Pure Training Center

Project management using MS project
Training series

What is a project?

Project is an undertaking that:

- Involves a sequence of activities with start and finish dates
- Involves work, cost, and material resources
- Aimed to achieve a set of well defined deliverables (outcomes)
- Deals with constraints (time, cost, and scope)

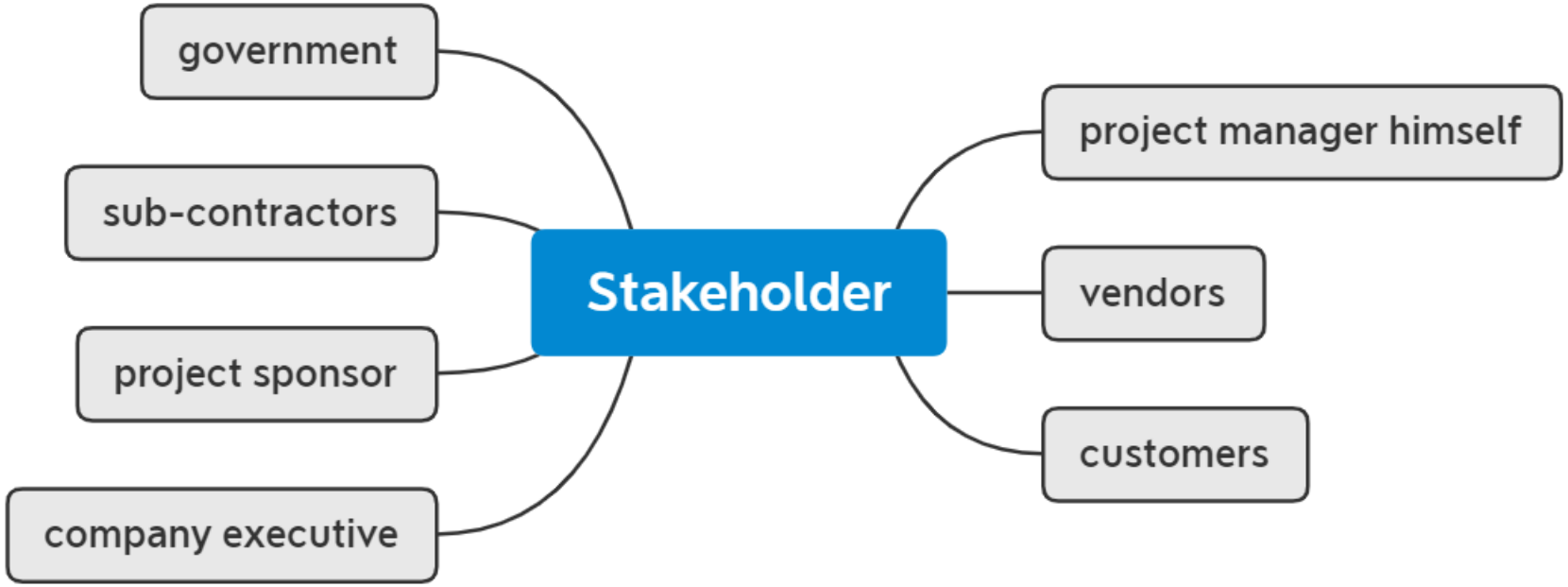
- Project has start and end
- Operation is continuous work

A project is considered successful when it fully meets the expectation of the project stakeholders

A project management is the application of project manager's skills and tools to project activities
In order to meet project requirements

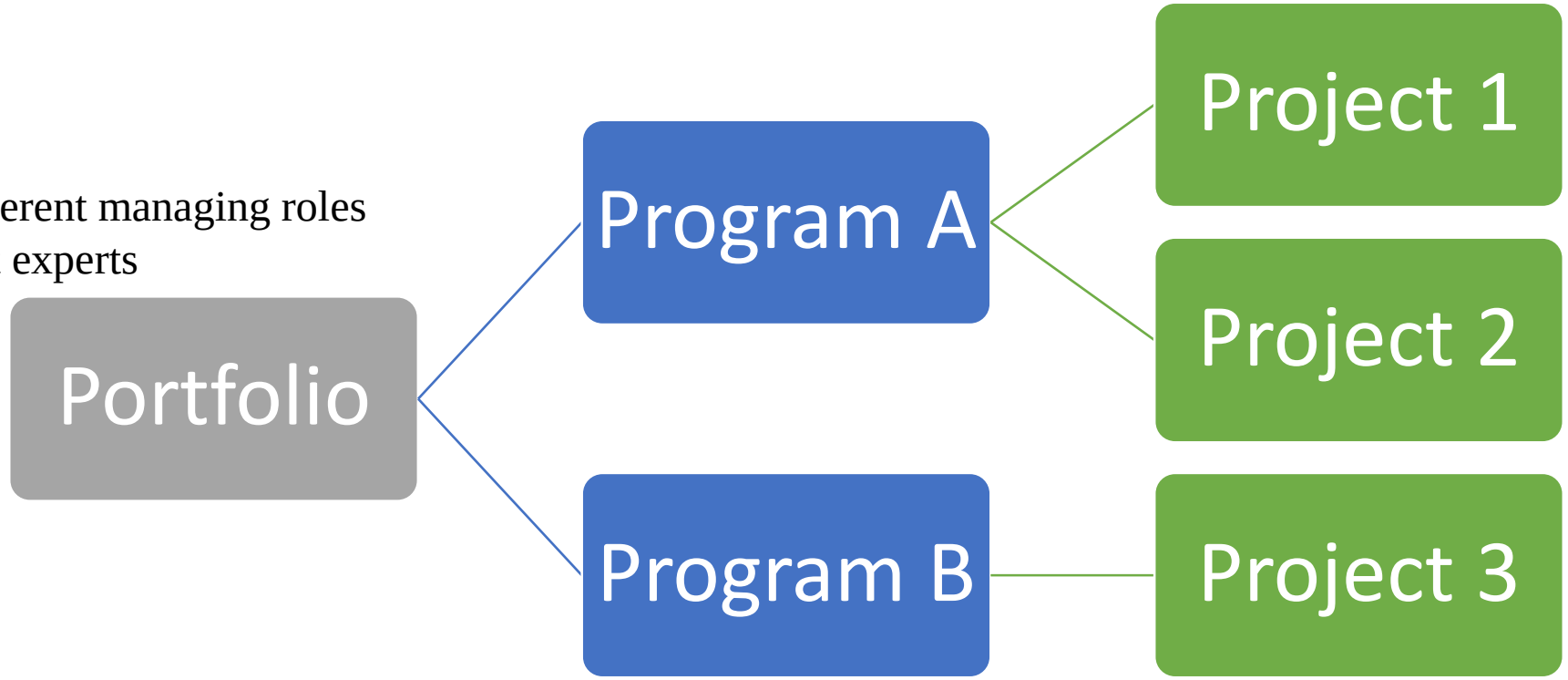
Project stakeholder

A project stakeholder is any entity that has an interest in the project



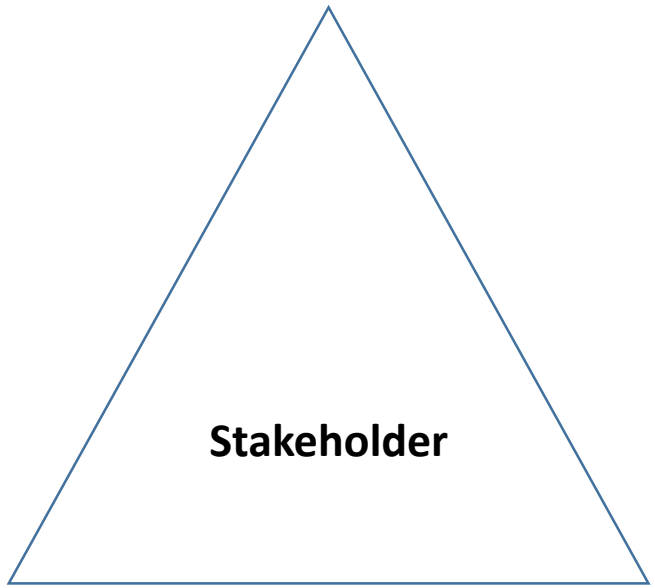
Project vs program vs portfolio

Portfolio is different managing roles
Under different experts



Project dimensions

Budget = $500,000



Time:
3 years

Scope:
Location
Deliverables
Target

The two wings of the project manager

Human competency

Soft skills acquired through environment And experience

- Communication skills
- Time management
- Leadership and interpersonal
- File management
- People centered manager
  - Listens to his team
  - Consultative
  - Motivating
  - Flexible
  - Willing to delegate
  - Empowering with creative ideas
  - Negotiation skills
  - Influencing stakeholders

Project competency

Hard skills acquired through College or training

- Project scope (requirement, outcome, stakeholder, etc.)
- Management tools (proposal, budget, PD, contracts, etc.)
- Sharing project to stakeholder meetings
- Annual work plan and resource allocation
- Project lifecycle
- Organizational structure
- Project executing, monitoring and controlling
- Project risk management

Project competency of the project manager

Proposal (scope, goal, objectives, indicators, outcome)	Project budget breakup and reporting procedures	Accounting source documents
Organizational manuals	Procurement plan	Income and expenditure report
Staff file (CVs, certificates, contract photos, appraisal)	Annual work plan	Monitoring and evaluation
Profile and organogram	Bank accounts, authorized signatures	Status report Progress report Annual report

Project document PD (proposal, budget, contract, costed work plan)

Project stages

Initiation

- Project objectives
- Stakeholders
- WBS
- Budgeting
- Log frame indicators
- Define deliverables
- Funding agreement

Planning

- Project start date
- Set project activities
- Estimate task duration
- Milestone tasks
- Project calendar
- Task dependencies
- Project resource
- Resource calendar
- Resource assignment
- Task constraint
- Share work plan

Execution and monitoring

- Baseline plan
- Track scope
- Track budget
- Update work plan
- Corrective actions
- Performance report
- Annual review
- Records keeping

Closure

- Verify deliverables
- Stakeholder acceptance
- Customer acceptance
- Evaluation
- Lessons learned
- Contracts closure
- Final report
- Handover

Status report VS progress report VS annual report

Status report

- Current project condition in terms of scope and work plan

Progress report

- Monthly or quarterly file that contains activities completed and milestones reached and next plan

Annual report

- Detailed report that contains project activities, target, indicators, accomplishments,

Project proposal

- Project summary
- Background
- Goal
- Objectives
- Project description
- Outcome
- Schedule plan
- Budget
- M & E
- Appendix

Example

Request for proposal (RFP) - Construction of tourism resort in Nugaal valley

Work breakdown structure (WBS)

1	Main goal of the project
1.1	Objective 1
1.1.1	Activity
1.1.2	Activity
1.2	Objective 2
1.2.1	Activity
1.2.2	Activity
1.2.3	Activity

Task = activity = work package

Lesson objectives

- State project objectives
- Set project start date
- Create project task and give it a name
- Estimate task duration
- Create milestone task
- Set non-working days
- Define task relationships
- Determine project overall duration

Example project

Project goal: Pure training center construction project

Project objectives:

1. To design and build the main building facilities
2. Equip offices and classes
3. Start enrollment and semesters

Objective1: design and build main building facility

Activity	Outcome
Five classes	Each accommodates 20 students
One meeting hall	Accommodate 150 people
Two offices	Admin and staff
One library	Accommodate 50 books
Three toilets	2 for boys and 1 for girls

Objective2: equip offices and classes

Activity	Outcome
Equip offices	Office has power, chairs, tables, internet, etc.
Equip library	Library has power, internet, books, etc.

Objective3: start enrollment and semesters

Activity	Outcome
Hire administration staff	Admin, HR, finance, security, etc.
Hire lecturers	10 lecturers hired
Student enrollment	Students registered

Monitoring and evaluation

During project management, the M & E officer is required for setting project targets using available baseline information. He is also required in setting indicators using log frame

Monitoring	Evaluation
Updating work plan	Progress assessment
Daily routine	Annual review
Internal (done by project team)	Done by external consultant or independent consultant

Exercise

Discuss the difference between outcome, output, and impact

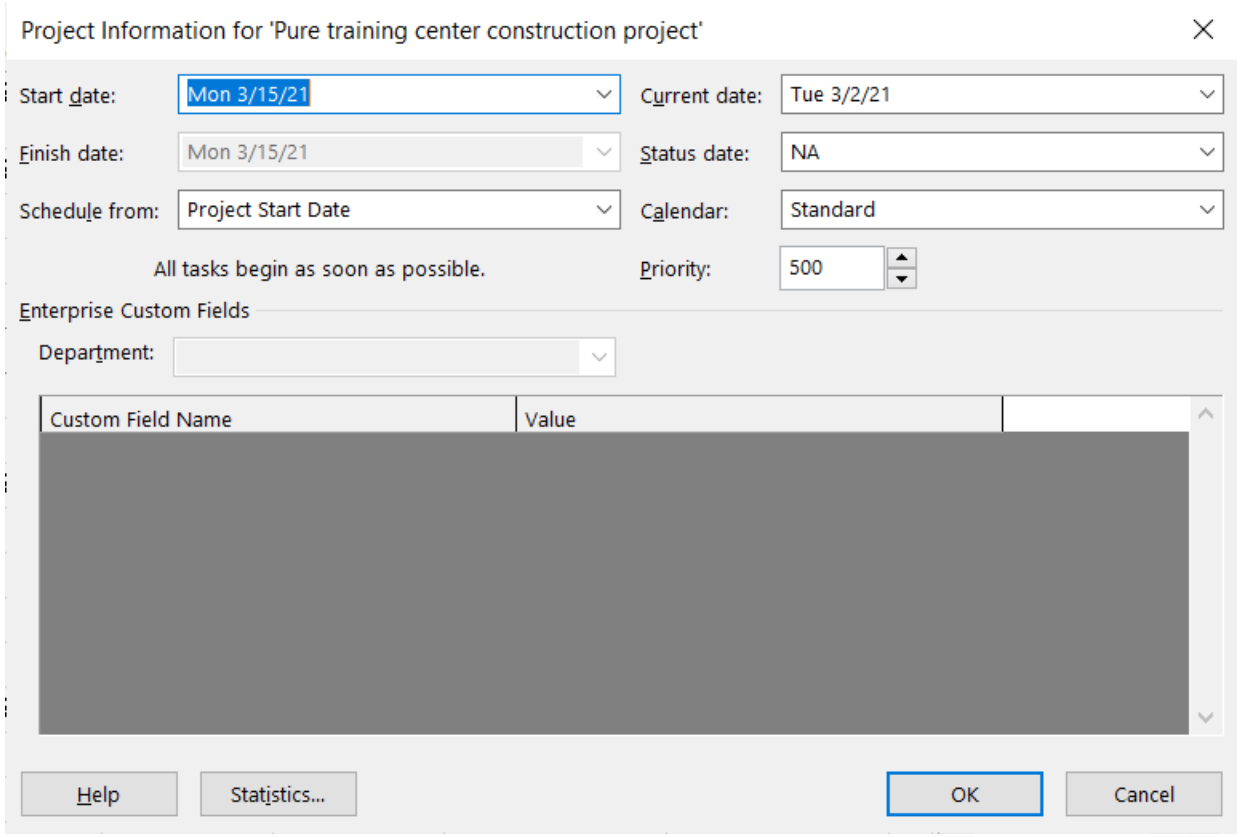
M & E log frame example

	Project summary	Objectively verifiable indicators (OVI)	Means of verification	Critical assumptions
Goal	Construction of training center	Percentage completion of the construction	Number of classes ready as of now	NA
Outcome	Training center established	Number of students the training center can accommodate	Counting the number of seats in each class	High number of seats in each class will increase number of students
Outputs	1000 Students enrolled for training	Number of students enrolled in first semester	Training center registration file	NA
Activities	Build 5 teaching classes and 2 meeting hall within 3 months	Number of teaching classes and meeting halls constructed	Visit training center for evaluation	Vehicle used for M & E activities purchased

Scheduling projects from start date

Under ***project*** tab, select ***project information***

It is recommended
To schedule a project
From start date



Task and task duration

	Task Mode	Task Name	Duration	Start	Finish
1		**Pure training center construction project**	**1 day?**	**Mon 3/15/21**	**Mon 3/15/21**
2		**Main building facilities**	**1 day?**	**Mon 3/15/21**	**Mon 3/15/21**
3		Five classes			
4		one meeting hall			
5		two offices			
6		one lab			
7		one library			
8		three toilets			
9		**Equip offices and class**	**1 day?**	**Mon 3/15/21**	**Mon 3/15/21**
10		Equip the two offices			
11		equip the computer lab			
12		equip the library			
13		Setup internet			
14		**start first enrollment and semeter**	**1 day?**	**Mon 3/15/21**	**Mon 3/15/21**
15		hire administration staff			
16		hire lecturers			
17		students enrollment			
18					

Using manual scheduling in the first few Activities

And then automatic scheduling in Subsequent planning

Milestone task

A milestone is a task with **zero** duration that marks and important event within the project.

