Project Scheduling and Gantt Charts

Siddharth Gangadhar
Dr. Prasad Kulkarni

Department of Electrical Engineering & Computer Science
Lab Presentation

siddharth@ku.edu
prasadk@ku.edu

4 November 2015
Project Scheduling and Gantt Charts

Outline

• What is project scheduling?
• Project scheduling techniques
• Gantt charts
• Project scheduling and Gantt charts software
• References
Project Scheduling and Gantt Charts

What is Project Scheduling?

- What is project scheduling?
- Project scheduling techniques
- Gantt charts
- Project scheduling and Gantt charts software
- References
What is Project Scheduling?

What is a project?

• What is a project
  – collection of tasks to be completed preferably
    • in minimal time
    • and minimal cost

• Examples of projects
  – software implementation
  – research paper
  – product development

• Project scheduling
  – listing of activities, deliverables, and milestones
  – with intended start and finish dates
What is Project Scheduling?

Project Statistics

- Only 2.5% of companies successfully complete
  - 100% of projects [source]
- Average cost overrun of all projects is 27% [source]
- 39% of projects fail due to lack of planning
  - resources and activities [source]
- One in six IT projects
  - average cost overrun of 200%
  - schedule overrun of 70% [source]
What is Project Scheduling?

Objectives of Project Scheduling

- Completion of tasks
  - in minimal time or at minimal cost
  - in presence of task dependencies
- Likelihood of project completion in a given period
  - extremely hard optimization scenario
  - constraints such as time, money, resources and reqs.
- Finding minimum cost schedule for project comp.
  - by a certain time
What is Project Scheduling?

Aspects of Project Scheduling

• Agree on objectives for the project
  – product features and their requirements

• Finalize resources
  – human, system and monetary

• Identify task relationships
  – helpful in scheduling tasks

• Determine task time to completion
  – and associated costs

• Critical task determination
  – and according organization
Project Scheduling and Gantt Charts

Project Scheduling Techniques

- What is project scheduling?
- Project scheduling techniques
- Gantt charts
- Project scheduling and Gantt charts software
- References
Project Scheduling Techniques
List of Project Scheduling Techniques

• Mathematical Analysis (Network diagrams)
  – Critical Path Method
  – Program Evaluation and Review Technique (PERT)
  – Graphical Evaluation and Review Technique (GERT)

• Bar Charts
  – Bar charts
  – Gantt charts
Project Scheduling Techniques
Critical Path Method (CPM)

- Joint venture between Dupont and Remington Rand
- Sequential activities from start to finish of project
- EF, ES, LF, LS are important variables
Project Scheduling Techniques

PERT

- Developed by US navy in 1950s
- Usage of a time variance
  - probabilistic approach to activity estimation
- Pessimistic time, Most likely time and Optimistic time
- Cannot be used for time/cost tradeoff analysis

![PERT Diagram]

[PERT-01]
Project Scheduling Techniques

**GERT**

- Proven less accurate than CPM and PERT
- Probabilistic treatment of network logic
  - and activity duration estimates
- Applied on subset of project activities
  - invariably applied in loops
- Node state reached
  - when a subset of its predecessors are completed
- Supports branching
  - each branch has a probability
Project Scheduling Techniques

Bar Charts

- Visual representation of project status
- Visualize the temporal relation of processes
  - among different group members
- Manage project deadlines for Project Manager
- Coloring depicts the state of a particular process
  - font also used for depicting state
- Support for process dependencies
- BSCW – Basic Support for Cooperative Work
  - software with bar chart support for project scheduling
Project Scheduling and Gantt Charts

Gantt Charts

- What is project scheduling?
- Project scheduling techniques
- Gantt charts
- Project scheduling and Gantt charts software
- References
Gantt Charts
What are Gantt Charts?

- Special version of bar chart
  - Henry Gantt around 1910s
- What a Gantt chart shows
  - different activities
  - length of activities along with start and end times
  - their dependencies

![Gantt chart example](Gantt-01)
Gantt Charts
A Typical Gantt Chart
Gantt Charts
Creating Gantt Charts I

- Define project settings
  - start date, end date and scheduling mode
- Define project calendar
- Define task names and their durations
- Resources finalized and made as a list for distribution
  - if resource person, number of hours for particular task
  - associated cost of resource included
- Create dependencies between tasks
  - arrowheads join tasks to each other
  - tasks can have multiple predecessors or successors
Gantt Charts
Creating Gantt Charts II

- Add necessary constraints to each task
  - cost or temporal constraints most common
  - Start No Later Than (SNLT), SNET, MSO

- Add more information/comments to chart
  - add details as comments to tasks
  - highlight critical path
  - prioritize tasks
  - percentage completion for each task

- Project reviewing periodically

- In depth information
Project Scheduling and Gantt Charts

Project Scheduling and Gantt Charts Software

- What is project scheduling?
- Project scheduling techniques
- Gantt charts
- Project scheduling and Gantt charts software
- References
Project Sch. and Gantt Charts SW

Trello

- Free web based project management tool
  - [https://trello.com/](https://trello.com/)
- Uses Kanban paradigm for management
  - originally used by Toyota for production
- Trello terminology
  - boards contain lists which contain cards
Company started in 2005
  - https://basecamp.com/

60 day free trial period
  - 10 projects with 3 GB storage is $20/month

Nice email integration
  - task addition, discussion updates and progress updates

Strong user permissions feature
  - permissions provided depending on user roles

Missing Gantt chart integration
  - time management is difficult
Project Sch. and Gantt Charts SW

www.ganttproject.biz

- desktop based free Gantt application

Creation of tasks and milestones

Task organization
- in a work breakdown structure

PERT support included

Other features
- pdf report generation, CSV export/import
- png/jpeg import
Project Sch. and Gantt Charts SW
LibrePlan

- Open source web based Gantt application
  - [www.libreplan.com](http://www.libreplan.com)
- Forward and Backward allocation model supported
- Positioning constraints supported
  - ASAP, ALAP, NST, NLT
Project Scheduling and Gantt Charts

References

- What is project scheduling?
- Project scheduling techniques
- Gantt charts
- Project scheduling and Gantt charts software
- References
References

- [PERT-01] https://en.wikipedia.org/wiki/Program_evaluation_and_review_technique
- www.business.unr.edu/faculty/rtl/701/ppt/02-ProjSch-09.ppt
- web.ntpu.edu.tw/~juang/ms/CH05.ppt
- amutiara.staff.gunadarma.ac.id/Downloads/files/3270/08-scheduling.ppt
END OF FOILS

QUESTIONS???