

LECTURE 6

PROJECT MANAGEMENT PART 2



*CEEN 4812: Construction Management
Uzair (Sam) Shamsi, Ph.D., P.E.
Adjunct Professor
Department of Civil / Environmental & Chemical Engineering*

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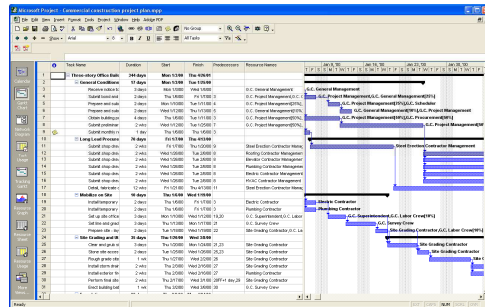
OUTLINE

- ◆ **Scheduling with Microsoft Project**
 - ◆ Introduction
 - ◆ Microsoft Project Steps
 - ◆ Interface (menus and dialogues)
 - ◆ Critical path method in Microsoft Project
- ◆ **Demo**
- ◆ **Homework No. 5**

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WHAT IS MICROSOFT PROJECT?

- Microsoft Project is a project management software that you can use to control projects.
- It helps you schedule and track project activities so you can stay on top of their progress.
- Allows many different ways of entering and observing information.



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MS PROJECT STEPS

1. Enter project information
2. Select view type and columns
3. Add tasks/subtask and durations
4. Set dependencies
5. Assign resources
6. Assign constraints
7. Save project

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Step 1. PROJECT SETUP

- ◆ Enter project information
- ◆ Select project defaults
 - ◆ Set them before starting every new project
- ◆ Set project calendar
 - ◆ Holidays
 - ◆ Working hours

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PROJECT INFORMATION

◆ Project > Project Information

The screenshot shows the Microsoft Project interface. The 'Project Information' dialog box is open, displaying the following settings:

- Start date: Mon 1/3/00
- Finish date: Thu 4/26/01
- Schedule from: Project Start Date
- All tasks begin as soon as possible.
- Current date: Mon 11/19/07
- Status date: NA
- Calendar: Standard
- Priority: 500

The background window shows a task list for 'Three-story Office Building (76,000 square feet)'. The tasks are:

| Task Name | % Complete | Dur |
|--|------------|-----|
| 1 Three-story Office Building (76,000 square feet) | 0% | 3: |
| 2 General Conditions | 0% | 1 |
| 3 Receive notice to proceed and sign contract | 0% | |
| 4 Submit bond and insurance documents | 0% | |
| 5 Prepare and submit project schedule | 0% | |
| 6 Prepare and submit schedule of values | 0% | |
| 7 Obtain building permits | 0% | |

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PROJECT DEFAULTS

◆ Tools > Options > View

The screenshot shows the Microsoft Project application window with the 'Options' dialog box open. The 'View' tab is selected, showing settings for the default view (Gantt Chart) and date format (Mon 1/31/00). The 'Show' section includes checkboxes for Status bar, Windows in Taskbar, Scroll bars, Entry bar, OLE links indicators, and Project screentips. The 'Cross project linking options' section includes checkboxes for Show external successors, Show external predecessors, Show Links Between Projects dialog on open, and Automatically accept new external data. The 'Currency options' section includes a Symbol dropdown (set to \$) and a Decimal digits spinner (set to 2). The 'Outline options' section includes checkboxes for Indent name, Show outline number, Show outline symbol, Show summary tasks, and Project summary task. The 'Help', 'OK', and 'Cancel' buttons are visible at the bottom.

| Task Name | % Complete | Dur |
|--|------------|-----|
| 1 Three-story Office Building (76,000 square feet) | 4% | 31 |
| 2 General Conditions | 4% | 1 |
| 3 Receive notice to proceed and sign contract | 0% | |
| 4 Submit bond and insurance documents | 0% | |
| 5 Prepare and submit project schedule | 0% | |
| 6 Prepare and submit schedule of values | 0% | |
| 7 Obtain bid from vendors | 0% | |