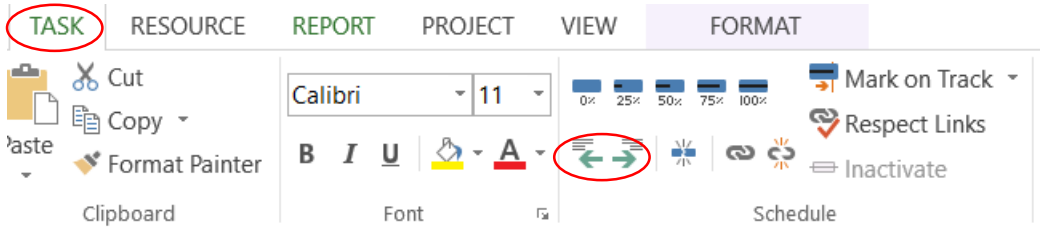
- It can be reached within the project such as finishing phase 1
- It can be imposed on the project such as deadline for new funding installment request

Task < insert < milestone

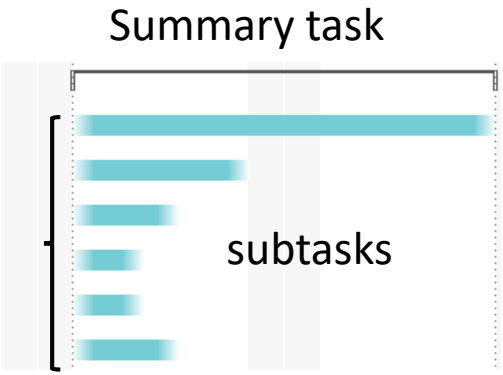
	construction complete	0 days

Organize related tasks into phases

Phases group related tasks (for example all tasks related to construction will be in construction phase)



construction phase	10 days	Mon 3/15/21	Fri 3/26/21
Five classes	10 days		
one meeting hall	5 days		
two offices	3 days		
one lab	2 days		
one library	2 days		
three toilets	3 days		

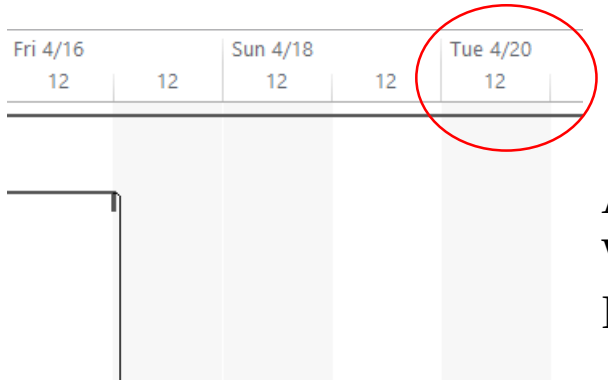


Setting non-working days for the entire project

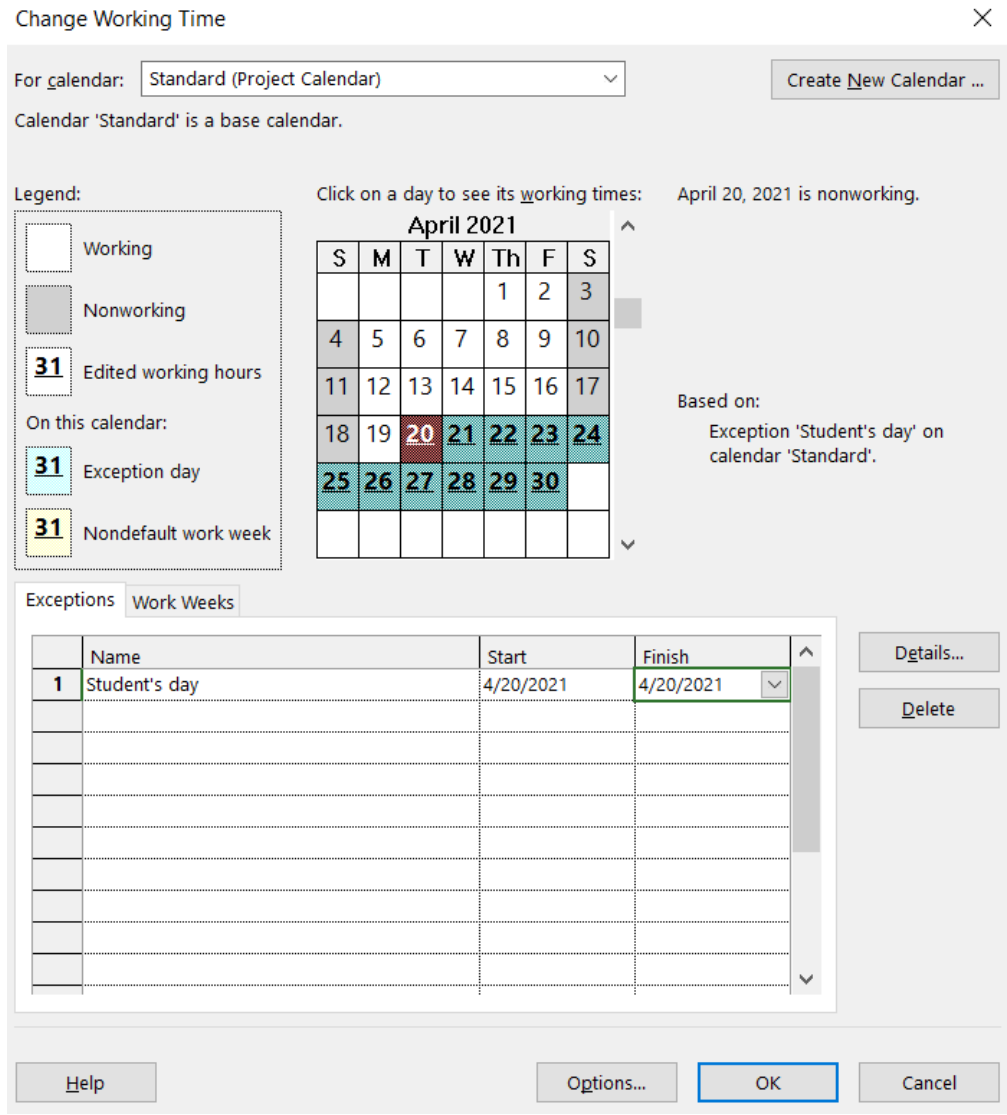
Project calendar tells working and non-working time for each task
For example, working hours per day = 8AM to 4PM,
Weekend = Friday, lunch break = 1PM – 2PM

Project < properties < change working time

Let us assume than April 20 is student's day and set that day as non-working day of the project

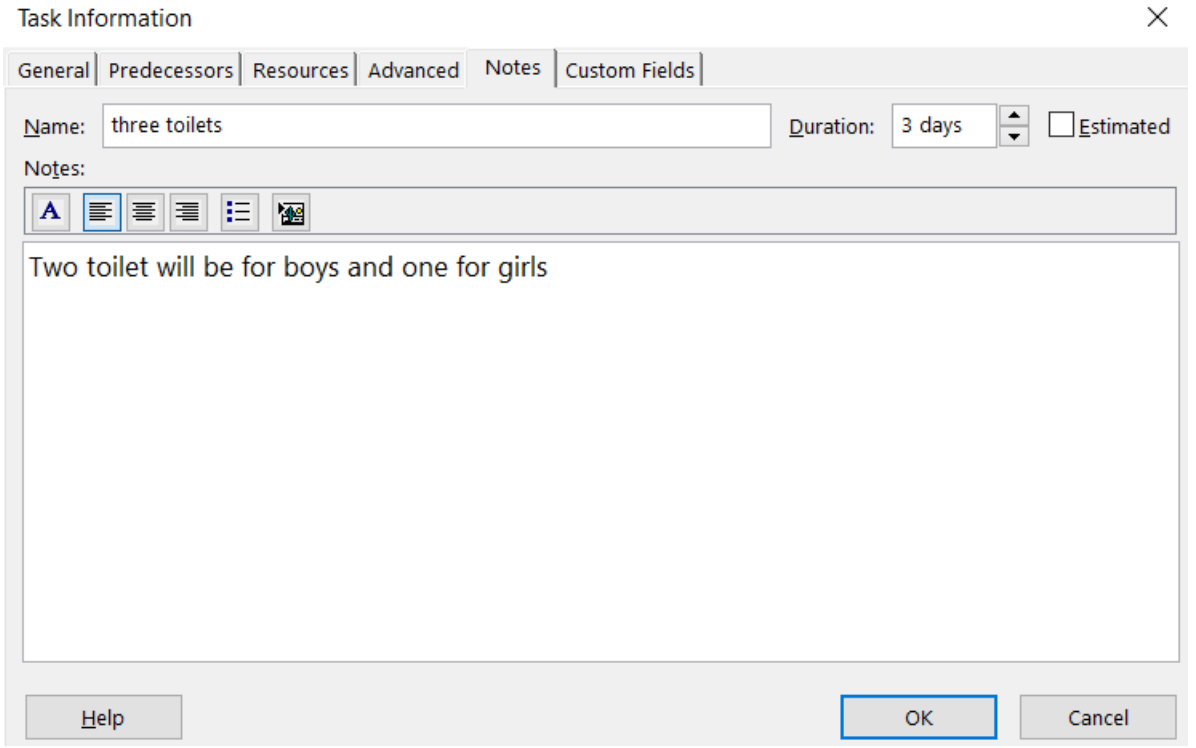


April 20 is highlighted
With grey to indicate
Non-working day

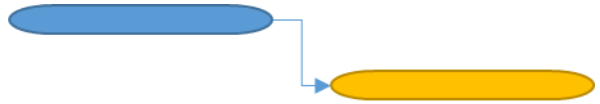
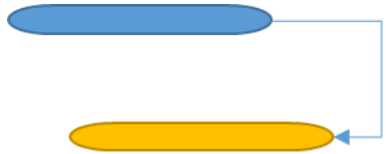
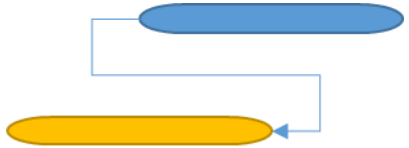


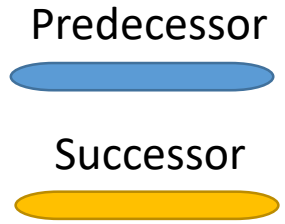
Task note

Task < properties < notes



Task dependency

Finish to start (FS)		Successor can not start until its predecessor finishes
Start to start (SS)		Successor and predecessor start at the same time. When one starts, the other one also starts simultaneously
Finish to finish (FF)		Both tasks finish at the same time. For example, project rented office and project finish at the same time
Start to finish (SF)		Successor task cannot finish until its predecessor task starts



3		Five classes	10 days	Mon 3/15/21	Fri 3/26/21	
4		one meeting hall	5 days	Mon 3/29/21	Fri 4/2/21	3

predecessor

Finish to start (FS)

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Start to start (SS) dependency

Task tab < information

Task Mode	Task Name	Duration	Start	Finish
	Pure training center construction project	**25 days?**	**Mon 3/15/21**	**Fri 4/16/21**
	construction phase	**25 days**	**Mon 3/15/21**	**Fri 4/16/21**
	Five classes	10 days	Mon 3/15/21	Fri 3/26/21
	one meeting hall	5 days	Mon 3/29/21	Fri 4/2/21
	two offices	3 days	Mon 4/5/21	Wed 4/7/21
	one lab Predecessor	2 days	Thu 4/8/21	Fri 4/9/21
	one library Successor	2 days	Mon 4/12/21	Tue 4/13/21
	three toilets	3 days	Wed 4/14/21	Fri 4/16/21
	building equiping phase	**8 days**	**Mon 3/15/21**	**Wed 3/24/2**
	Equip the two offices	5 days		
	equip the computer lab	5 days		
	equip the library	8 days		
	Setup internet	1 day		
	construction complete	0 days		
	semester starting phase	**4 days?**	**Mon 3/15/21**	**Thu 3/18/21**
	hire administration staff	4 days		

Resource

Mar 7, '21 | Mar 14, '21 | Mar 21, '21

Task Information

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

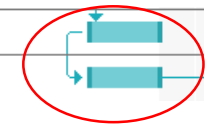
Name: one library Duration: 2 days Estimated

Predecessors:

ID	Task Name	Type	Lag
6	one lab	Start-to-Start (SS)	0d

Help OK Cancel

	one lab	2 days	Thu 4/8/21	Fri 4/9/21	5	
	one library	2 days	Thu 4/8/21	Fri 4/9/21	6SS	



Can run parallel

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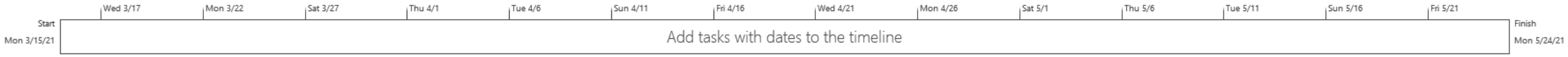
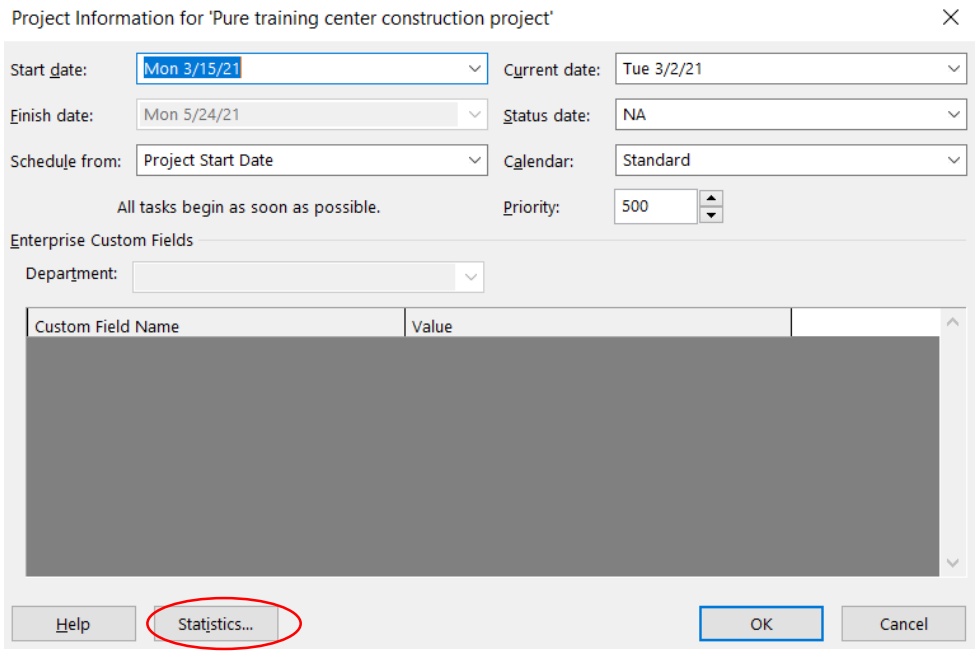
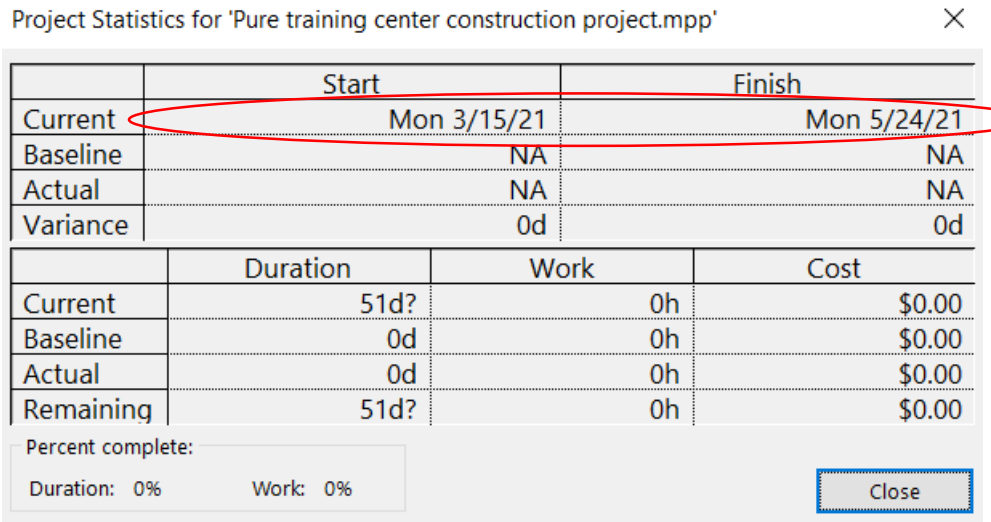
Project time

The **timeline** bar can be used to determine project start date and end date



We can also check project duration from project information dialog box





Availability of resource to Work on task

Cost required to pay for Those resources

Lesson objectives

- Work, cost, and material resource
- Associate people and equipment with a task (work resource)
- Resource capacity and pay rate
- Set resource calendar to control non-working days of an individual resource
- Associate financial cost with a task (cost resources)
- Document resource notes
- Add or remove resources for automatically scheduled tasks

Work resource

People	Staff, contracting firm, consultant, etc.
Equipment	Vehicle, computer, printer, etc.

View < resource views < resource sheet

Amount of time that a resource is available for work on task
100% means full capacity of a single resource in the work calendar

Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use
Engineer	Work		E		100%	$15.00/day	$0.00/hr	$0.00
Construction firm	Work		C		50%	$50.00/day	$0.00/hr	$0.00
Vehicle	Work		V		100%	$0.00/hr	$0.00/hr	$80.00

Cost per use. For vehicle $80 per trip

A resource is assigned to a task

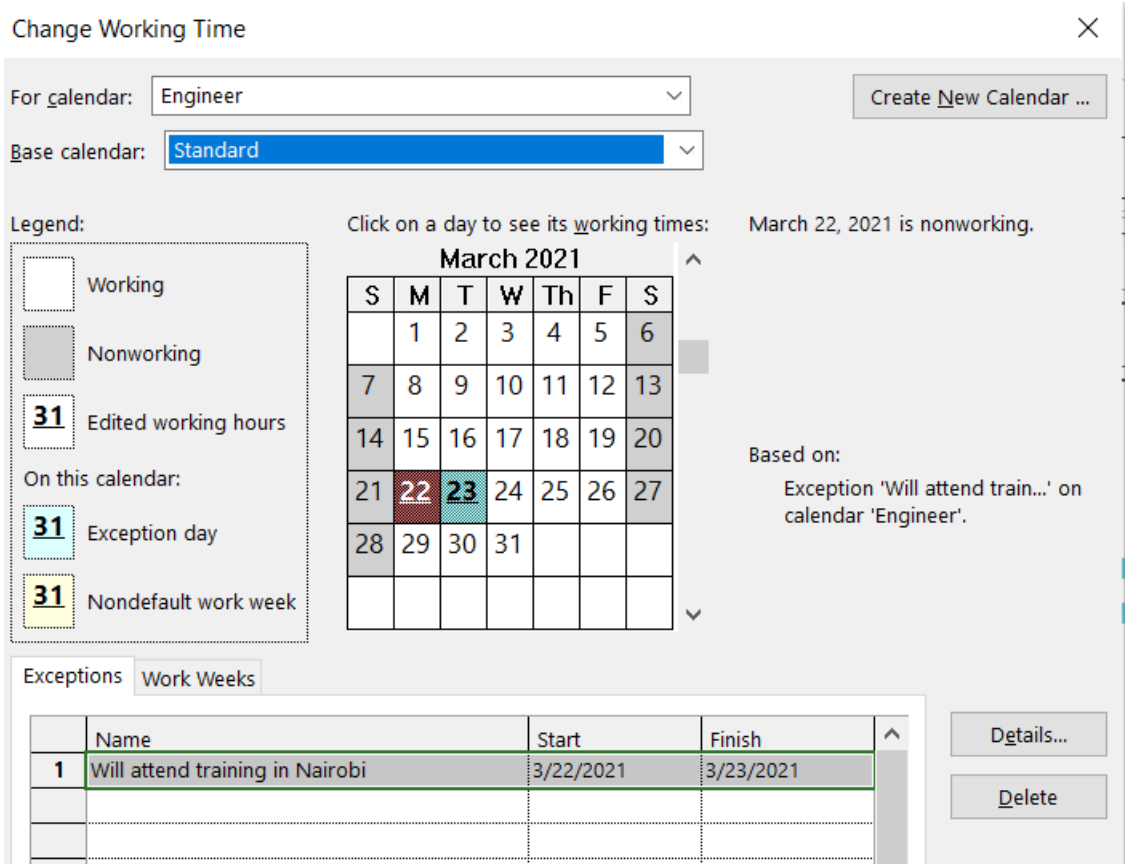
Cost of assignment = work time **x** pay rate

