Project Management Advanced Diploma

Computers & PM – Week 9

Josephine Coffey

Computers & PM – Week 9

- Updating Schedules & Multi-Project Schedules
- **Large Networks, Risk Analysis and Standard Networks & Templates**

Objectives

- Understand difficulties associated with large networks and how to effectively deal them
- Review two risk analysis methods: PERT & Monte Carlo Analysis
- Understand the use of standard networks & templates

Large Projects\Networks

- Thousands or tens of thousands of activities
- Difficulties for PM include:
  - Difficult to display large networks
  - Difficult to print
  - Prone to errors
  - Difficult to keep up-to-date
  - Different levels of detail required
  - Not all information known or understood upfront

Large Networks

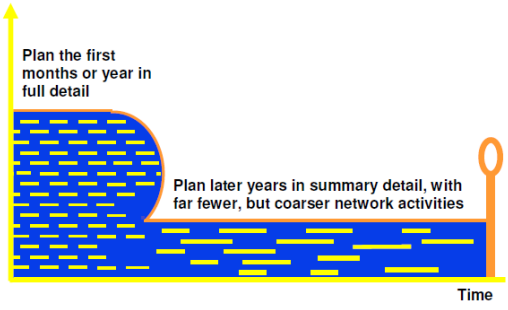
Some techniques for handling large projects:

- Rolling Wave Planning
- Filtering and Sorting large projects
- Hierarchical network breakdown

Rolling Wave Planning

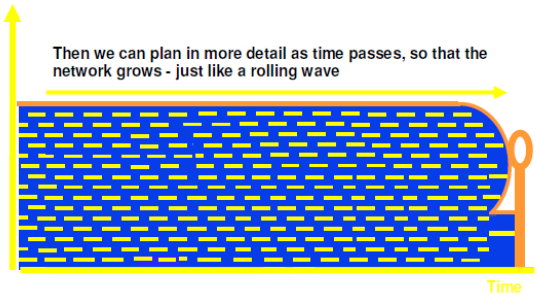
- Part of PRINCE2 methodology
- Used for large projects with long time span
- Not all information known at the project start
- Project broken into stages, details added to each stage as project progresses
- Once stages determined at outset then updates can be anticipated in advance

Rolling Wave Planning



Rolling Wave Planning (Lock) – Outset

Rolling Wave Planning



Rolling Wave Planning (Lock) – Towards Conclusion

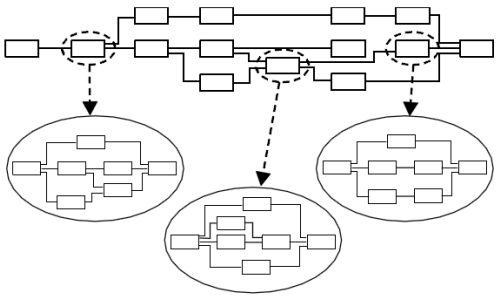
Filtering and Sorting large projects

- Coding of activities to allow filtering & sorting
- Department codes
- Milestone activities
- Resource Types\Resource codes
- Other:
  - Security level codes
  - OBS level codes
  - Custom fields

Hierarchical network breakdown

- Hierarchy of sub-networks
- Summary network broken down into several more detailed sub-networks
- WBS: work packages planned separately with smaller network diagram

Hierarchical network breakdown



Example of a large network broken down into sub-networks (Lock)

Quantitative Risk Analysis

- PERT - Program (or Project) Evaluation and Review Technique
- Monte Carlo Analysis

Steps to Risk Analysis

1. Identify Tasks
2. Create the CPM schedule
3. Estimate the uncertainty in the activity durations
4. Perform risk analysis
5. Take steps to mitigate the risks

PERT

- Most Project plans deterministic
- PERT is more sceptical and allows for some uncertainty
- Uses three different time durations to calculate expected time for each activity:
  - most optimistic
  - most likely
  - most pessimistic