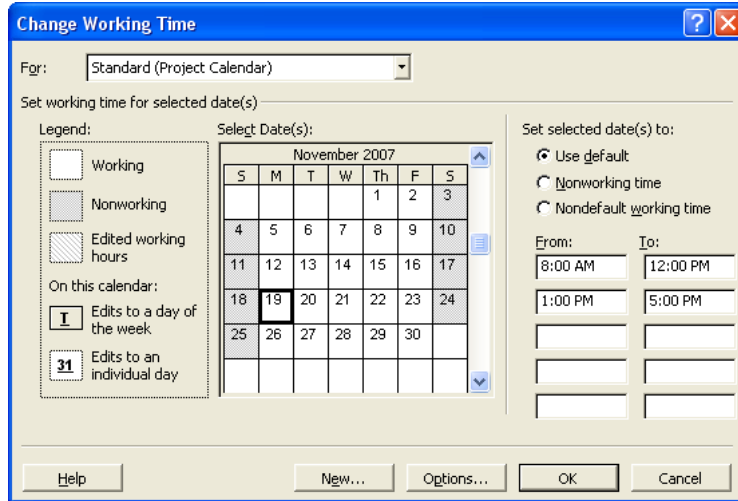
PROJECT DEFAULTS

◆ Tools > Options > Schedule

The screenshot shows the 'Options' dialog box with the 'Schedule' tab selected. The 'Schedule options for Microsoft Project' section includes a checked checkbox for 'show scheduling messages' and a dropdown for 'Show assignment units as a' (set to Percentage). The 'Scheduling options for 'MS Project Demo.mpp'' section includes dropdowns for 'New tasks:' (Start On Project Start Date), 'Duration is entered in:' (Days), 'Work is entered in:' (Hours), and 'Default task type:' (Fixed Units). The bottom section includes checkboxes for 'New tasks are effort driven', 'Autolink inserted or moved tasks', 'Split in-progress tasks', 'Tasks will always honor their constraint dates', 'Show that tasks have estimated durations', and 'New tasks have estimated durations'. A 'Set as Default' button is located to the right of the last checkbox. The 'Help', 'OK', and 'Cancel' buttons are visible at the bottom.

PROJECT CALENDARS

◆ Tools > Change Working Time



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STEP 2. SELECT VIEW TYPE AND COLUMNS

◆ Task Sheet view

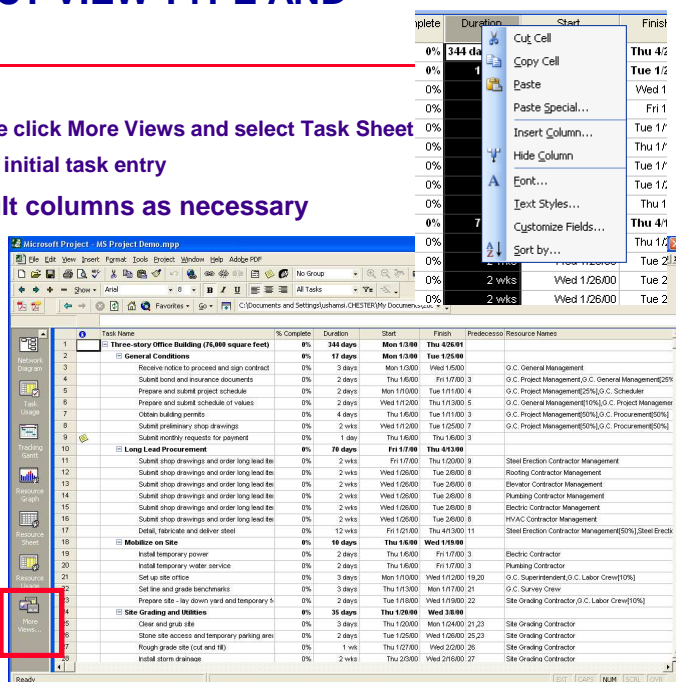
- ◆ In View Bar, double click More Views and select Task Sheet
- ◆ Recommended for initial task entry