Resource calendar for work resources

In this exercise, we set March 22 and 23 as non-working days for the resource Engineer. He will be attending training

Project < change working time

Go to exception tab and set off-days

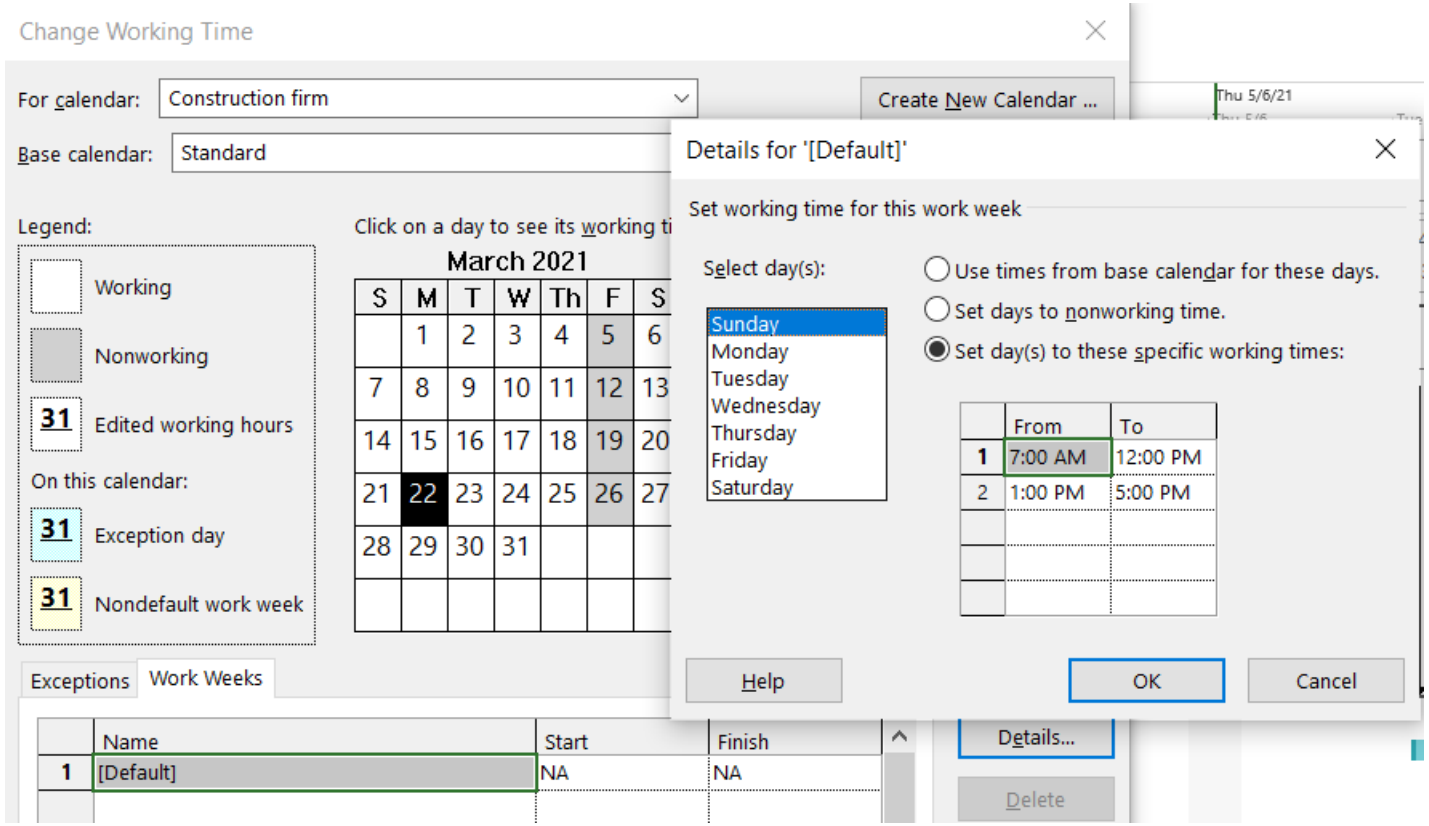


Resource calendar for work resources

In this exercise, we set 6 days by 8 hours for the construction firm resource except Friday
For multiple resources, create new project calendar instead of resource by resource change

Project < change working time

In the for calendar, select construction firm resource
Click work weeks, and set working days except Friday



Cost resource for project budgeting

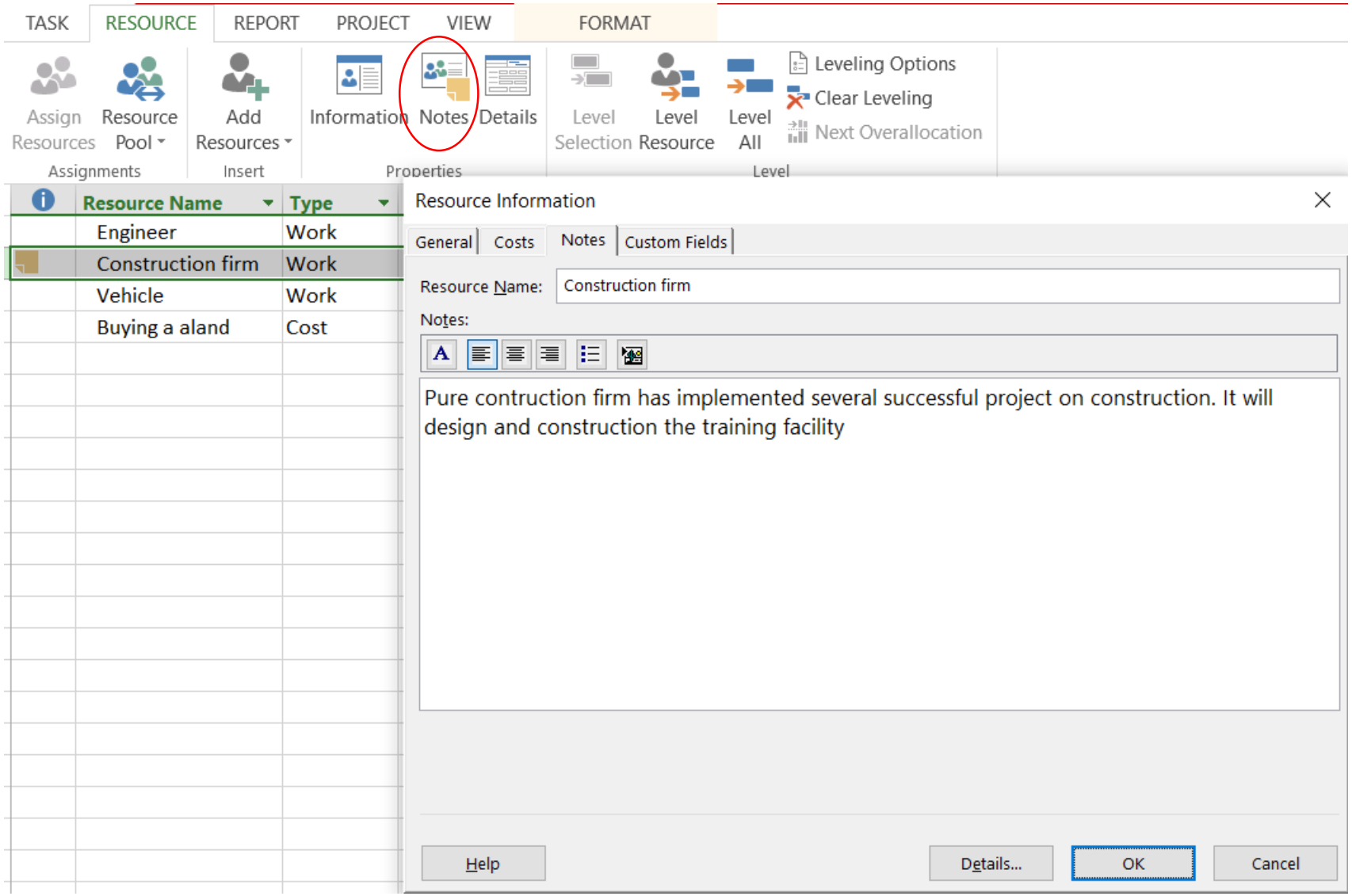
Cost resources does not effect task scheduling. They represent financial expenses on tasks

View < resource sheet

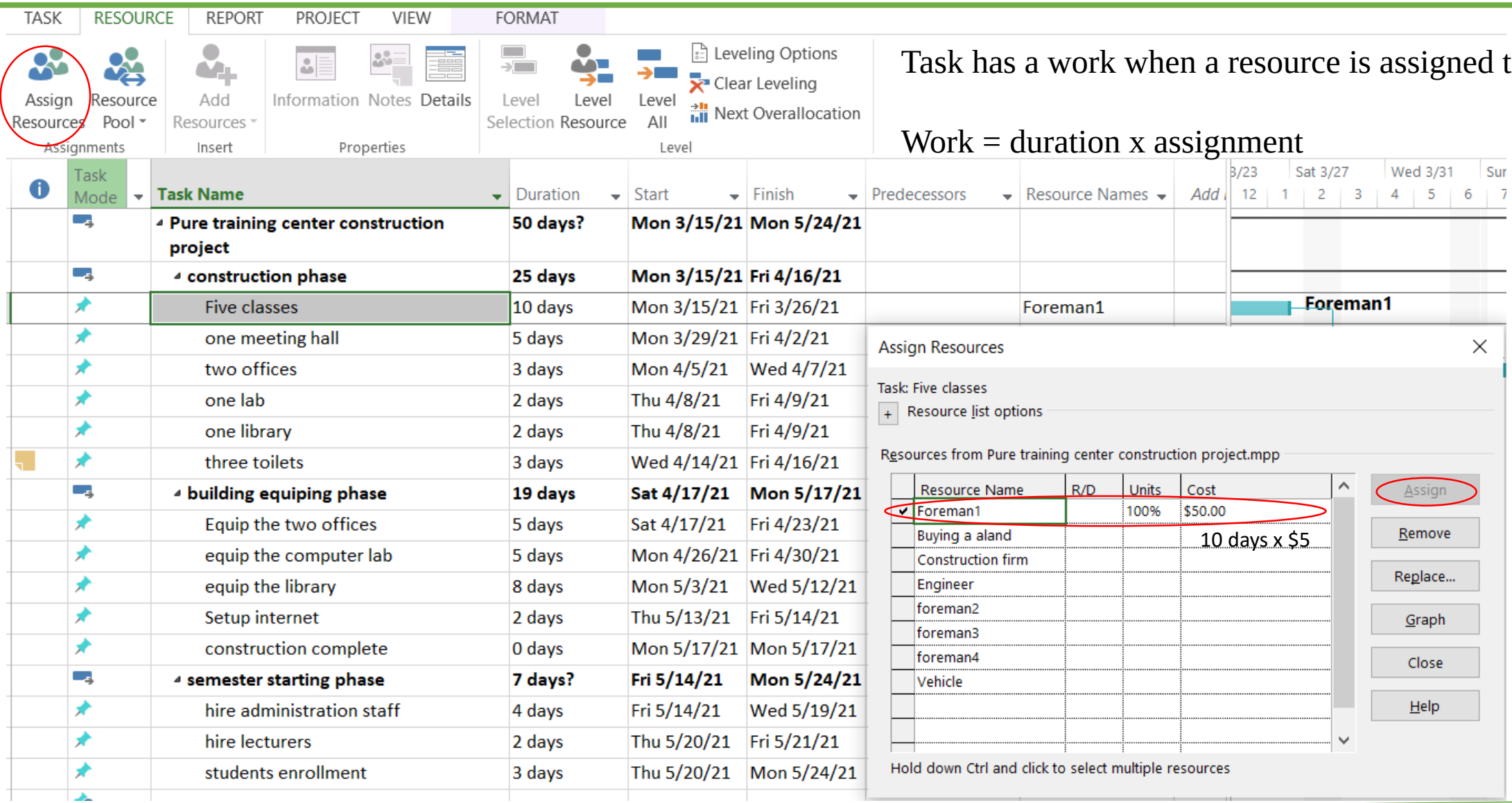
Add buying a land row and set resource type as cost

Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
Engineer	Work		E		100%	$15.00/day	$0.00/hr	$0.00	Prorated	Standard
Construction firm	Work		C		50%	$50.00/day	$0.00/hr	$0.00	Prorated	Standard
Vehicle	Work		V		100%	$0.00/hr	$0.00/hr	$80.00	Prorated	Standard
Buying a aland	Cost		B						Prorated	

Resource details



Assign work resource to a task



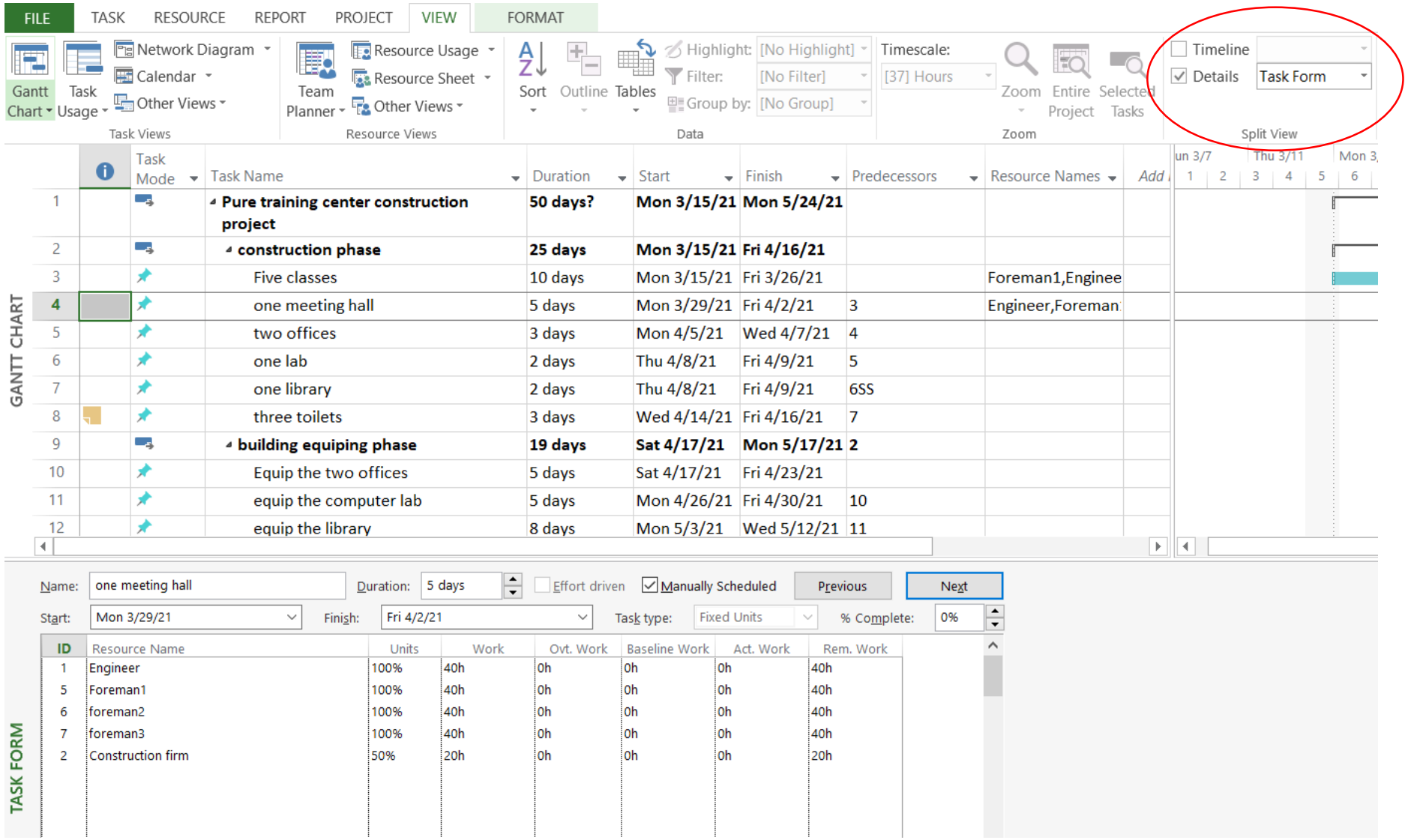
Task has a work when a resource is assigned to it

Work = duration x assignment

Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
	Pure training center construction project	**50 days?**	**Mon 3/15/21**	**Mon 5/24/21**		
	construction phase	**25 days**	**Mon 3/15/21**	**Fri 4/16/21**		
	Five classes	10 days	Mon 3/15/21	Fri 3/26/21		Foreman1
	one meeting hall	5 days	Mon 3/29/21	Fri 4/2/21		
	two offices	3 days	Mon 4/5/21	Wed 4/7/21		
	one lab	2 days	Thu 4/8/21	Fri 4/9/21		
	one library	2 days	Thu 4/8/21	Fri 4/9/21		
	three toilets	3 days	Wed 4/14/21	Fri 4/16/21		
	building equiping phase	**19 days**	**Sat 4/17/21**	**Mon 5/17/21**		
	Equip the two offices	5 days	Sat 4/17/21	Fri 4/23/21		
	equip the computer lab	5 days	Mon 4/26/21	Fri 4/30/21		
	equip the library	8 days	Mon 5/3/21	Wed 5/12/21		
	Setup internet	2 days	Thu 5/13/21	Fri 5/14/21		
	construction complete	0 days	Mon 5/17/21	Mon 5/17/21		
	semester starting phase	**7 days?**	**Fri 5/14/21**	**Mon 5/24/21**		
	hire administration staff	4 days	Fri 5/14/21	Wed 5/19/21		
	hire lecturers	2 days	Thu 5/20/21	Fri 5/21/21		
	students enrollment	3 days	Thu 5/20/21	Mon 5/24/21		

Read resource assignment detail from task form

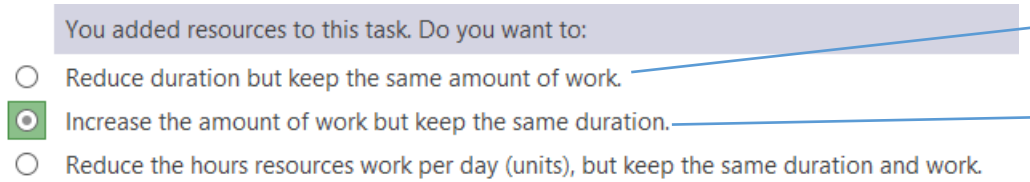
Task < split view < details



For task 4, these Resources are needed.

