

The background features a dark teal color with faint, semi-transparent charts and data points. A solid red vertical bar is positioned in the top right corner. The main title is centered in large white font.

# CS 428

# Creating PERT and Gantt Charts

WINTER 2023

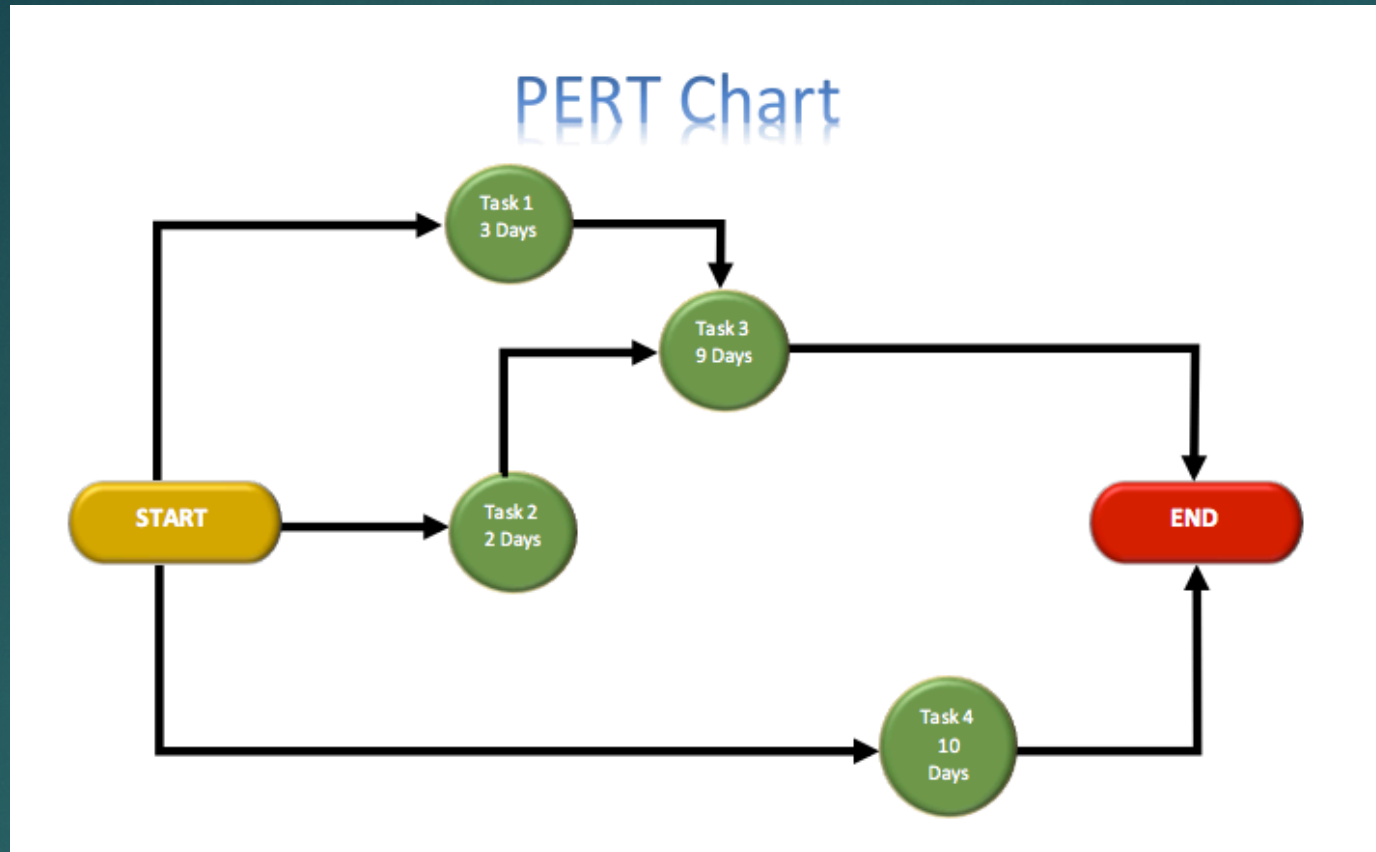
BRUCE F. WEBSTER

- ▶ Challenge: appropriate estimation of tasks
  - ▶ Armour: the more novel your work, the harder it is to estimate how long it will take or to predict the errors/dead ends you'll encounter
  - ▶ Plus, we're optimists
  - ▶ Knutson: "Take your estimate, double it, and add 1." e.g., 4 days really is 9 days
- ▶ Challenge: thinking through all tasks that need to be done for the project
- ▶ Challenge: correctly identifying the project's critical path (and near-critical paths) at any give time
- ▶ Challenge: keeping the schedule up to date each week based on actual work accomplished, new tasks discovered, estimate changes
- ▶ Challenge: schedule tends to be linear (waterfall-ish) rather than iterative (agile-ish)