◆ Add or hide default columns as necessary

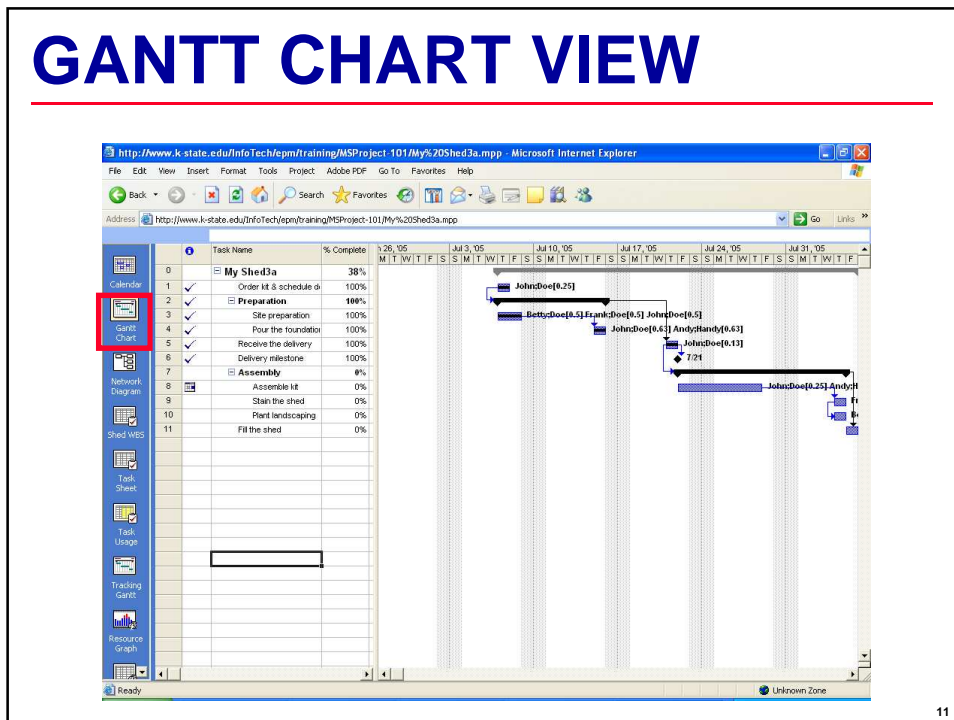
- ◆ Select column & right click

◆ Suggested columns:

- ◆ Task Name
- ◆ % Complete
- ◆ Duration
- ◆ Start
- ◆ Finish
- ◆ Predecessor
- ◆ Resources



GANTT CHART VIEW



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STEP 3. ADD TASKS / SUBTASKS AND DURATIONS

| | | Task Name | Duration | Start |
|---------------------|---|--|---------------|--------------------|
| Summary Task | 1 | <input type="checkbox"/> Inventory and research | 1 day? | Mon 6/25/01 |
| | 2 | <input type="checkbox"/> Inventory artifacts | 1 day? | Mon 6/25/01 |
| Subtasks | 3 | <input type="checkbox"/> Arrange for loans | 1 day? | Mon 6/25/01 |
| | 4 | <input type="checkbox"/> Pick up donations | 1 day? | Mon 6/25/01 |
| | 5 | <input type="checkbox"/> Design and Developme | 1 day? | Mon 6/25/01 |

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Adding Tasks and Durations

| Task ID | Task Name | Duration | Start | Finish | Predecessors |
|---------|-------------------------------|----------|-------------|-------------|--------------|
| 1 | Project definition task | 5 days | Mon 9/20/99 | Fri 9/24/99 | |
| 2 | Initial Meeting of MSU Team | 2 days | Mon 9/20/99 | Tue 9/21/99 | |
| 3 | First contact with int. ptner | 1 day | Mon 9/20/99 | Mon 9/20/99 | |
| | | | | | |

Just enter data on a blank row or double click on a blank row to enter data in Task Information window.

TASK INFORMATION WINDOW

- ◆ Double click on a task
- ◆ Durations
- ◆ Dependencies (predecessors)
- ◆ Constraints
- ◆ Milestone tasks