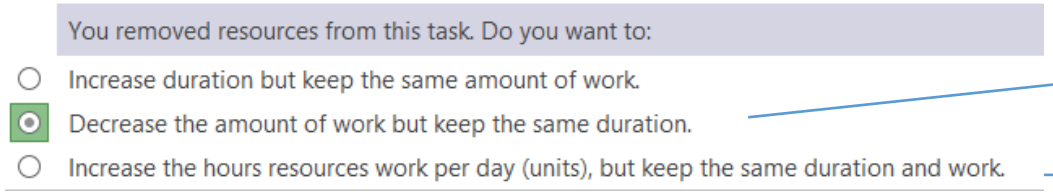
The work needed per Resource to complete This task shown

Add or remove resource assignment



Add more resource assignment, and reduce duration

Add more resource assignment, but keep duration

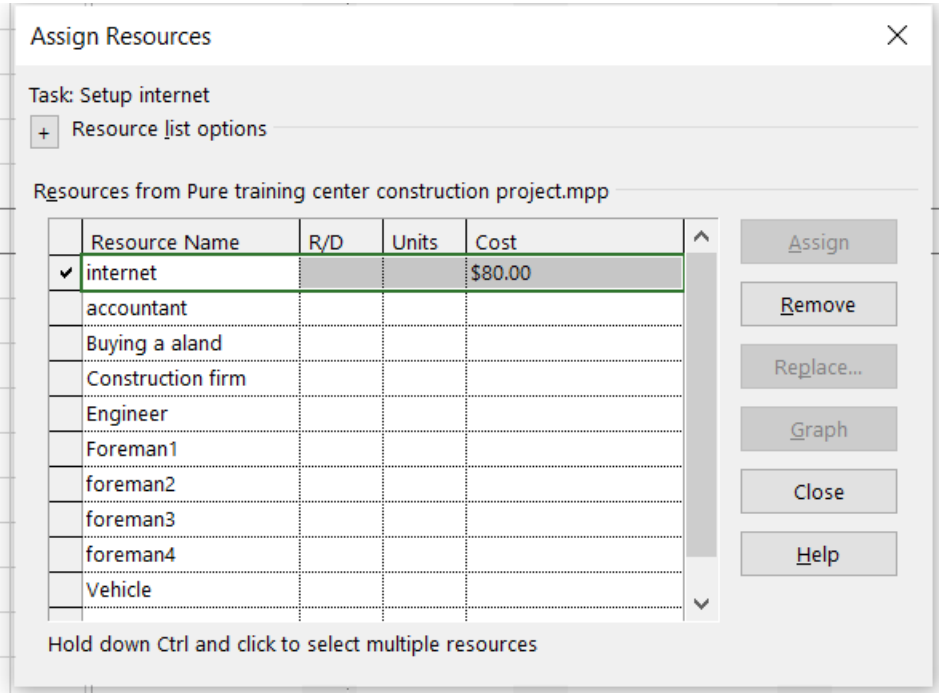


Remove resource assignment, because
Remaining resources are already enough

Remove resource assignment, and increase
Work hours of the removed resource
for remaining resources

Assign cost resource to a task

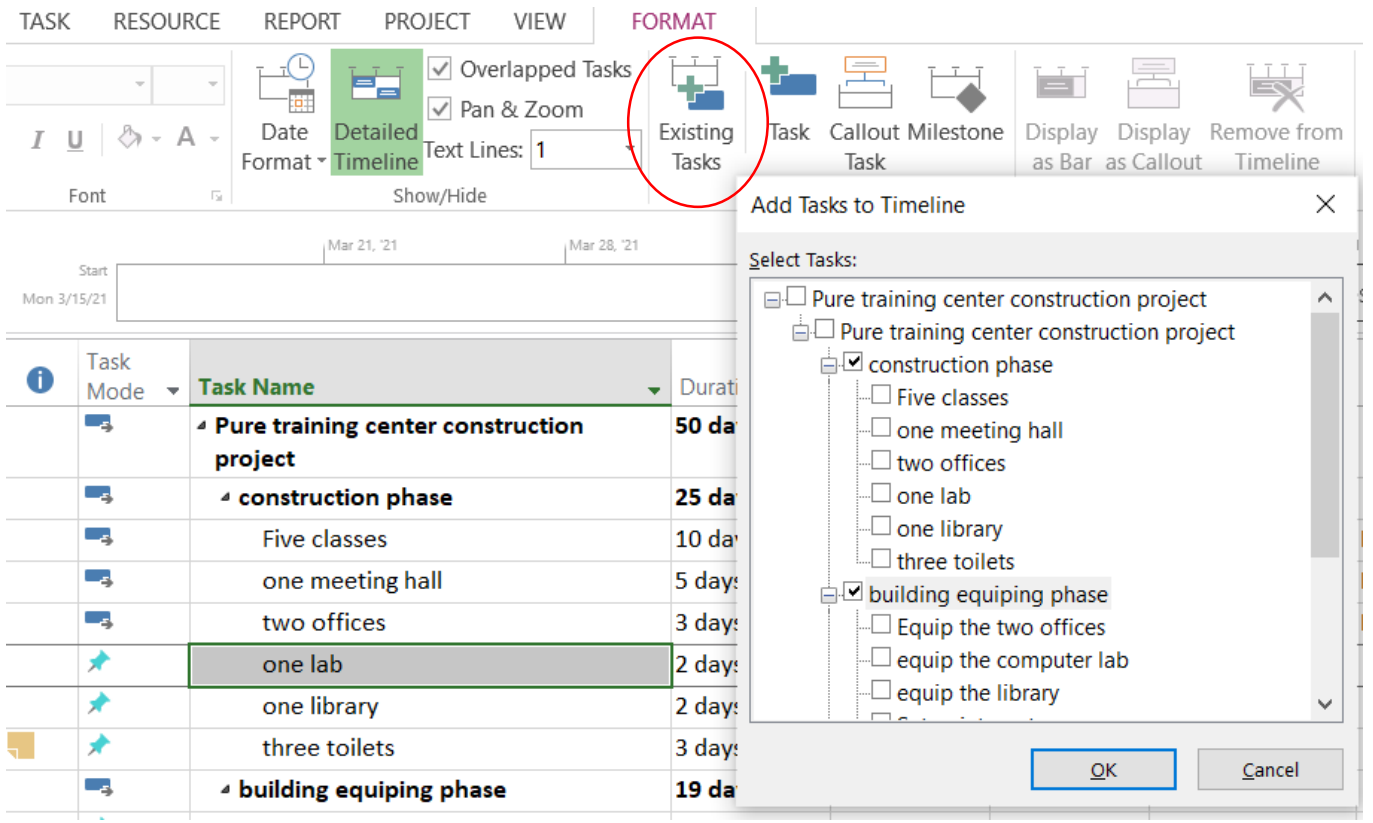
three toilets	3 days	Wed 4/14/21	Fri 4/16/21	7	
building equiping phase	**19 days**	**Sat 4/17/21**	**Mon 5/17/21**	**2**	
Equip the two offices	5 days	Sat 4/17/21	Fri 4/23/21		
equip the computer lab	5 days	Mon 4/26/21	Fri 4/30/21	10	
equip the library	8 days	Mon 5/3/21	Wed 5/12/21	11	
Setup internet	2 days	Thu 5/13/21	Fri 5/14/21	12	internet[$80.00]
construction complete	0 days	Mon 5/17/21	Mon 5/17/21	13	
semester starting phase	**7 days?**	**Fri 5/14/21**	**Mon 5/24/21**	**9**	
hire administration staff	4 days	Fri 5/14/21	Wed 5/19/21		
hire lecturers	2 days	Thu 5/20/21	Fri 5/21/21	16	
students enrollment	3 days	Thu 5/20/21	Mon 5/24/21	17SS	

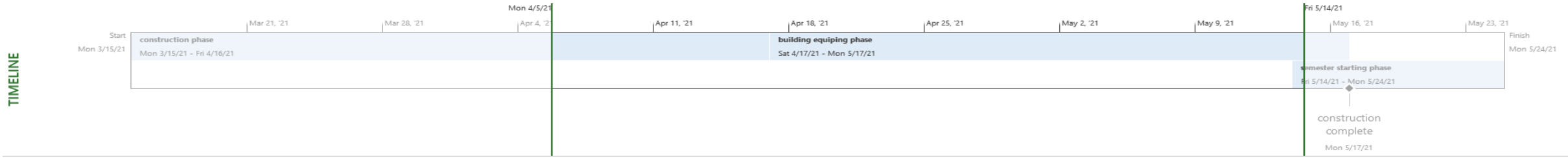


Lesson objectives

- Format the Gantt chart
- Format specific task to make it standout
- Add main tasks and milestones to the timeline view
- Draw objects on the Gantt chart

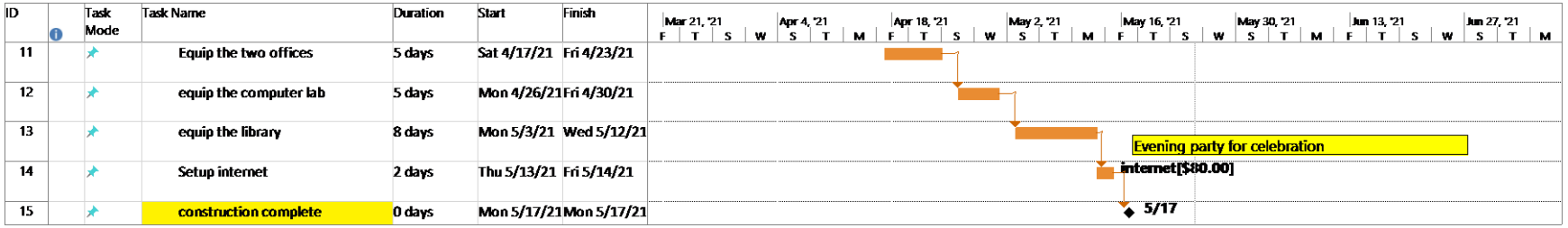
Customize the timeline view



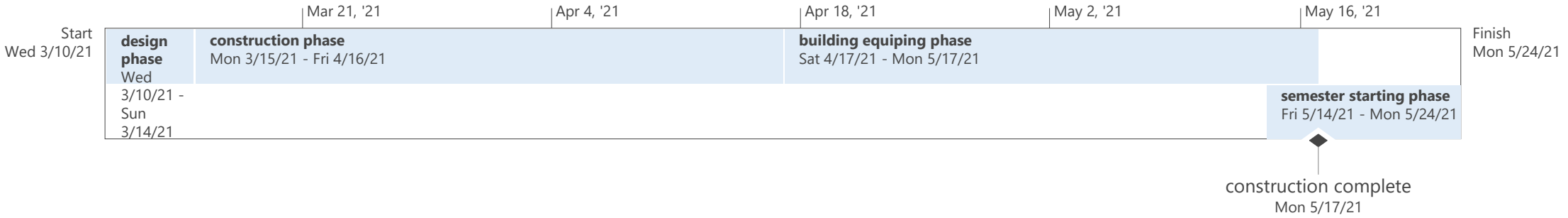


Copying Gantt chart and timeline

Scroll to the task you want to copy and select, then go to **task < copy < copy picture**, then paste to word or presentation



Select the timeline, then go to **format < copy timeline < full size**

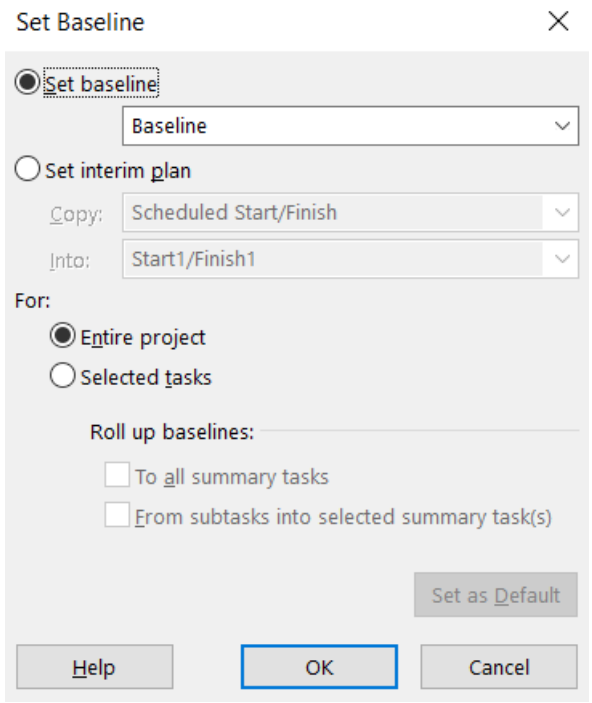


Lesson objectives

- Project baseline plan
- Project update as it progresses
- Actual task schedule

Project baseline plan

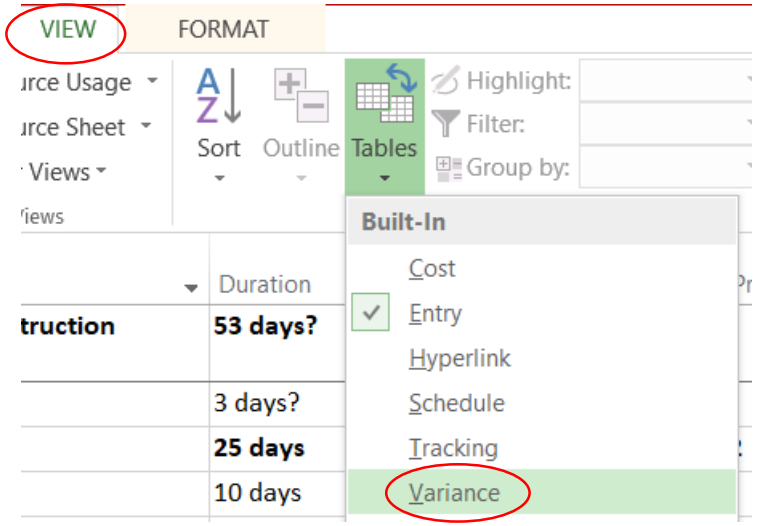
Project < schedule < set baseline



To view the baseline

Open the task sheet from
View < tables < variance

Then go to

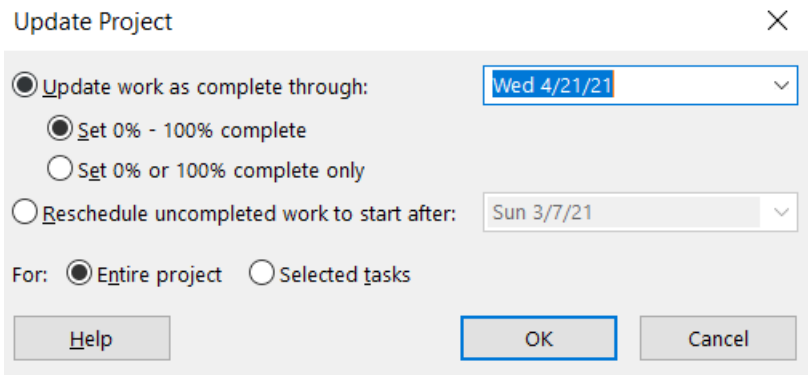


Scheduled plan Baseline plan

Task	Task Name	Start	Finish	Baseline Start	Baseline Finish	Start Var.	Finish Var.
	Pure training center c	**Wed 3/10/21**	**Mon 5/24/21**	**Wed 3/10/21**	**Mon 5/24/21**	**0 days**	**0 days**
	design phase	Wed 3/10/21	Sun 3/14/21	Wed 3/10/21	Sun 3/14/21	0 days	0 days
	construction phase	**Mon 3/15/21**	**Fri 4/16/21**	**Mon 3/15/21**	**Fri 4/16/21**	**0 days**	**0 days**
	Five classes	Mon 3/15/21	Fri 3/26/21	Mon 3/15/21	Fri 3/26/21	0 days	0 days
	one meeting hall	Mon 3/29/21	Fri 4/2/21	Mon 3/29/21	Fri 4/2/21	0 days	0 days
	two offices	Mon 4/5/21	Wed 4/7/21	Mon 4/5/21	Wed 4/7/21	0 days	0 days

Project update in the execution phase

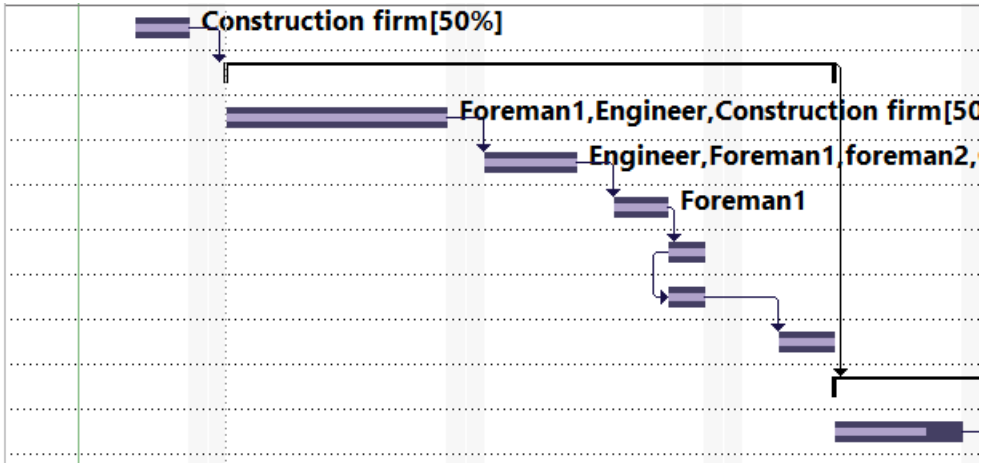
Project < status < update project



Show completion percentage of all tasks scheduled to start before 4/21/2021

Finished Tasks Ticked

	design phase	3 days?	Wed 3/10/21	Fri 3/12/21	
	construction phase	**25 days**	**Mon 3/15/21**	**Fri 4/16/21**	**2**
	Five classes	10 days	Mon 3/15/21	Fri 3/26/21	
	one meeting hall	5 days	Mon 3/29/21	Fri 4/2/21	4
	two offices	3 days	Mon 4/5/21	Wed 4/7/21	5
	one lab	2 days	Thu 4/8/21	Fri 4/9/21	6
	one library	2 days	Thu 4/8/21	Fri 4/9/21	7SS
	three toilets	3 days	Wed 4/14/21	Fri 4/16/21	8
	building equiping phase	**19 days**	**Sat 4/17/21**	**Mon 5/17/21**	**3**
	Equip the two offices	5 days	Sat 4/17/21	Fri 4/23/21	