# The challenges of devising a schedule

- ▶ **PERT = Program Evaluation Review Technique** (US Navy, 1950s)
- ▶ Directed graph showing expected significant tasks for the project
  - ▶ Each node (box, bubble) contains a task and an estimated duration
    - ▶ Sometimes arrow represents task + duration
  - ▶ Arrows coming in show what other tasks (nodes) must be completed before this one can start
  - ▶ Arrows going out show what other tasks (nodes) cannot start until this one is completed
  - ▶ Starts with START node, ends with FINISH or END node
- ▶ Used to identify:
  - ▶ Task dependencies: for a given task, what other tasks must be completed first
  - ▶ Critical path: longest duration path from START to FINISH

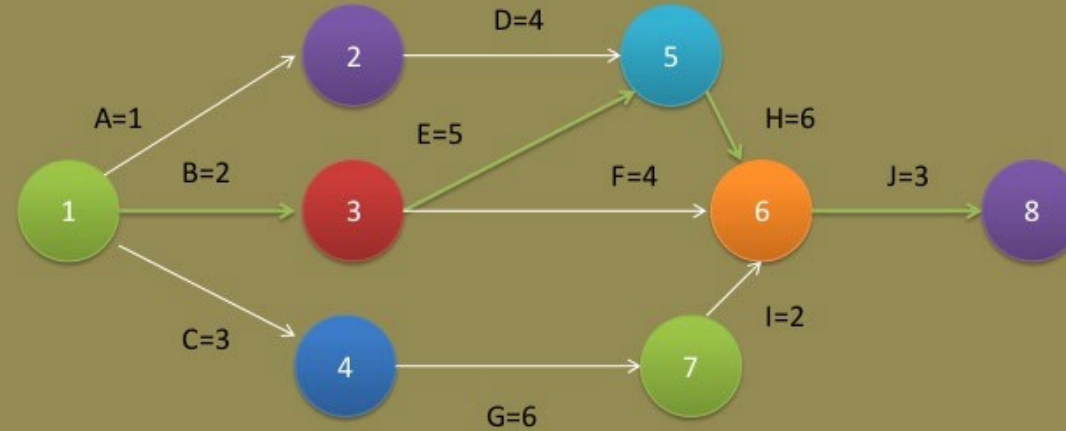
# PERT Charts



Sample (dummy) PERT Chart

## Critical Path

### Example



Path 1: A-D-H-J	Length=1+4+6+3=14 day
<b>Path 2: B-E-H-J</b>	<b>Length=2+5+6+3=16 day</b>
Path 3: B-F-J	Length=2+4+3=9 day
Path 4: C-G-I-J	Length=3+6+2+3=14 day

Since the critical path is the longest path through the network diagram, Path 2, B-E-H-J, is the critical path.