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

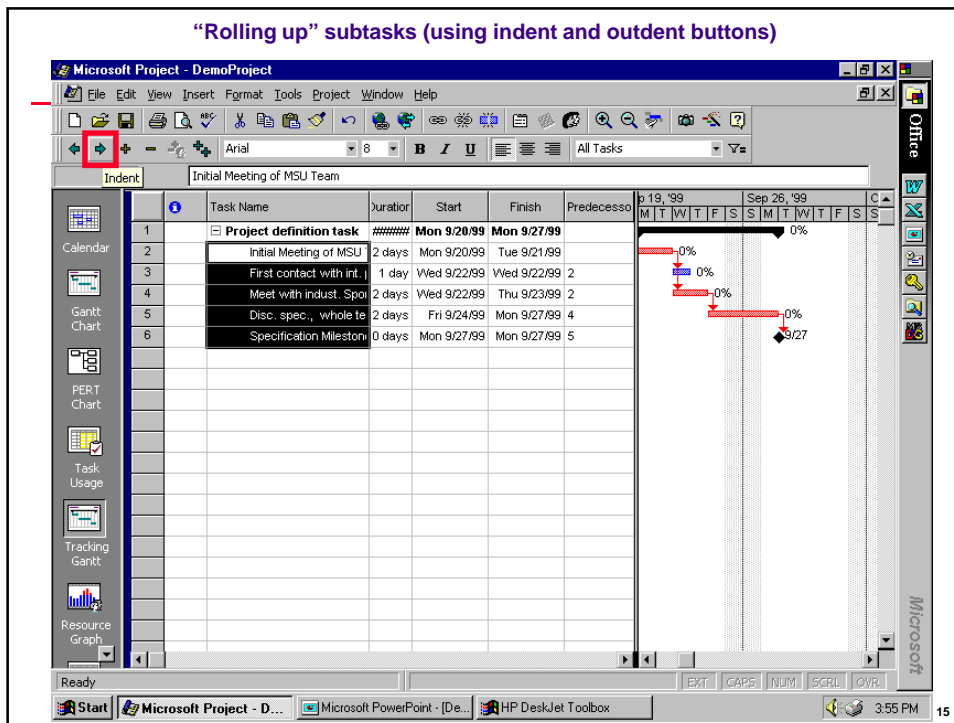
Name: Obtain building permits Duration: 4d Estimated

Percent complete: 0% Priority: 500

Dates: start: Thu 1/6/00 Finish: Tue 1/11/00

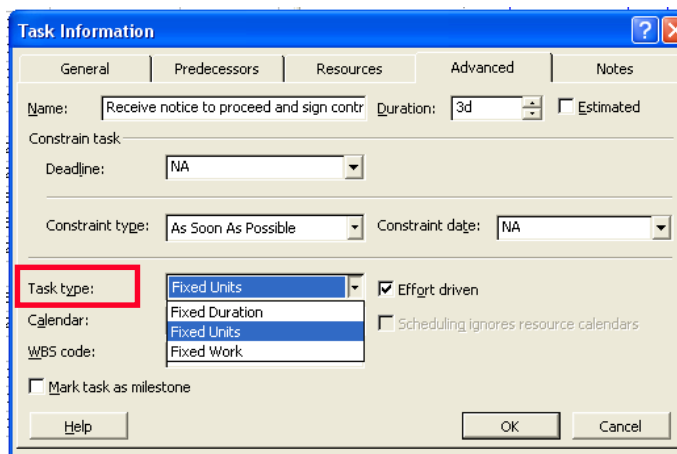
Hide task bar
 Roll up Gantt bar to summary

Help OK Cancel



TASK TYPES

- ◆ Double click on a task or subtask to open Task Information window.



TASK RELATED DEFINITIONS

- ◆ **Work:** The total labor required to complete a task.
- ◆ **Duration:** The total span of active working time that is required to complete a task.
- ◆ **Resources:** Labor categories (manager, engineer, technician, etc.)
- ◆ **Units:** The percentage of a work resource's time the resource is assigned to a task.

| Task Name | Work |
|--|-------------|
| 1 Three-story Office Building (76,000 square feet) | 7,929.6 hrs |
| 2 General Conditions | 193.6 hrs |
| 3 Receive notice to proceed and sign contract | 24 hrs |
| 4 Submit bond and insurance documents | 20 hrs |
| 5 Prepare and submit project schedule | 20 hrs |
| 6 Prepare and submit schedule of values | 17.6 hrs |
| 7 Obtain building permits | 32 hrs |
| 8 Submit preliminary shop drawings | 80 hrs |
| 9 Submit monthly requests for payment | 0 hrs |

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Obtain building permits Duration: 4d Estimated

Resources:

| Resource Name | Units |
|-------------------------|-------|
| G.C. Project Management | 50% |
| G.C. Procurement | 50% |

Help OK Cancel

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TASK TYPES

- ◆ **Three types:**
 1. **Fixed duration:** Duration is fixed and changes to the work or the units don't affect the duration.
 - ◆ If you revise duration, Project recalculates work.
 2. **Fixed units (default):** Units are fixed and changes to the amount of work or the duration don't affect the resources.
 - ◆ If you revise units, Project recalculates duration.
 3. **Fixed work:** Amount of work is fixed and changes to the duration or the units do not affect the work.
 - ◆ If you revise the amount of work, Project recalculates duration.
- ◆ **Effort Driven check box:** the duration of a task shortens or lengthens as resources are added or removed from a task while the effort (work) remains the same.
 - ◆ Check box is automatically selected for fixed-work tasks.