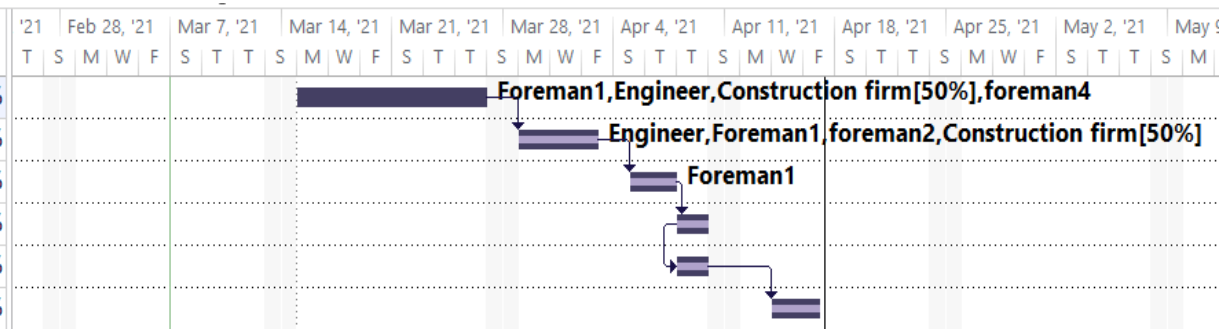
Progress indicated on the Gantt chart

Record actual work on task schedule

View < tables < work

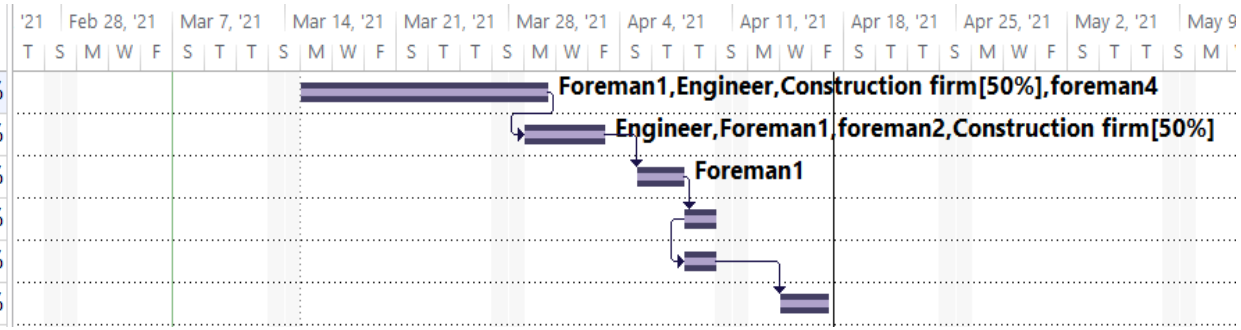
On task 4, currently it is 0% completion

	Task Name	Work	Baseline	Variance	Actual	Remaining	% W. Comp.
4	Five classes	264 hrs	264 hrs	0 hrs	0 hrs	264 hrs	0%
5	one meeting hall	140 hrs	140 hrs	0 hrs	140 hrs	0 hrs	100%
6	two offices	24 hrs	24 hrs	0 hrs	24 hrs	0 hrs	100%
7	one lab	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%
8	one library	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%
9	three toilets	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%



But after completion 300hrs work is spent

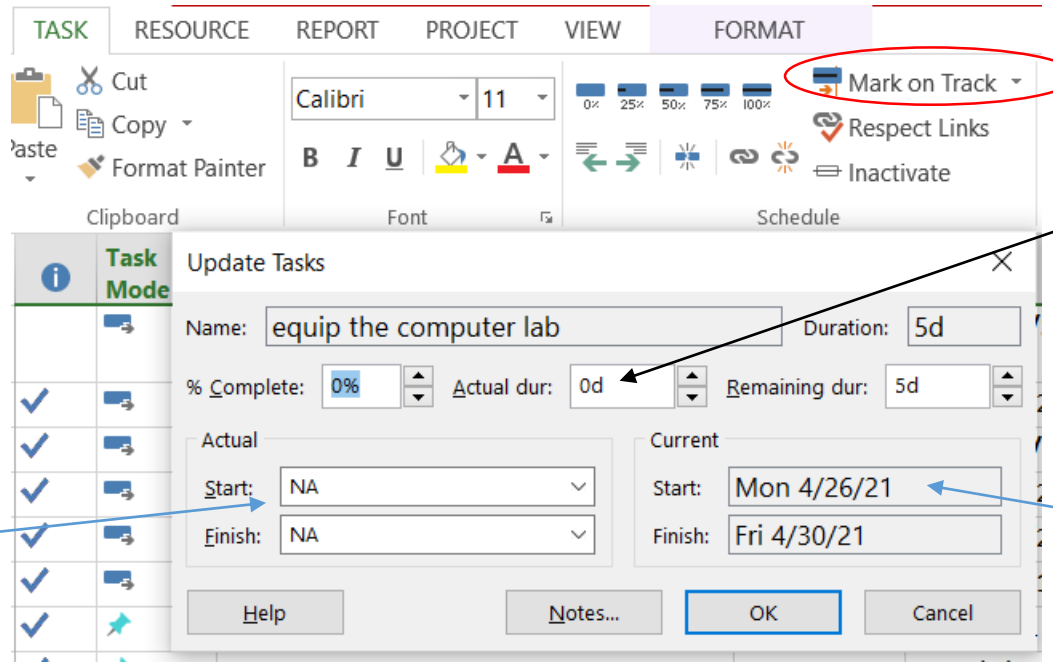
	Task Name	Work	Baseline	Variance	Actual	Remaining	% W. Comp.
4	Five classes	300 hrs	264 hrs	36 hrs	300 hrs	0 hrs	100%
5	one meeting hall	140 hrs	140 hrs	0 hrs	140 hrs	0 hrs	100%
6	two offices	24 hrs	24 hrs	0 hrs	24 hrs	0 hrs	100%
7	one lab	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%
8	one library	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%
9	three toilets	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs	100%



Scheduled
= 264hrs

Actual
= 300hrs

Record actual start date on task schedule



Instead of changing the start date, the duration can be extended which will effect finish date

Set actual start date

Planned start date

Optimizing task details

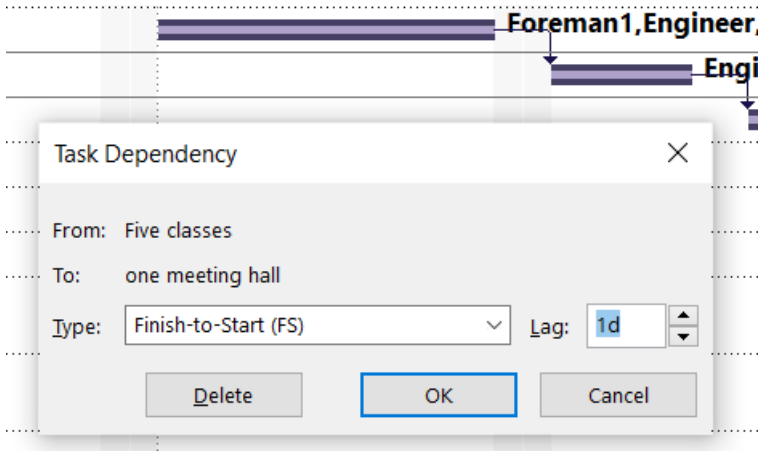
Lesson objectives

- Lag and lead time
- Task constraint
- Task split due to interruption
- Specific task calendar
- Set deadline on task
- Task budget using fixed cost
- Repetitive tasks (monthly meetings, monthly reports, etc.)
- Project critical path

Entering lead and lag times

Double click on the Gantt chart link between tasks to open task dependency dialog box

- Lag time delays the start of the successor and entered as positive
- Lead time causes the successor to start before predecessor finishes and entered as negative



Task constraint

Task constraint controls start date, finish date, and rescheduling flexibility

Hard constraint

- Task must *start or end* on specified date
- Example are project handover date, project funding application date, etc.

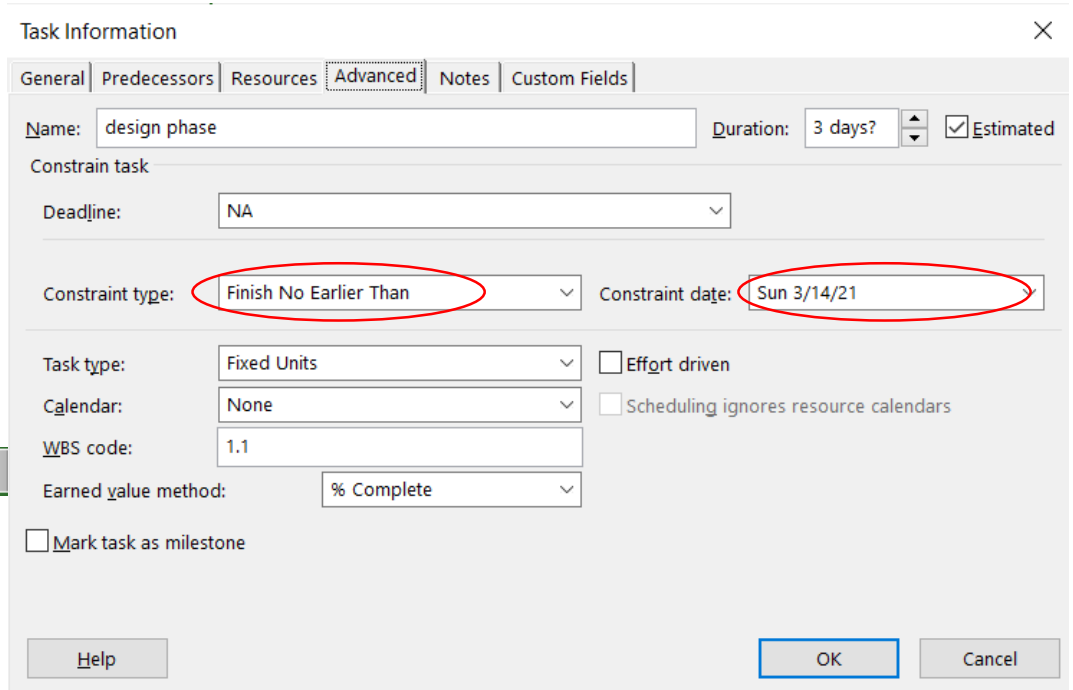
As soon as possible constraint

- Task can start as soon as possible with flexibility in rescheduling

Moderate constraint

- *Start no earlier than* (e.g. will start on or after 15 March)
- *Start no later than* (e.g. will start on or before 15 March)
- *Finish no earlier than* (e.g. will finish after 15 March)
- *Finish no later than* (e.g. will finish on or before 15 March)

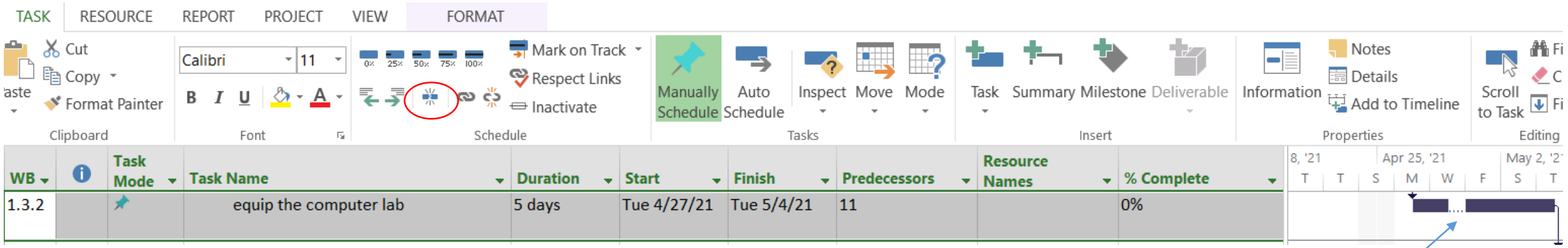
This task has *finish no earlier than*
Constraint on 14 March and will finish
After this date



Task split due to interruption

Project task could be interrupted due to

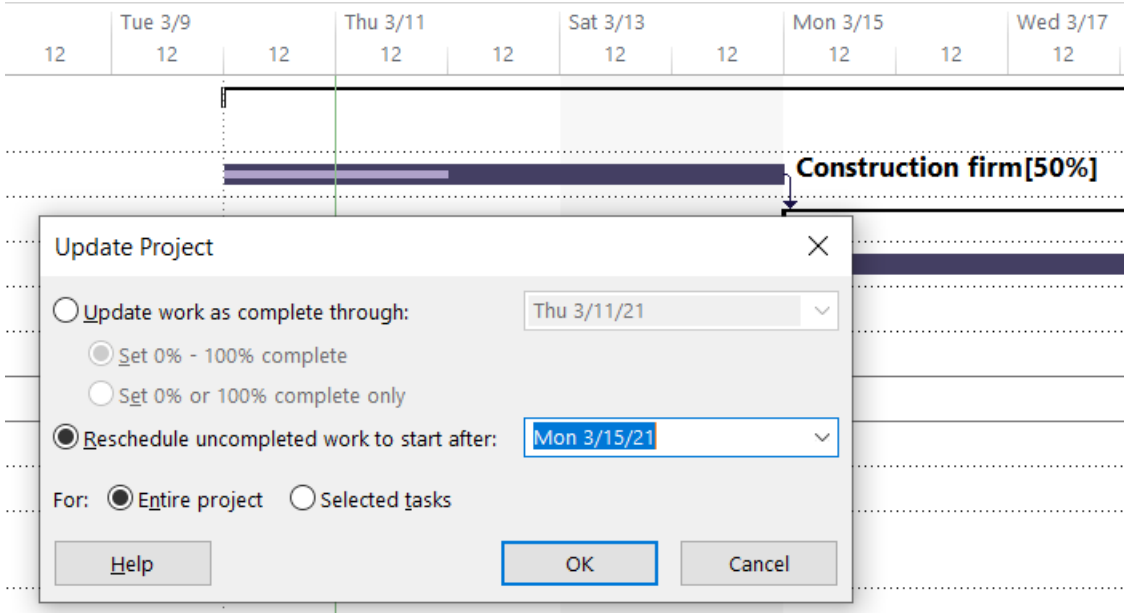
- Expected circumstances (e.g. resource unavailable due to meeting or coming late due to traffic jam)
- Unexpected circumstances (e.g. shared resource assigned to another high priority task, equipment malfunction)

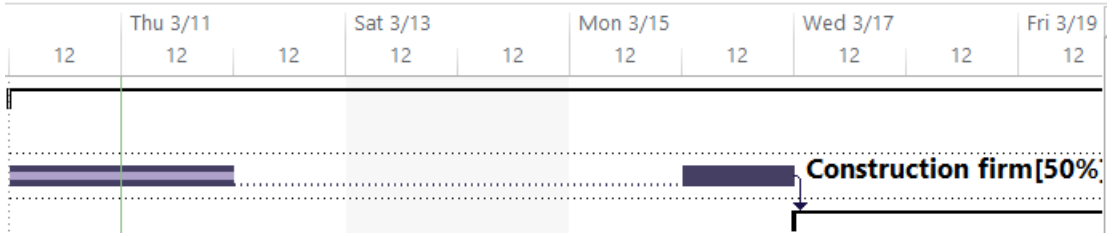


Dotted lines represent
Interruption time in which there
Is no work and duration not counted

Reschedule incomplete task

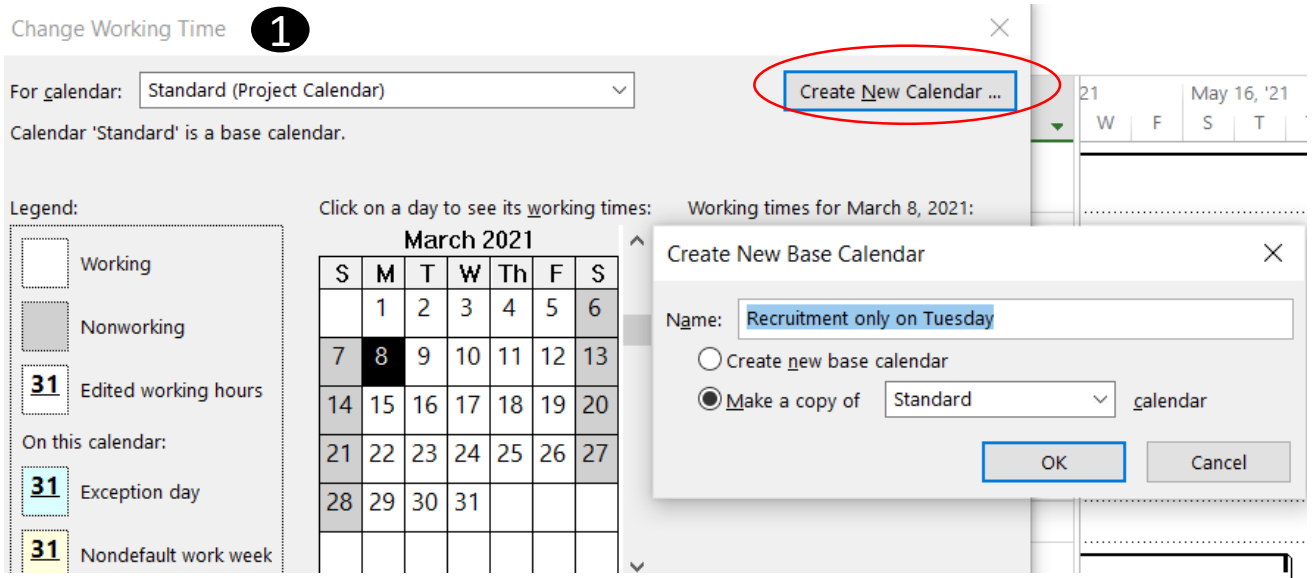
This task has 3 days duration and starts on Wednesday
Instead of finishing on Friday, we want to re-start it on Monday