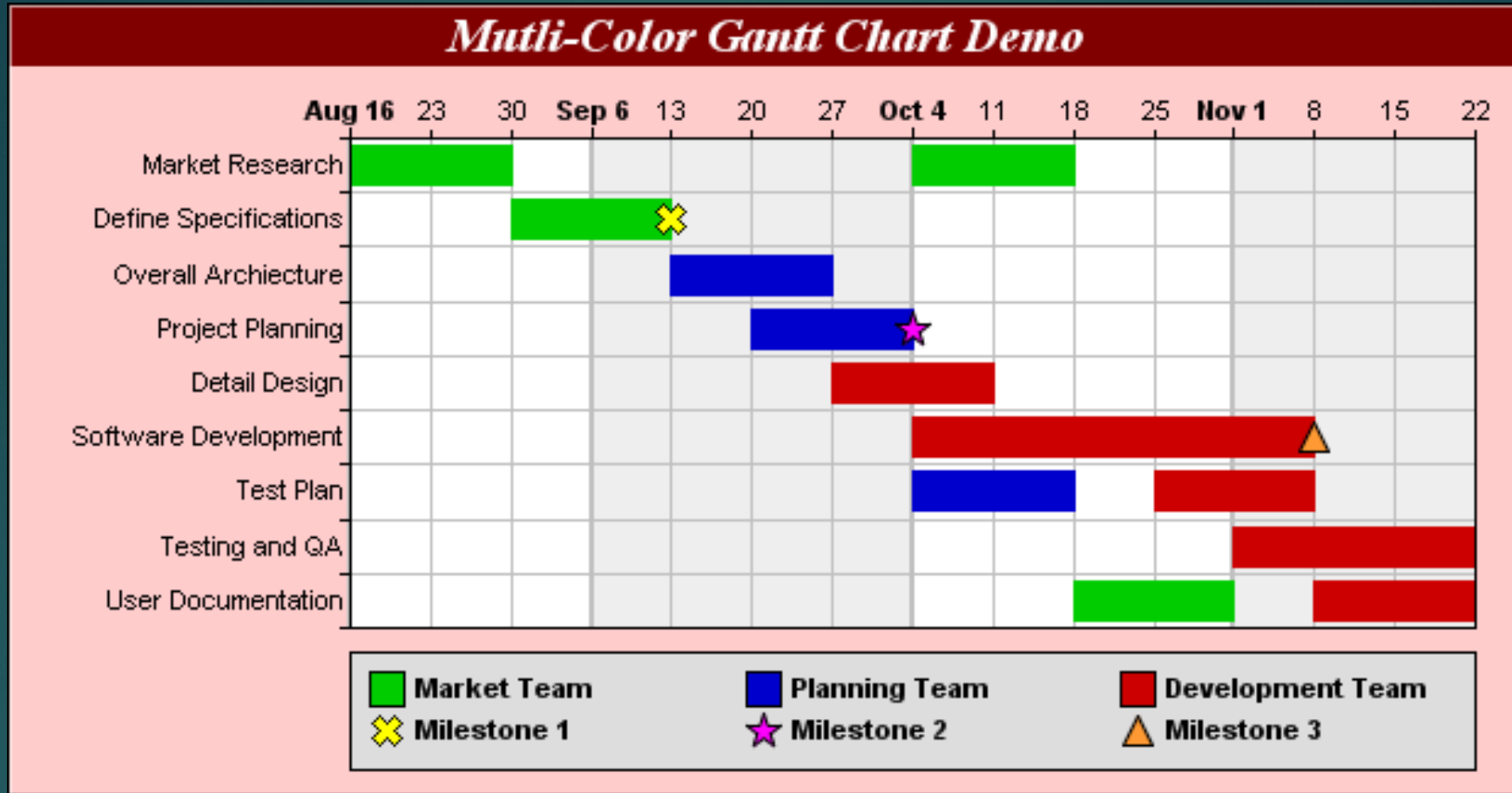
# PERT w/critical path

- ▶ Identify major tasks and key events that will lead you to project completion
- ▶ Establish dependencies for each item
  - ▶ What must be done before it can be started
    - ▶ NOTE: in some cases, a task can be started before but not completed until another task is finished
  - ▶ What other tasks cannot be started until it is completed
- ▶ Agree upon first-order estimates of how long each task will take
- ▶ Draft your first PERT chart on the above information
  - ▶ Using whatever drawing/design tool you can agree upon
  - ▶ **Lots of free templates available online**
  - ▶ **NOTE: MUST VISUALLY INDICATE CRITICAL PATH**
- ▶ Revise and refine until done