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MILESTONES

- ◆ Check “Mark task as milestone” for milestone tasks (usually with deadlines)
 - ◆ Obtain authorization to proceed from the client
 - ◆ Submit preliminary design documents
 - ◆ Submit final design documents

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Duration: Estimated

Constrain task:

Deadline:

Constraint type: Constraint date:

Task type: Effort driven

Calendar: Scheduling ignores resource calendars

WBS code:

Earned value method:

Mark task as milestone

Help OK Cancel

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Step 4: Set Dependencies (predecessors)

Microsoft Project - DemoProject

File Edit View Insert Format Tools Project Window Help

Task Name Duration Start Finish Predecessors

| Task Name | Duration | Start | Finish | Predecessors |
|---------------------------------|----------|-------------|-------------|--------------|
| 1 Project definition task | 6 days | Mon 9/20/99 | Mon 9/27/99 | |
| 2 Initial Meeting of MSU Team | 2 days | Mon 9/20/99 | Tue 9/21/99 | |
| 3 First contact with int. ptner | 1 day | Wed 9/22/99 | Wed 9/22/99 | 2 |
| 4 Meet with indust. Sponsor | 2 days | Wed 9/22/99 | Thu 9/23/99 | 2 |
| 5 Discuss with whole team | 2 days | Fri 9/24/99 | Mon 9/27/99 | 4 |

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Duration: Estimated

Predecessors:

| ID | Task Name | Type | Lag |
|----|---|----------------------|-----|
| 3 | Receive notice to proceed and sign contract | Finish-to-Start (FS) | 0d |

Help OK Cancel

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Step 5. Assign Resources

The screenshot shows the Microsoft Project interface with the 'Assign Resources' dialog box open. The task list shows a task with a duration of 1 day, starting on Mon 9/27/99 and finishing on Fri 10/8/99. The resource 'Joe,Tina,Barb' is assigned to this task. The 'Task Information' dialog box is open, showing the task name '00000000000000000000' and the resource 'Joe,Tina,Barb' with 50% units assigned.

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Assigning Resources (using Resource Sheet)

| | | | |
|----|----------------------------|-------------|----------|
| 19 | Elevator Contractor | Work | E |
| 20 | Elevator Contractor | Work | E |
| 21 | Steel Erection Cont | Work | S |
| 22 | Steel Erection Contrac | Work | S |
| 23 | Drywall Contractor | Work | D |
| 24 | Masonry Contractor | Work | M |
| 25 | Tile Contractor | Work | T |

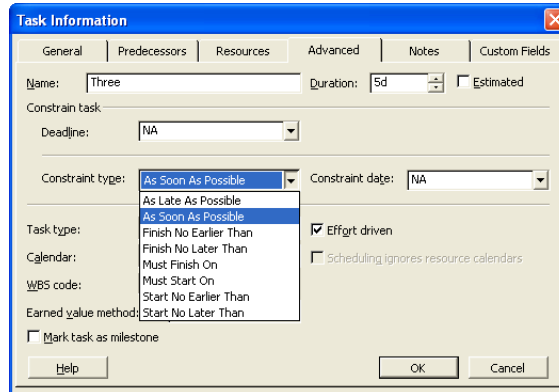
The screenshot shows the Microsoft Project 'Resource Sheet' view. The resource sheet is displayed with the following data:

| Resource Name | Initials | Group | Max. Units | Std. Rate | Ovt. Rate | Cost/Use | Accrue At | Bas |
|---------------|----------|-------|------------|-----------|-----------|----------|-----------|------|
| 1 Joe | J | | 100% | \$0.00/hr | \$0.00/hr | \$0.00 | Prorated | Stai |
| 2 Tina | T | | 100% | \$0.00/hr | \$0.00/hr | \$0.00 | Prorated | Stai |
| 3 Bill | B | | 100% | \$0.00/hr | \$0.00/hr | \$0.00 | Prorated | Stai |
| 4 Barb | B | | 100% | \$0.00/hr | \$0.00/hr | \$0.00 | Prorated | Stai |