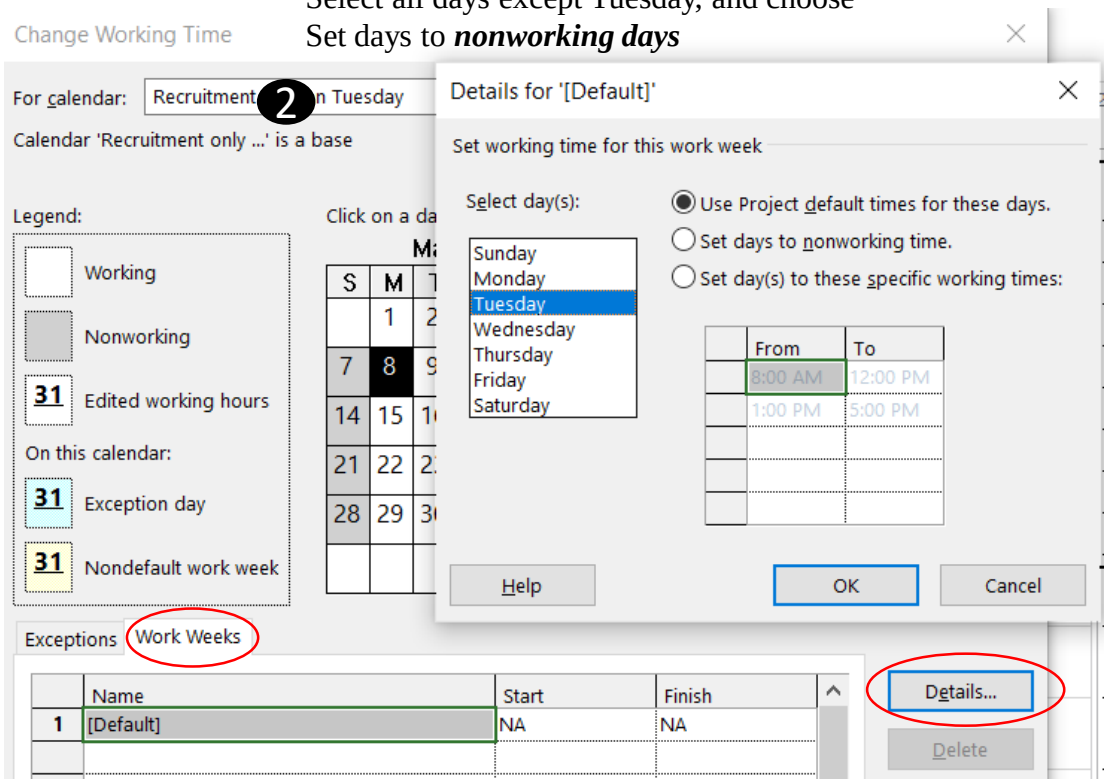


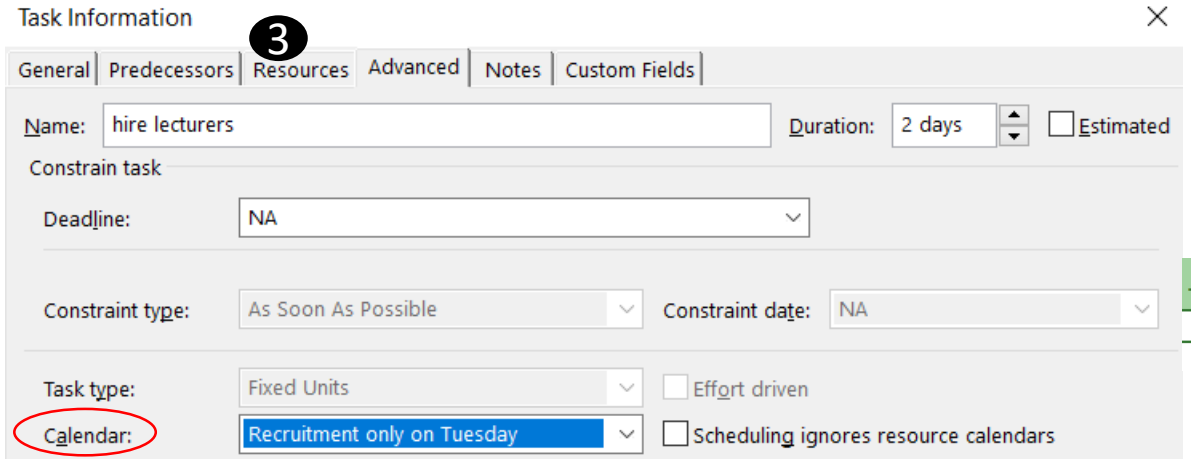
Specific task calendar

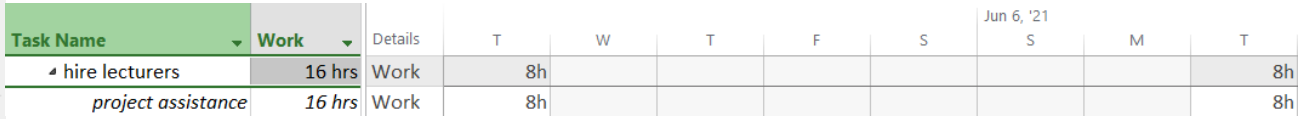
Some tasks might be performed during weekends or night shifts, which differs from project calendar (8hrs by 5 days)



Select all days except Tuesday, and choose
Set days to ***nonworking days***

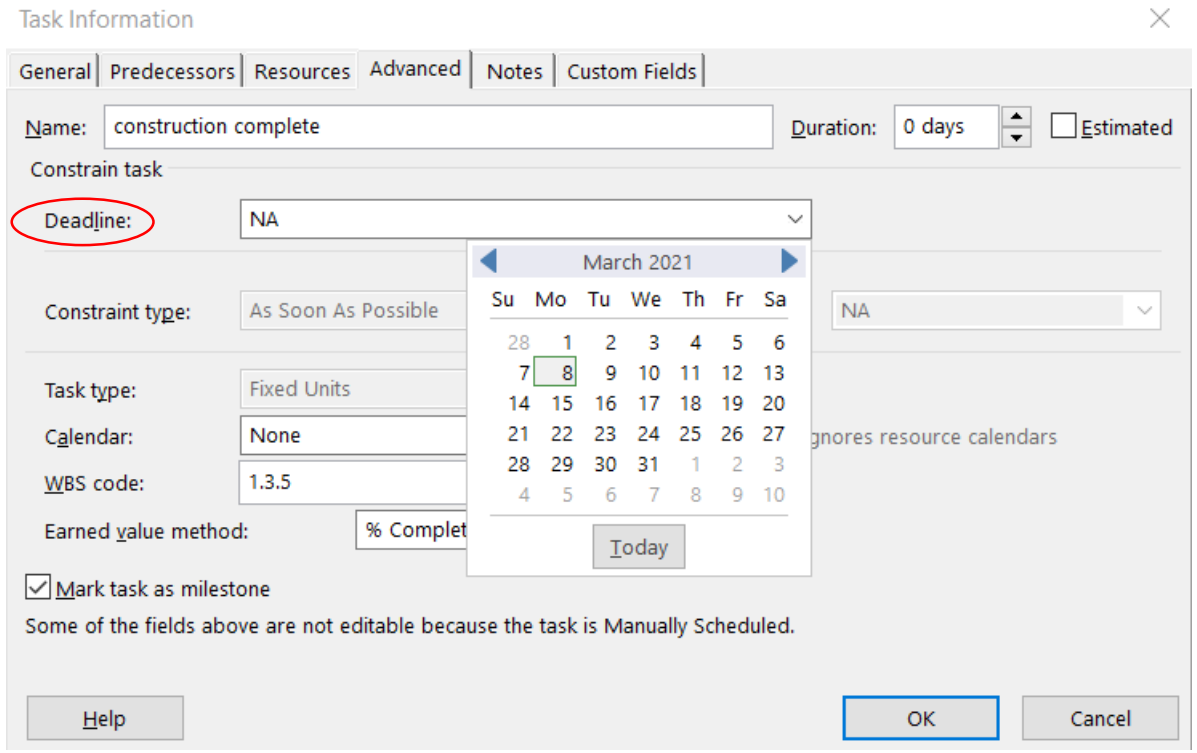


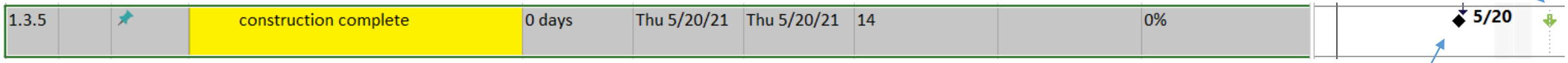




Set deadline on task

Deadline is used when a task is used as soon as possible and given sometime after finish date





Deadline
Task: construction complete
Deadline: Mon 5/24/21

Milestone scheduled on 20 May

Task budget using fixed cost

A fixed cost is a specific amount of money budgeted for a particular task, that does not change with resource assignment

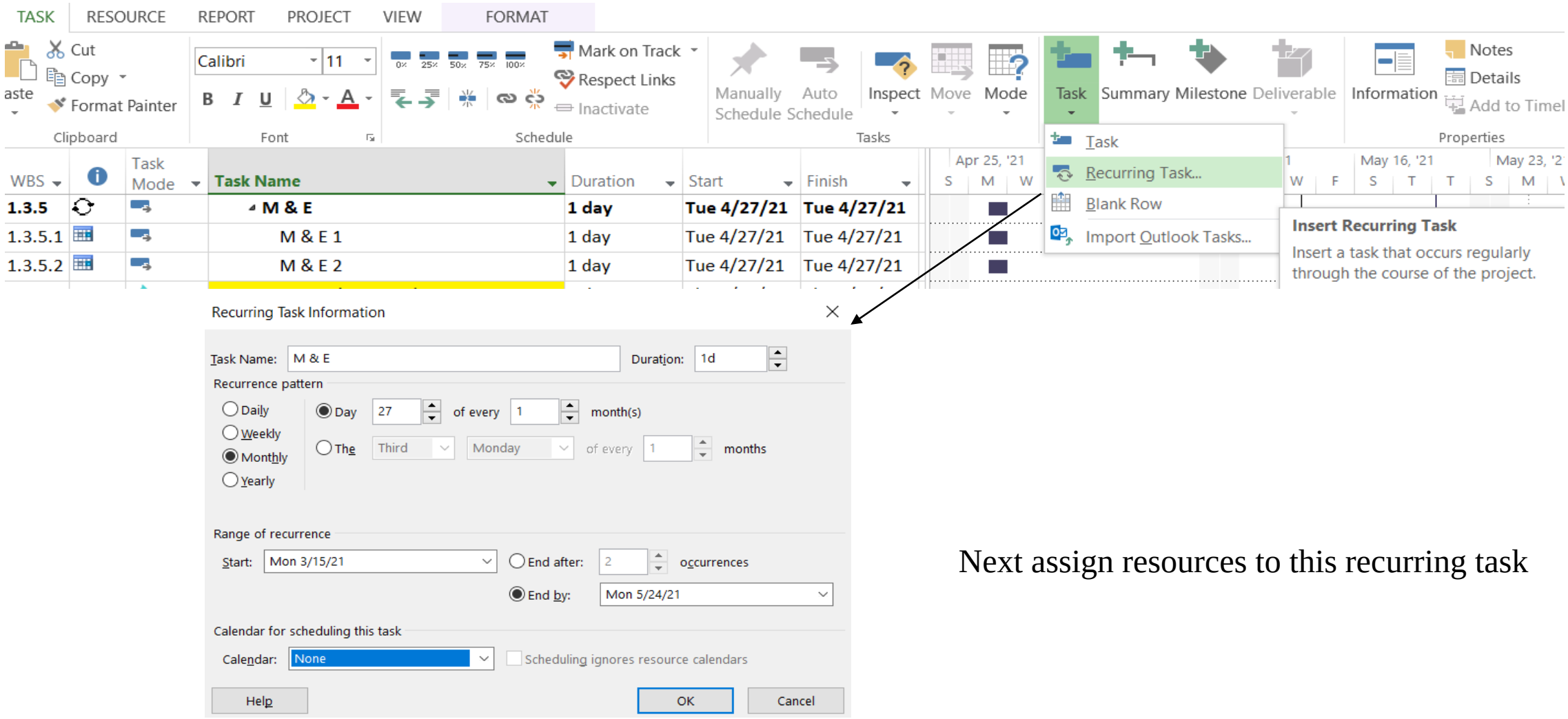
- For example a task of hiring an accountant for the project, which is paid as project starts

Open task sheet
View < tables < cost

Task Name	Fixed	Fixed Cost	Total	Baseline	Variance	Actual	Remaining
staff salary	$400.00	Start	$400.00	$0.00	$400.00	$0.00	$400.00

Repetitive task

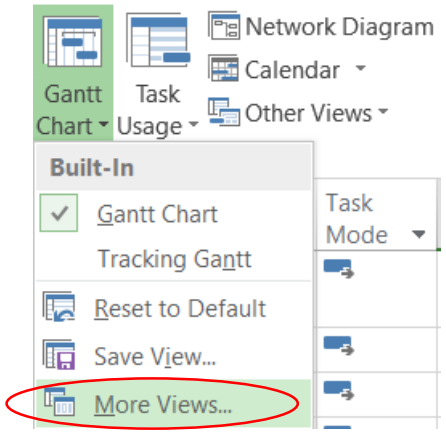
Repetitive tasks include yearly M&E, progress reports, meetings that take resources away from project tasks

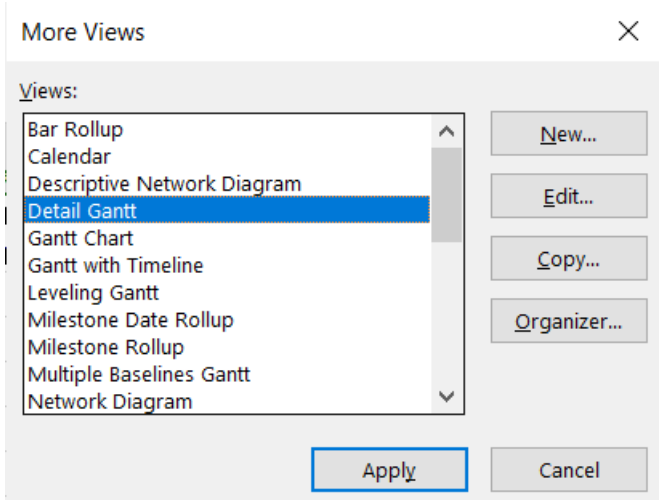


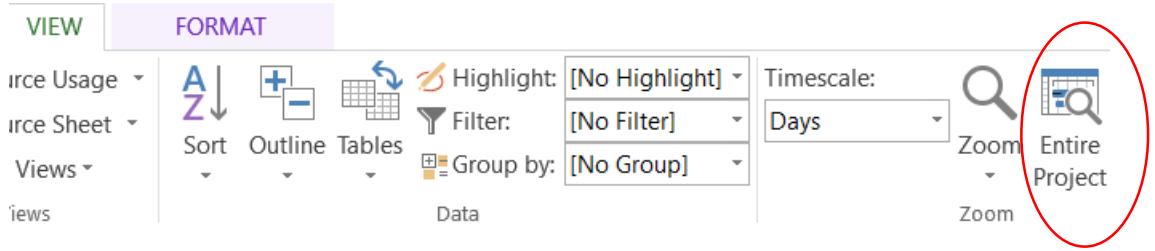
Next assign resources to this recurring task

Critical path

- *Critical path* is a series of tasks that will extend project duration if they are delayed
- A task is on critical path if *total slack* = 0 days
- *Total slack* is the time a task can be delayed without affecting project total duration
- *Free slack* is the amount of time a task can be delayed without delaying another task

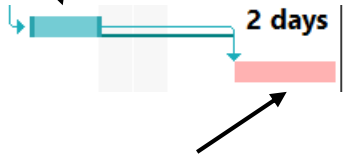






one library	0 edays	2 days	Thu 4/8/21	Fri 4/9/21	9
three toilets	0 edays	3 days	Wed 4/14/21	Fri 4/16/21	