PERT

$$t_e = \frac{t_o + 4\,t_m + t_p}{6}$$

Where:

t_o = the most optimistic time estimate

t_m = the most likely time estimate

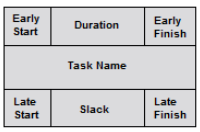
t_p = the most pessimistic time estimate

t_e = the expected time

$$\text{expected time} = \frac{\text{shortest time} + 4 \times \text{likely time} + \text{longest time}}{6}$$

PERT

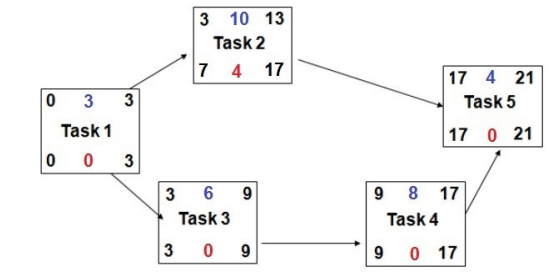
- PERT notation:



Limitations:

Only recommended when accurate estimates based on reliable historical data

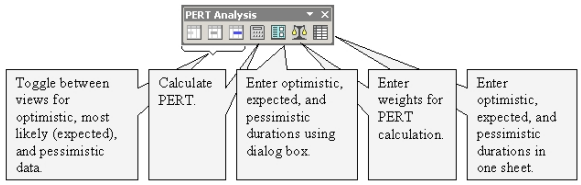
PERT



Source: http://www.pmstudy.com/trainingdocs2/TimeManagementFormulae.pdf

PERT

PERT in MS Project 2007



Need Add-in for more recent versions of MS Project.

Monte Carlo

- Monte Carlo analysis applied in scientific calculations, financial analysis and in calculation of risk for projects
- Monte Carlo simulation selects variable values at random to simulate a model
- Variables have a known range of values but an uncertain value for any particular time or event (dice variables:1,2,3,4,5,6 roll: ??)
  - e.g. interest rates, staffing needs, stock prices, inventory and phone calls per minute

Monte Carlo

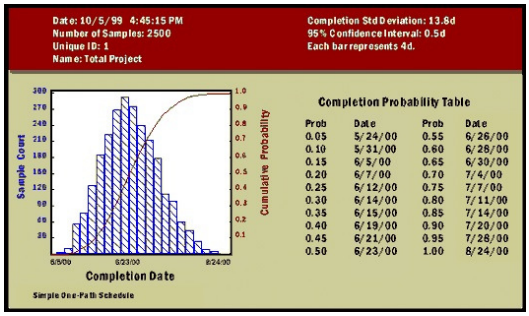
- Like PERT uses three time estimates (t_o, t_m, t_p)
- Uses thousands of randomly generated iterations of the estimates
- Applications available include:
  - *Crystal Ball* from Oracle (uses MS Excel)
  - *@Risk* (available for both MS Project and MS Excel)

Monte Carlo Simulation

Outcomes:
- 1 two
- 3 threes
- 3 fours
- 3 fives
- 6 sixes
- 6 sevens
- 5 eights
- 3 nines
- 1 ten
- 3 elevens
- 2 twelves

"Probability distribution" of the sum of two die

Monte Carlo Simulation



Crystal Ball example.

Standard Networks & Templates

- Many common attributes between projects
- Allowing organisation to re-use standard project plans/networks and modify
- Template: saved versions of plan/network
- Standard plans can be stored in "libraries" with record of contents and type of project
- Make sure not to overwrite the template
- Task\Activity identifier needs to reflect name of project

Summary

- Large networks can cause difficulties in PM but may be overcome using Rolling Wave Plan, filtering & sorting and breakdown of networks
- Quantitative risk analysis, using three possible durations, can be performed with both PERT & Monte Carlo techniques
- Standard networks can be saved as templates and reused\modified to bring consistency and efficiency

Project Management Advanced Diploma

Computers & PM – Week 9

Josephine Coffey