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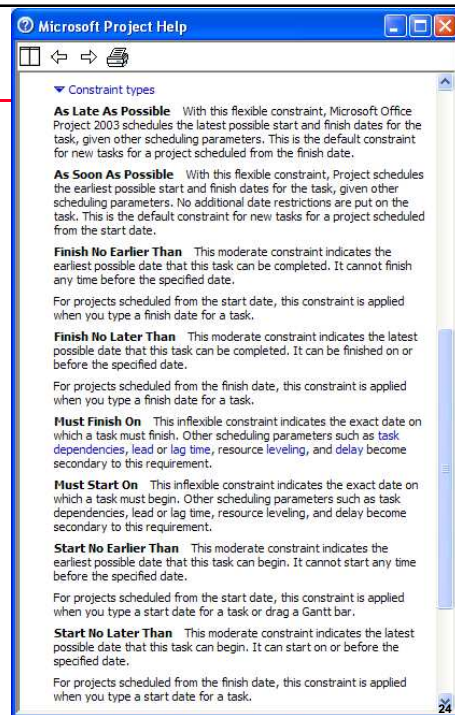
STEP 6. ASSIGN TASK CONSTRAINTS

- ◆ Task Information > Advanced tab
- ◆ Constraint types
 1. As late as possible
 2. As soon as possible (default)
 - ◆ Project schedules the earliest possible start and finish dates for the task
 3. Finish no earlier than
 4. Finish no later than
 5. Must finish on
 6. Must start on
 7. Start no earlier than
 8. Start no later than



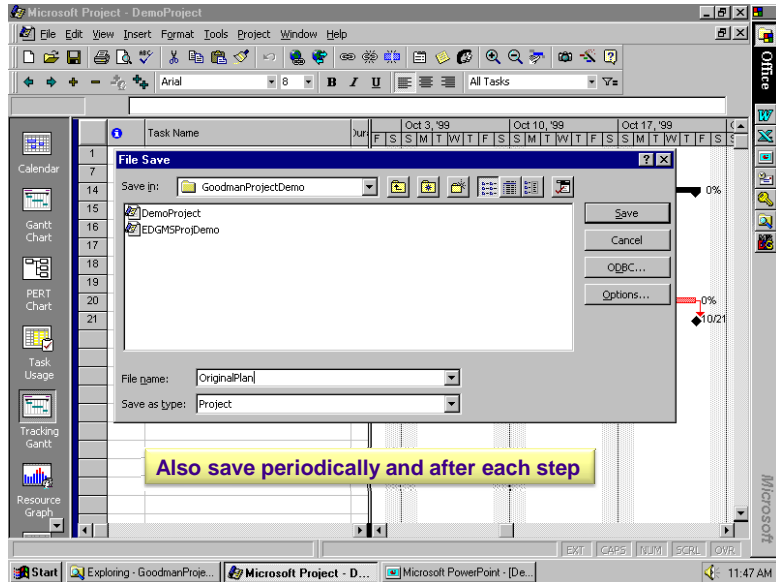
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CONSTRAINT DEFINITIONS FROM PROJECT HELP



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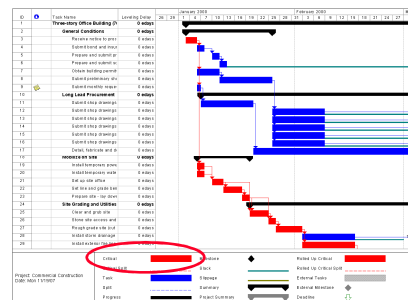
STEP 7. SAVE PROJECT