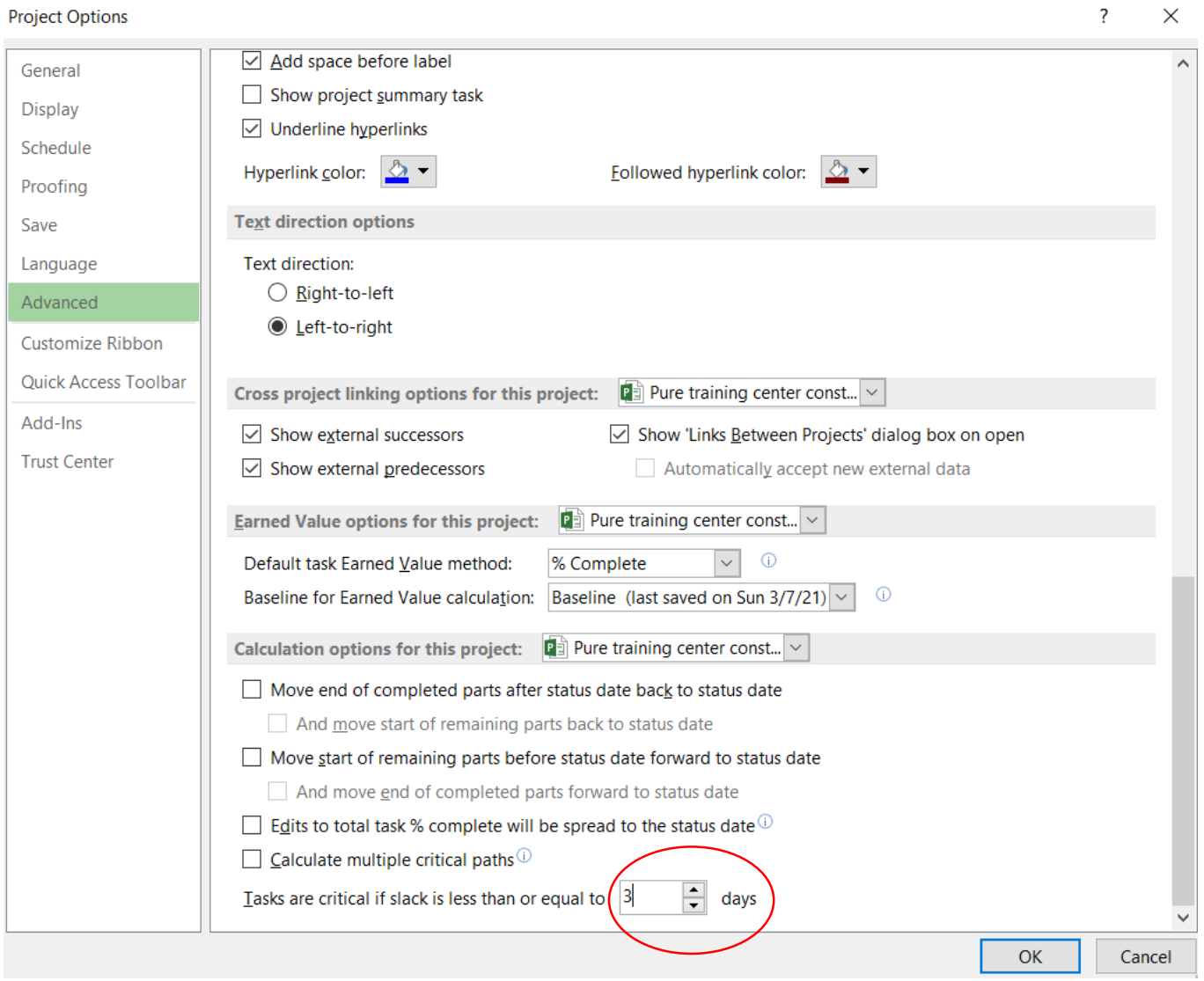
Non-Critical task with 2 days slack



Critical task with zero slack

It is good management practice to reduce project total duration

Change critical path slack from default 0 days



Optimizing resource details

Lesson objectives

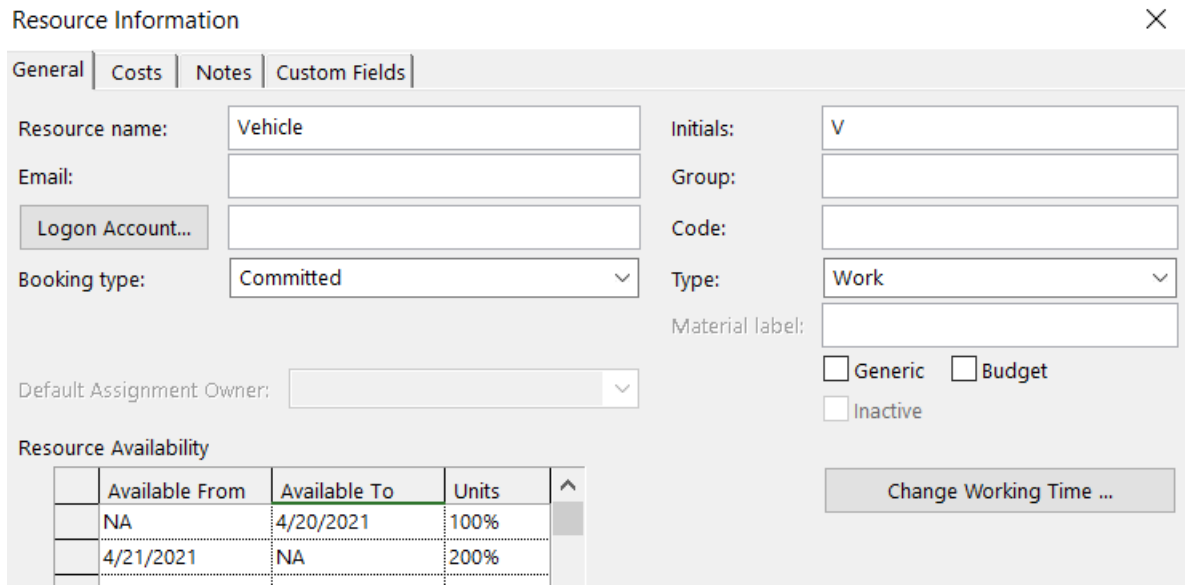
- Resource capacity based on availability
- Different pay rates for work resource
- Material resource

Different resource capacity based on their availability

Resource Name	Type	Material	Initials	Group	Max. Units
Vehicle	Work		V		100%

- This resource is available 100% for the tasks it is assigned to
- If two vehicles are available capacity will be 200%

But sometimes we want to adjust resource capacity during different times, for example one vehicle maybe available from start up to 20 April and two vehicles from 21 April until finish date

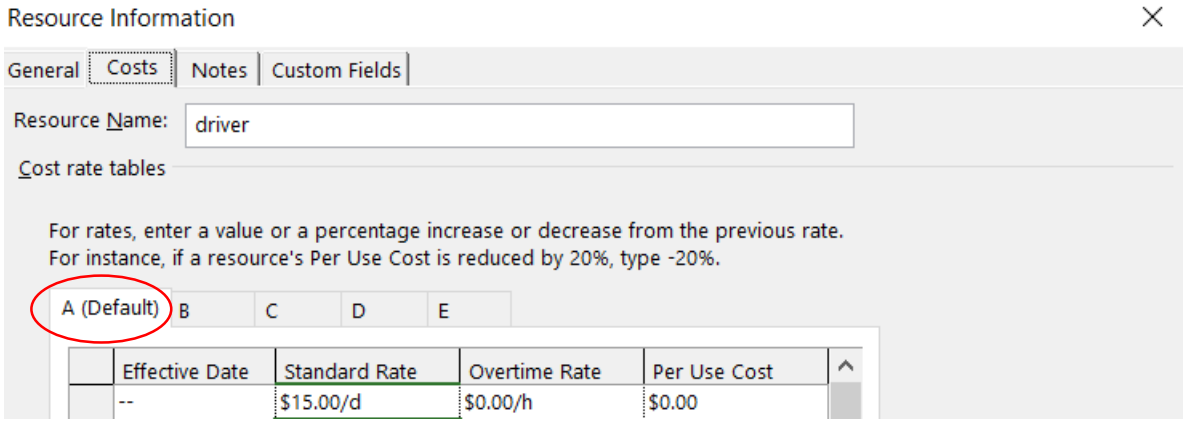


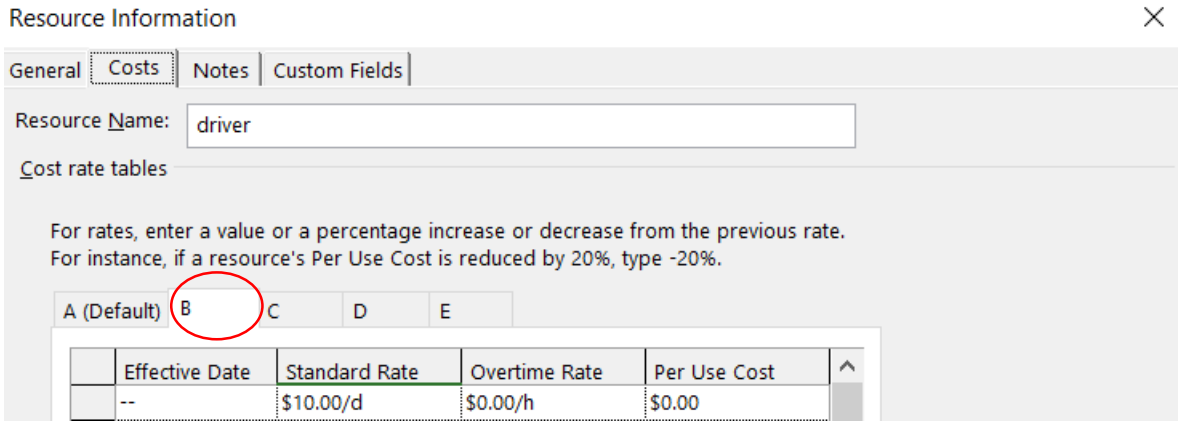
Different pay rates for a resource depending on task

Resource A can be assigned to task X with $10 per day

Resource A can also be assigned to task Y with $15 per day

→ Resource A has different pay rates





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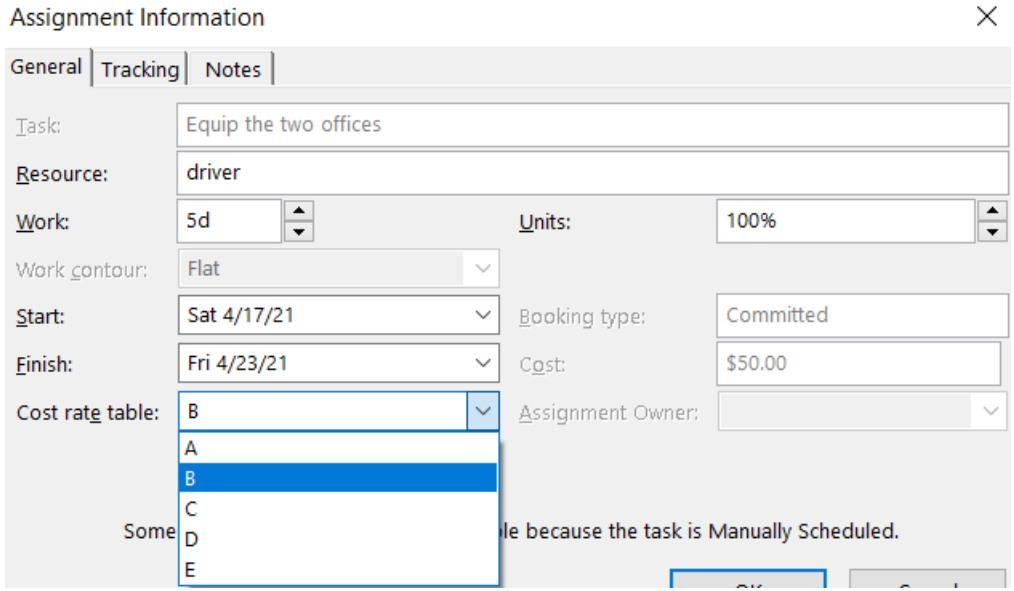


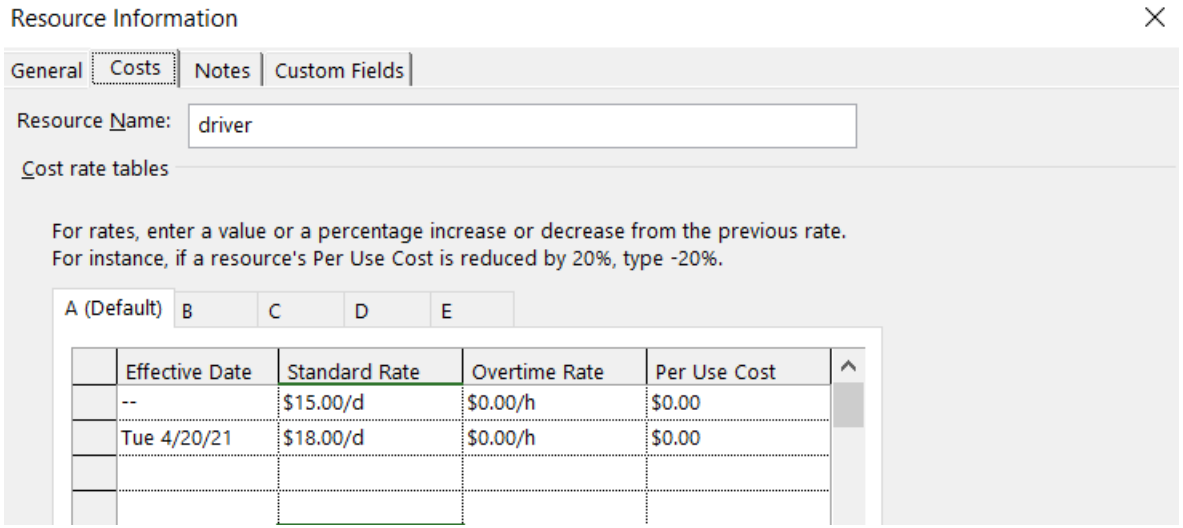
Select resource pay rate

Different pay rates for a resource depending on time

Resource A has pay rate of $10 per day in first year

Resource A has pay rate of $15 per day in second year

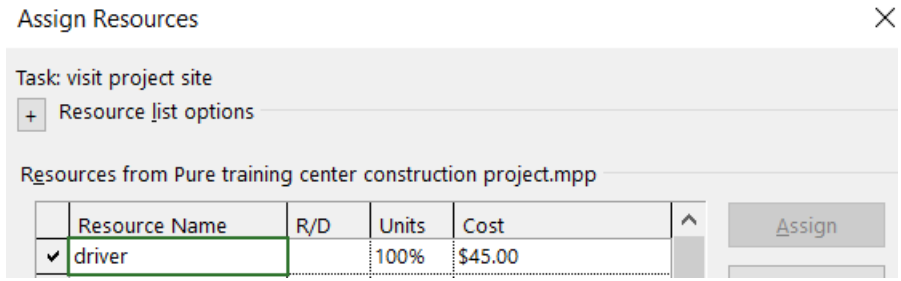
- Resource A has different pay rates
- Project will calculate resource cost based on scheduling of the work resource



Initial pay rate is $15 per day
But starting from 20 April, pay rate will increase 20% ➔ 20% of $15 = $18 (new pay rate)

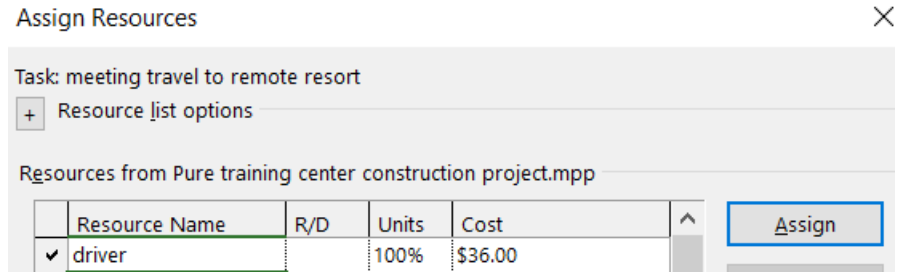
visit project site	3 days	Mon 4/12/21	Wed 4/14/21	8	driver

3 days before 20 April ➔ cost = 3 x 15 = $45



meeting travel to remote resort	2 days	Tue 6/1/21	Tue 6/8/21	20	driver

2 days after 20 April ➔ cost = 2 x 18 = $36



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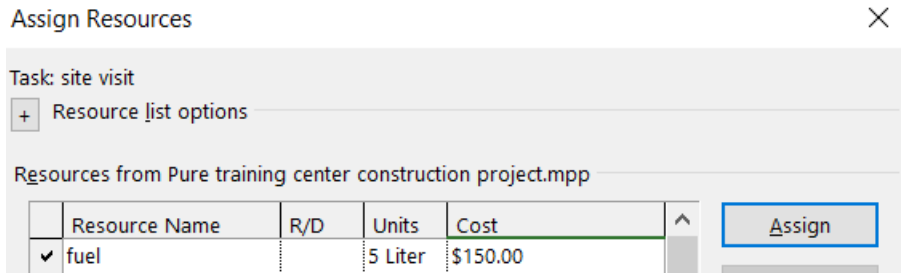
Material resource

Material resources end as project consumes them. Examples are water and fuel

Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate
fuel	Material	Liter	f			$30.00

$30 per liter of fuel



Assignment cost = 5 liter x $30 per liter = $150

Assigning material resource will not do work ➔ no effect on task duration

Lesson objectives

- Delay the start of work for a resource assigned to a task
- Unequal work resource assignment distribution using back-loaded contour
- Check individual resource remaining capacity per day, week, and month

Delay the start of work resource assigned to a task

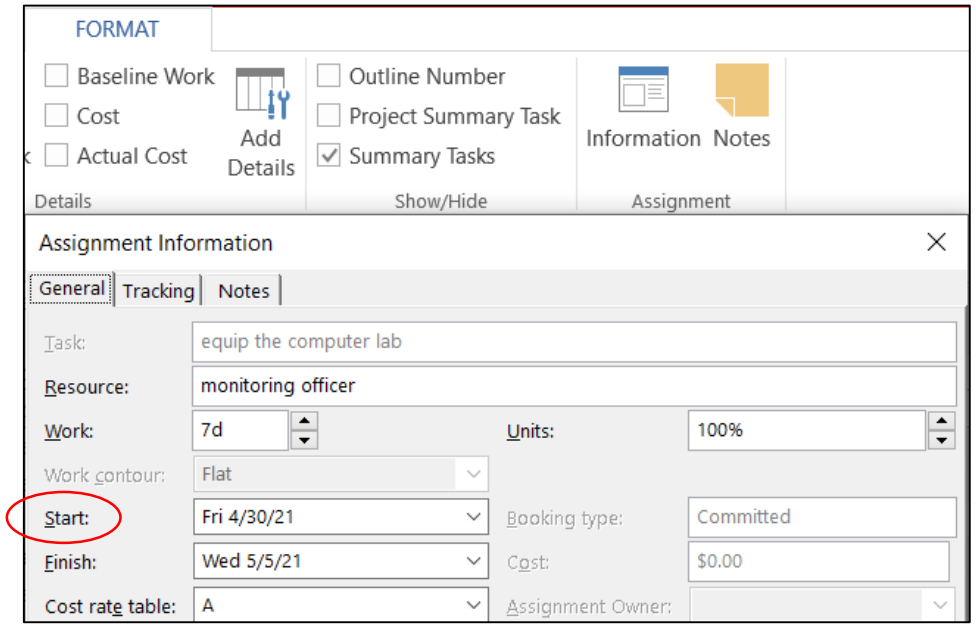
Assume social service project is assigned to a project assistance and monitoring office. The monitoring officer Can start the task later than the project assistance

Open task usage view

Task Mode	Task Name	Work	Duration	Start	Finish	Add New Column
	equip the computer lab	14 days	7 days	Tue 4/27/21	Wed 5/5/21	
	project assistance	*7 days*		*Tue 4/27/21*	*Wed 5/5/21*	
	monitoring officer	*7 days*		*Tue 4/27/21*	*Wed 5/5/21*	

Details	T	W	T	F	S	S	M	T	W
						May 2, '21			
Work	2d	2d	2d	2d			2d	2d	2d
Work	1d	1d	1d	1d			1d	1d	1d
Work	1d	1d	1d	1d			1d	1d	1d

Both project assistance and monitoring office
Start work at the same time, Tuesday