# Creating your team's PERT chart

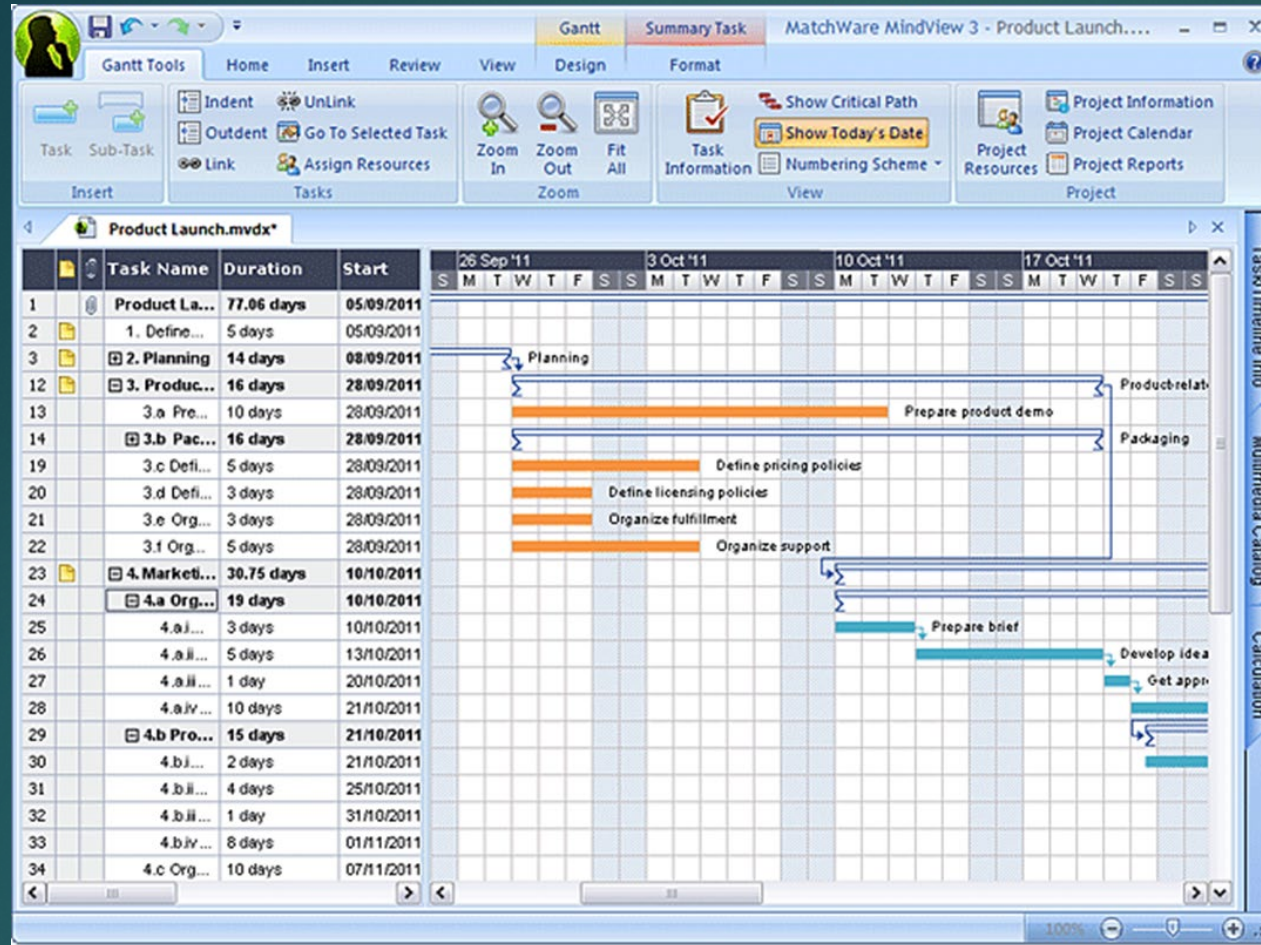
- ▶ **Created by Henry Gantt in the 1910-15 timeframe**
- ▶ Uses a two-dimensional layout
  - ▶ Vertical axis: list of tasks to be completed
  - ▶ Horizontal axis: estimated timeline of project (calendar layout)
  - ▶ Each task duration represented by horizontal length
  - ▶ Dependences often indicated by drop-down arrows from the end of one task to the start of the next
- ▶ Give more of an immediate graphical sense of actual task and project duration
- ▶ But less compact than PERT and harder to see critical path

# Gantt Charts



Sample Gantt chart





More complex Gantt chart

- ▶ Same data you came up with for your PERT chart: tasks, dependencies, duration
- ▶ Gantt chart often identified specific people or teams responsible for tasks
- ▶ **Lots of templates and apps available online**
- ▶ **Make sure your PERT and Gantt charts agree with each other**, at least in broad details
  - ▶ Gantt makes it easier to break major tasks down into smaller ones
  - ▶ Deadlines and dependences should still match

# Creating your team's Gantt chart

# Podcast: Project Management

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CS 428 - WINTER 2023 – MONDAYS, 3:00 – 5:30 PM  
BRUCE F. WEBSTER  
02/13/2023

- ▶ Strongly, strongly recommended first step: watch podcast on Project Management (warning: very long [~2 hrs] but extremely worthwhile)
  - ▶ 1<sup>st</sup> video, starting at around 63:20 to end of video
  - ▶ 2<sup>nd</sup> video: first 20 minutes or so
  - ▶ NOTE: Can count doing this as 'billable hours'
- ▶ Online resources
  - ▶ <https://www.smartsheet.com/pert-101-charts-analysis-and-templates-more-accurate-project-time-estimates>
  - ▶ <http://www.gantt.com/creating-gantt-charts.htm>

- ▶ A task table (described in the podcast) may be useful to you but does not have to be created and won't be reviewed (except by request)
- ▶ PERT chart (required) **should visually identify critical path**
- ▶ Gantt chart (also required) should somehow tie to your team members
- ▶ Be sure that what you produce can be posted and shared on your project wiki
- ▶ Due by midnight on Saturday (02/18)

Create both a PERT chart **and** a Gantt chart

- ▶ **IMPORTANT: CLASS NEXT WEEK IS ON TUESDAY, NOT MONDAY**
- ▶ By midnight on Saturday (02/18)
  - ▶ Create and post on team wiki **both** a PERT chart **and** a Gantt chart
  - ▶ Create and post on team wiki latest status report (#3)
- ▶ By start of next class period (**Tuesday**, 02/21):
  - ▶ Read *Peopleware*, Part III (chapters 14-20)
  - ▶ Read Webster #4 (online)
- ▶ REMINDER: Prototype demo in THREE weeks (03/06)

## Assignments for the coming week