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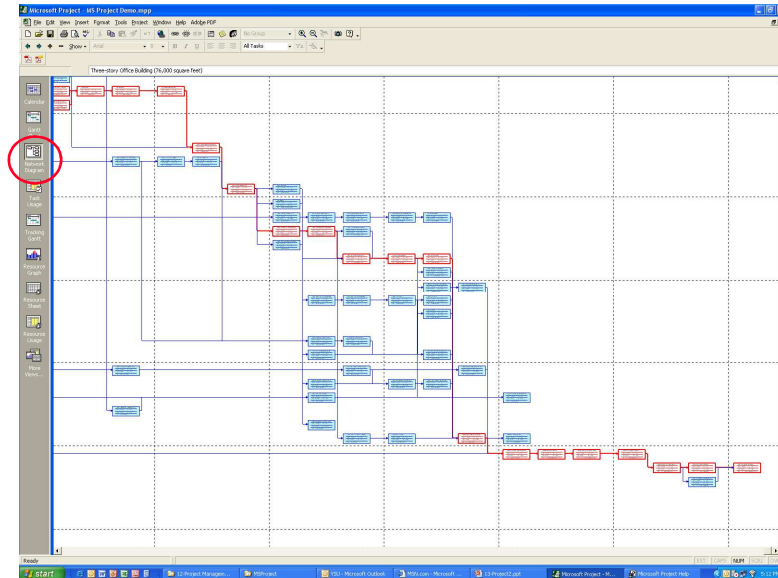
CRITICAL PATH IN MS PROJECT

- Helpful to know what tasks are on the critical path
 - MS Project can show such tasks in Red color
- Useful to try to shorten the critical path



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NETWORK DIAGRAM SHOWING CRITICAL PATH (IN RED)



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Summary

- ◆ Tip of the iceberg (much more capability)
- ◆ MS Project is a tool that aids planning, it won't plan for you.
- ◆ Need to invest in mastering the tool.

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HOMEWORK No. 5: COMMERCIAL CONSTRUCTION



- This is an individual homework
- Create a MS project file to create a Gantt chart project schedule for the data shown here.
- MS Project is installed in the computer lab.
- Use start date of **January 3, 2011**
- Use constraint type of "As soon as possible" for all tasks.
- Report the project duration (calendar days) and finish date.

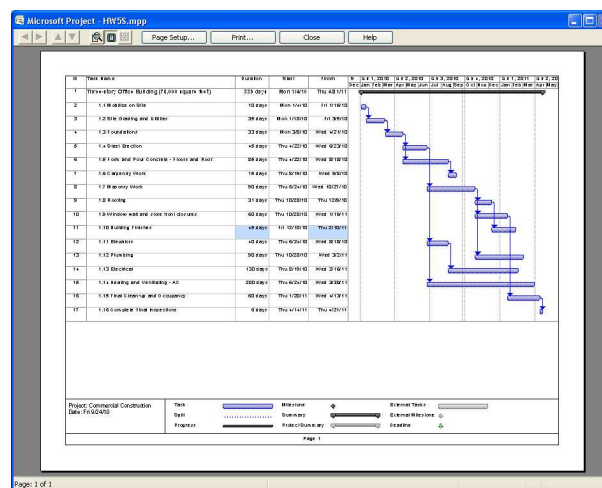
| Task / Subtask | Duration (Calendar Days) | Predecessor |
|--|--------------------------|-------------|
| Task 1. Three-story Office Building (76,000 square feet) | Calculate (?) | |
| 1.1 Mobilize on Site | 10 | |
| 1.2 Site Grading and Utilities | 35 | 1.1 |
| 1.3 Foundations | 33 | 1.2 |
| 1.4 Steel Erection | 45 | 1.3 |
| 1.5 Form and Pour Concrete - Floors and Roof | 85 | 1.3 |
| 1.6 Carpentry Work | 15 | 1.5 |
| 1.7 Masonry Work | 110 | 1.4 |
| 1.8 Roofing | 31 | 1.7 |
| 1.9 Window wall and store front closures | 60 | 1.7 |
| 1.10 Building Finishes | 80 | 1.8 |
| 1.11 Elevators | 40 | 1.4 |
| 1.12 Plumbing | 90 | 1.7 |
| 1.13 Electrical | 139 | 1.11 |
| 1.14 Heating and Ventilating - AC | 180 | 1.4 |
| 1.15 Final Clean-up and Occupancy | 60 | 1.9 |
| 1.16 Complete Final Inspections | 6 | 1.15 |

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HOMEWORK No. 5



- Print and submit the Gantt chart view (example shown here).
- Show columns for:
 - ID
 - Task Name
 - Duration
 - Start
 - Finish



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