, skilled, leadership, expert, management)
- Example.
  - Activity – Install Network Hardware for 20 computers.
  - Work units - 20.
  - Basic Skill – Bachelors Degree in related field.
  - Task Complexity: 5.
  - Task Category: Skilled (other categories may be Management, Leadership, Expert)

RESOURCE SCHEDULING

- After all the required resources have been identified, they need to be scheduled effectively.
- The earliest start dates, last start dates will need to be taken into account to schedule resources efficiently.
- Resources should be balanced throughout the project.
- Human resource scheduling issues,
  - Planned Leave, Public Holidays.
  - Possible sick leave (random, subjective at best and hard to predict).
  - General motivation and enthusiasm for the task allocated (If they dislike the task, it will flow through into the output).
  - Work load and stress in project.
  - Stress outside work.

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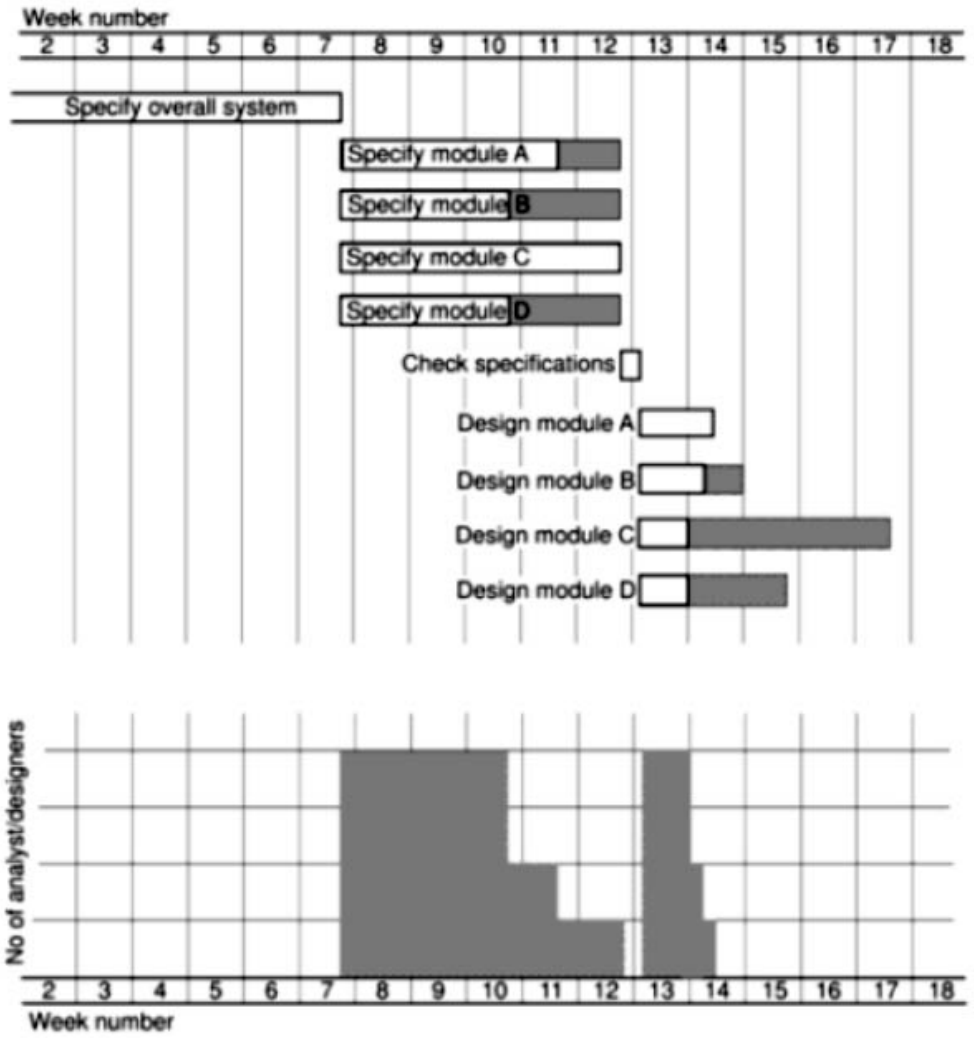
RESOURCE HISTOGRAMS

- Commonly used during planning to indicate possible problem areas,
  - People (by category) Vs Week Number
  - For each individual – estimated number of tasks (including complexity) over weeks
    - This helps in reducing work load some times to help the individual recover from any heavy load.
  - Category Vs Week

RESOURCE HISTOGRAMS

White rectangles indicate when an activity is scheduled and shaded rectangles the total float.



EXTERNAL DEPENDENCIES

- When planning any resources that rely on external factors, these need to be planned with the associated risks involved.

PRIORITISATION TECHNIQUES

- Total Float Priority
- Ordered List Priority
- There are many others that refine on top of these, but broadly these cover the general cases well.

TOTAL FLOAT PRIORITY

- Ordered according to their total float.
- Smallest total float has highest priority.
- Activities are allocated resources in ascending order of total float.
- Changes to plan will require re-calculation.

ORDERED LIST PRIORITY

- Activities that can proceed at the same time are ordered according to a set of simple criteria.
- Burman's priority list takes into account activity duration as well as total float:
  1. Shortest critical activity.
  2. Critical activities.
  3. Shortest non-critical activity.
  4. Non-critical activity with least float.
  5. Non-critical activities.
- Note: Other ways of ordering are also possible.

CREATING CRITICAL PATHS

- Resource scheduling will almost always change the activity network.
- The changes often result in changes to the critical path.
  - Delaying an activity due to lack of correct resources will cause that activity to become critical after it uses up all its slack time.
- These changes are often experienced after the project has started which will require adapting during the project (this is normally much harder in practice).

COST OF RESOURCES

- All projects concentrate on completion in the shortest time span with minimum resources (in planning stage).
- However, once the project starts – all un-planned for issues and any risks will cause some strain on the cost.

RESOURCE ALLOCATION ISSUES (BEING SPECIFIC)

- Availability: We need to know if a particular individual will be available when required.
- Criticality : Allocation of more experienced personnel to activities on the critical path often helps in shortening project durations or at least reduces the risk of overrun.
- Risk: Allocating the most experienced staff to the highest risk activities is likely to have the greatest effect in reducing overall project uncertainties
- Training : It will be benefit to the organization if positive steps are taken to allocate junior staff to appropriate non critical activities where there will be sufficient slack for them to train and develop skills.
- Team Building : The selection of individuals must also take account of the final shape of the project team and the way they will work together.

PUBLISHING THE RESOURCE SCHEDULE

COST SCHEDULING

- Weekly or monthly cost over the life of the project which will provide a more detailed and accurate estimate of costs and will serve as a plain against which project progress can be monitored.
- Broad Categories
  - Staff Costs: (staff salaries, social security fund, pension scheme contribution, holiday pay)
  - Overheads (Office Space, Interest charges, Travel Costs, Insurance and so on).
  - Usage charges (for external resources or contractors, leased/rental equipment).

SCHEDULING IN PRACTICE

- It should always be in the project planner's mind, right from the start of the project.
- During the resource scheduling and allocation phase of the planning activity a lot of the plan will change.
- Most of the issues with respect to resource allocation and scheduling arise after the project starts (normally after about 30% of the activities are complete).