Details	T	W	T	F
Work	1d	1d	1d	2d
Work	1d	1d	1d	1d
Work	0d	0d	0d	1d

3 days delayed for monitoring officer
And starts on Friday

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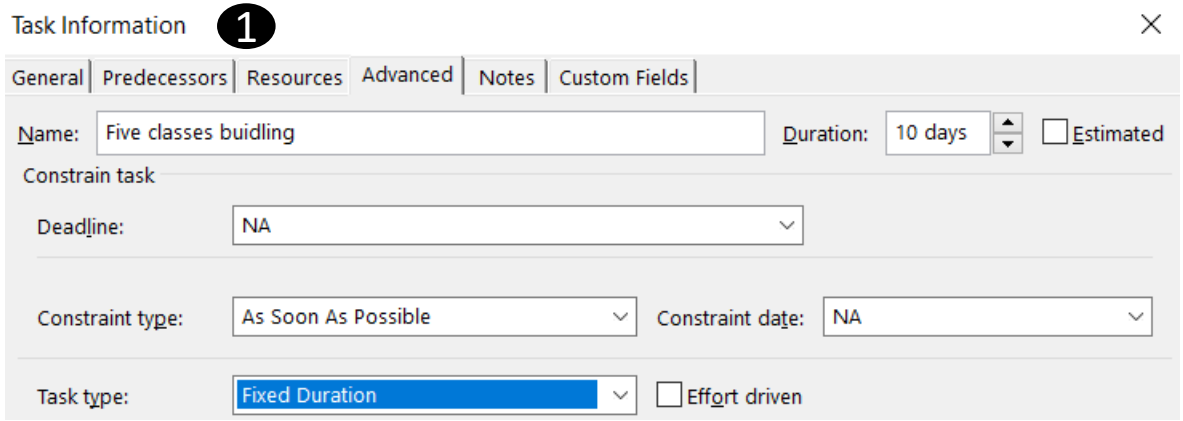
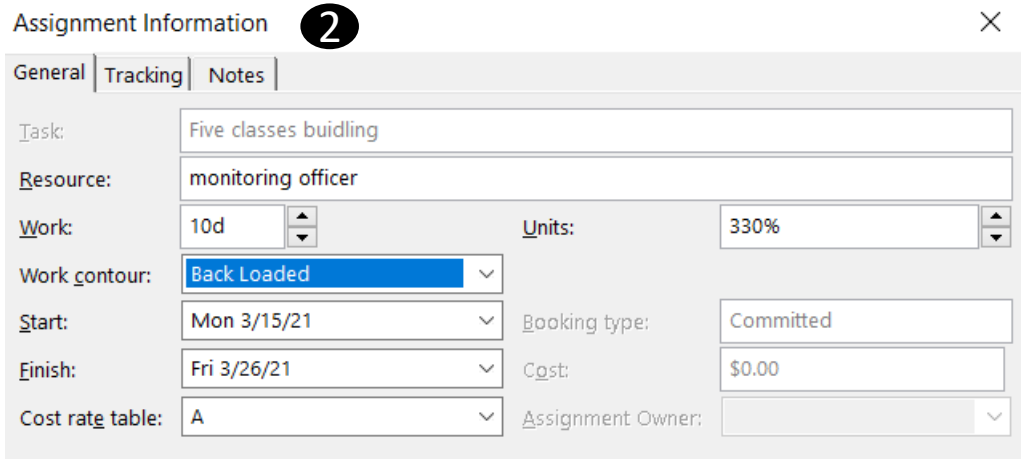
Unequal time distribution for a work resource assignment

- If a resource is scheduled for 2 day work each 8 hours, the assignment will equally apply 8 hours to day 1 and 8 hours to day 2
- Sometimes we hire new employee (resource) and we want first day to work 2 hours training only, and second day 14 hours
- We can use contour to distribute work over the scheduling time unequally (first day less work, and then gradual increase)

monitoring officer	*10 days*		*Mon 3/15/21*	*Fri 3/26/21*	Work	1d	1d	1d	1d	1d	1d			1d	1d	1d	1d	1d

Monitoring officer is assigned to task for 10 working days, 1 day equally distributed
But we want less time in the first days, and more work in later days





monitoring officer	*6 days*		*Mon 3/15/21*	*Fri 3/26/21*	Work	0.1d	0.15d	0.25d	0.5d	0.5d			0.75d	0.75d	1d	1d	1d	

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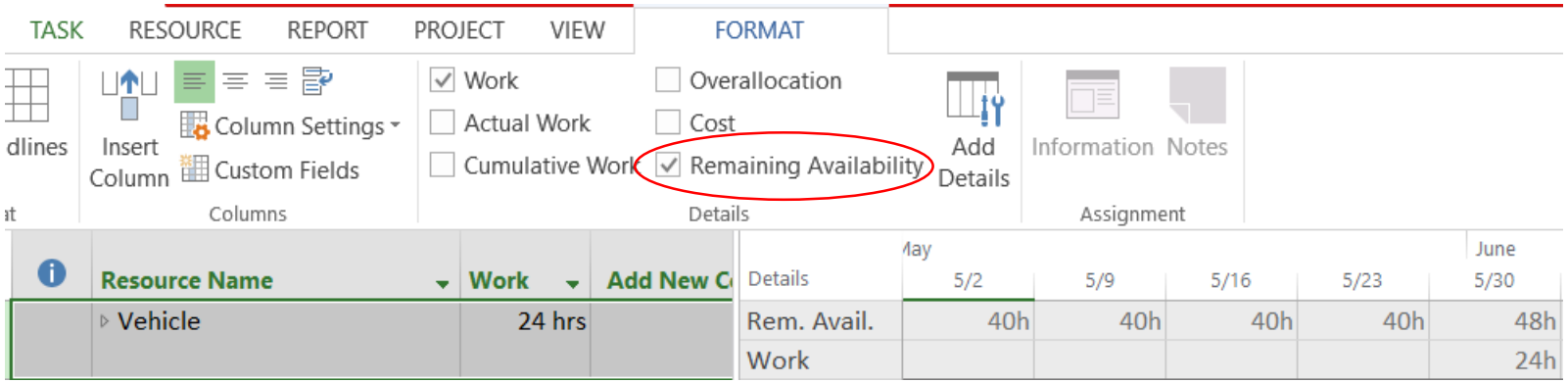
Remaining resource capacity per day, week, and month

Open **resource usage** view, and set zoom timescale to weeks



Vehicle capacity is 8 hours by 5 days calendar
Hence work per week = 40 hours
Its has work of 24 hours (3 days)
Remaining availability = 3 x 16 hours = 48 hours

Lesson objectives

- Resource allocation states
- Level over allocated resources
- Project cost (budget)

Resource allocation

This applies to work resource which affect project duration. Cost and material resources do not do work

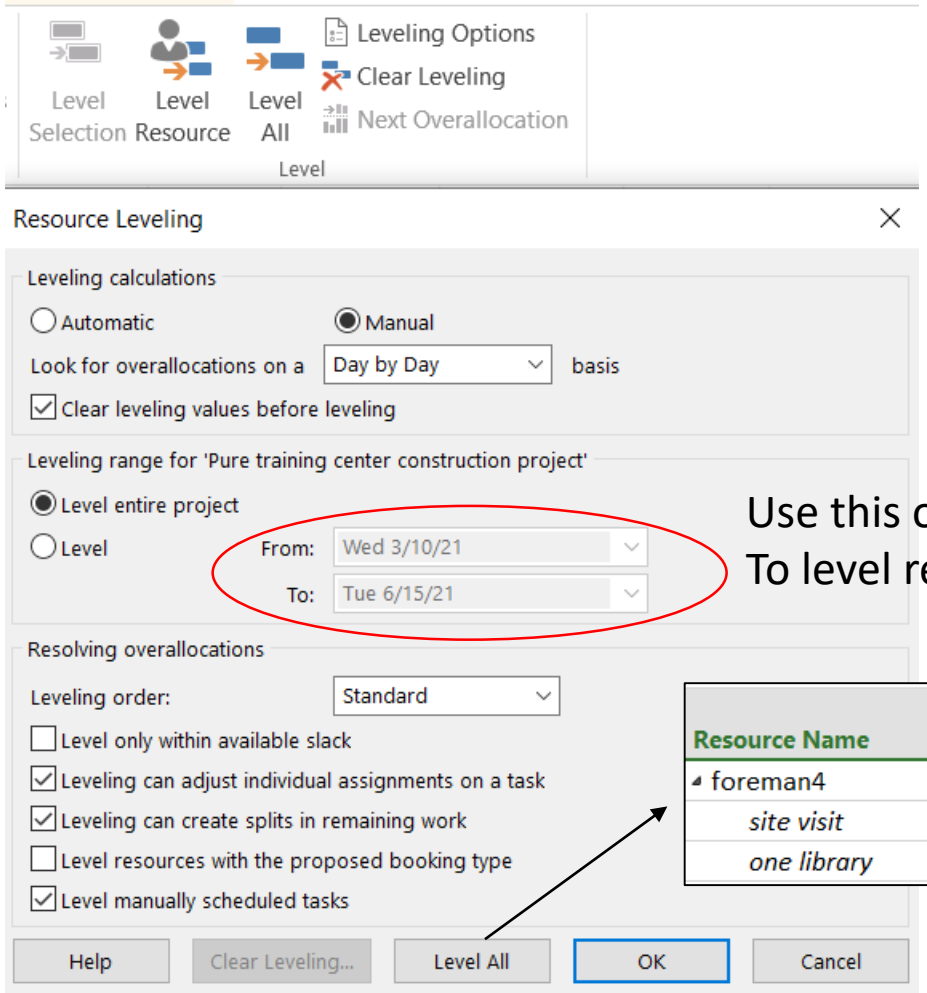
- *Under allocated* (resource assignment < resource capacity)
- *Fully allocated* (resource assignment = resource capacity)
- *Over allocated* (resource assignment > resource capacity)

Resource Name	Work	Add New C	Details	T	F
foreman4	32 hrs		Work	16h	16h
one library	*16 hrs*		Work	8h	8h
site visit	*16 hrs*		Work	8h	8h

Foreman4 is over allocated
Assigned to two parallel task that start on Tuesday
Instead of 8 hour capacity, he is working 16 hours

Level over allocated resource

Open resource sheet view and spot over allocated resource marked red

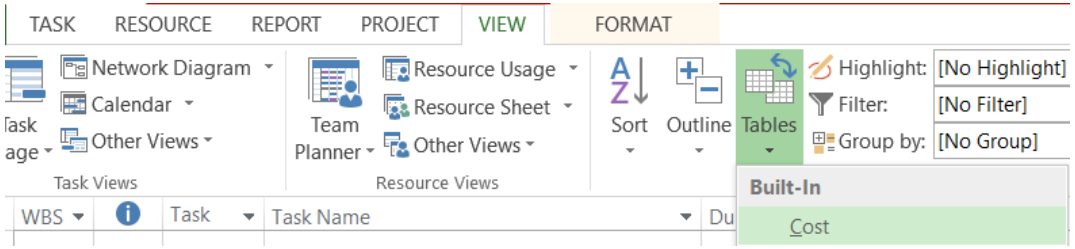


Use this option in the execution phase
To level remaining assignments only

Resource Name	Work	Add New C	Details	Apr 11, '21 T	F	S	S	M	T
foreman4	32 hrs		Work	8h	8h			8h	8h
site visit	*16 hrs*		Work	8h	8h				
one library	*16 hrs*		Work					8h	8h

Project cost (budget)

Open task sheet view, then select **tables < cost**, and then **tables < summary**



Project total cost and total duration
Can be viewed from
Project information < statistics

Project Statistics for 'Pure training center construction project.mpp'

	Start	Finish
Current	Wed 3/10/21	Tue 6/15/21
Baseline	Wed 3/10/21	Mon 5/24/21
Actual	Wed 3/10/21	NA
Variance	0d	16d

	Duration	Work	Cost
Current	69d?	408h	$1,780.00
Baseline	53d	440h	$890.00
Actual	2.23d	8h	$50.00
Remaining	66.77d?	400h	$1,730.00

Percent complete:
Duration: 3% Work: 2%

Close

Total project cost = $1,780
Baseline cost = $890

Task Name	Fixed	Fixed Cost	Total	Baseline	Variance	Actual	Remaining
Pure training center cor	**$0.00**	**Prorated**	**$1,780.00**	**$890.00**	**$890.00**	**$50.00**	**$1,730.00**
design phase	$0.00	Prorated	$75.00	$75.00	$0.00	$50.00	$25.00
construction phase	**$0.00**	**Prorated**	**$435.00**	**$735.00**	**($300.00)**	**$0.00**	**$435.00**
Five classes buidling	$0.00	Prorated	$0.00	$470.00	($470.00)	$0.00	$0.00
one meeting hall	$0.00	Prorated	$250.00	$250.00	$0.00	$0.00	$250.00
two offices	$0.00	Prorated	$15.00	$15.00	$0.00	$0.00	$15.00
site visit	$0.00	Prorated	$160.00	$0.00	$160.00	$0.00	$160.00
one library	$0.00	Prorated	$10.00	$0.00	$10.00	$0.00	$10.00
three toilets	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
building equiping pha	**$0.00**	**Prorated**	**$130.00**	**$80.00**	**$50.00**	**$0.00**	**$130.00**
Equip the two office	$0.00	Prorated	$50.00	$0.00	$50.00	$0.00	$50.00
equip the computer	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
equip the library	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
Setup internet	$0.00	Prorated	$80.00	$80.00	$0.00	$0.00	$80.00
M & E	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
M & E 1	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
M & E 2	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
construction compl	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
semester starting pha	**$0.00**	**Prorated**	**$1,140.00**	**$0.00**	**$1,140.00**	**$0.00**	**$1,140.00**
hire administration	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
hire lecturers	$500.00	Start	$500.00	$0.00	$500.00	$0.00	$500.00
students enrollment	$0.00	Prorated	$240.00	$0.00	$240.00	$0.00	$240.00
staff salary	$400.00	Start	$400.00	$0.00	$400.00	$0.00	$400.00

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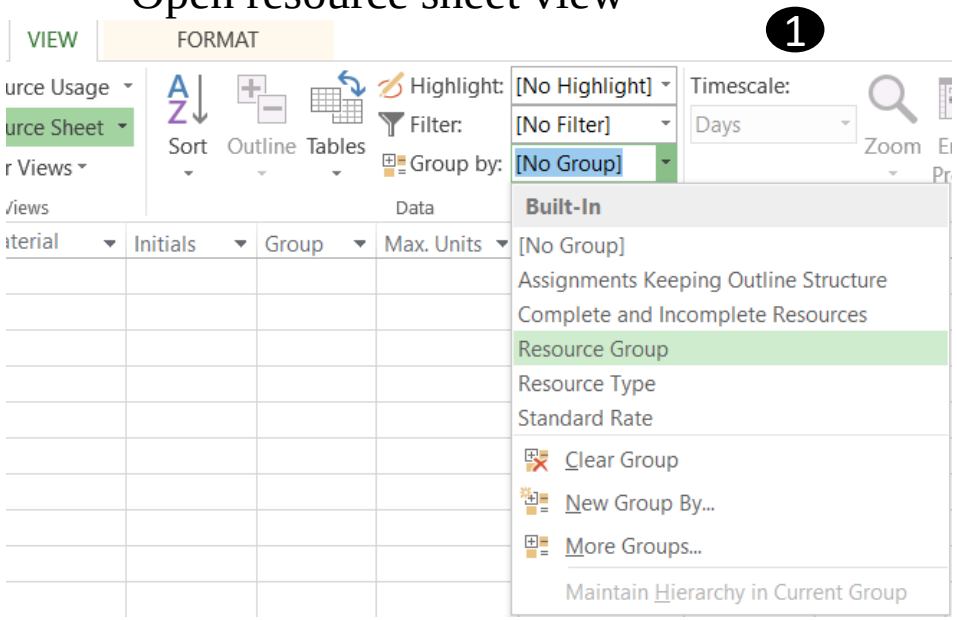
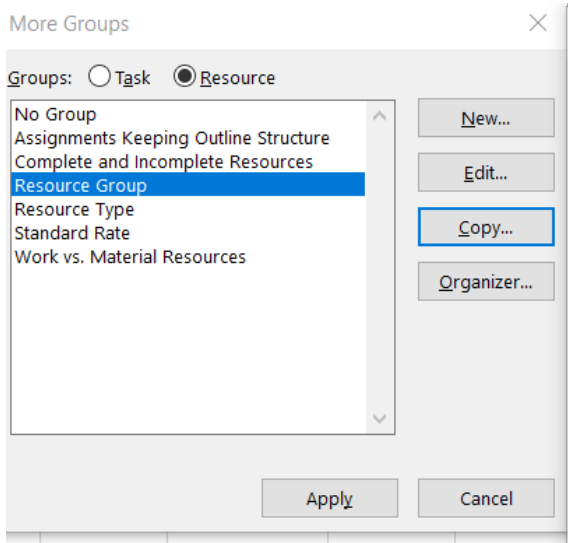
Lesson objectives

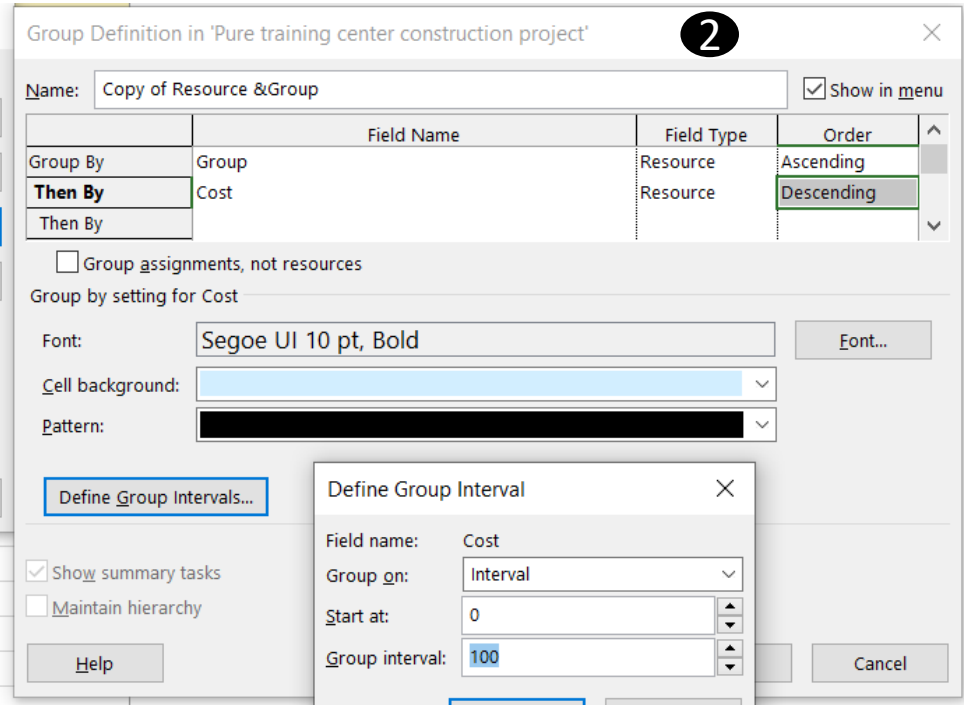
- Custom resource groups

Custom resource groups based on cost

Open resource sheet view







3

Resource Name	Group	Max.	Pe	Std. Rate	Ovt. Rate	Cost	Work
Group: No Value		**1,050%**	**'50%**			**$880.00**	**51 days**
Cost: $200.00 - <$300.00		**150%**	**50%**			**$440.00**	**7 days**
Construction firm		50%	50%	$50.00/day	$0.00/hr	$200.00	4 days
Vehicle		100%	100%	$80.00/day	$0.00/hr	$240.00	3 days
Cost: $100.00 - <$200.00						**$150.00**	
fuel			r/day	$30.00		$150.00	5 Liter
Cost: $0.00 - <$100.00		**900%**	**i00%**			**$290.00**	**44 days**

Cost = pay rate *x* work

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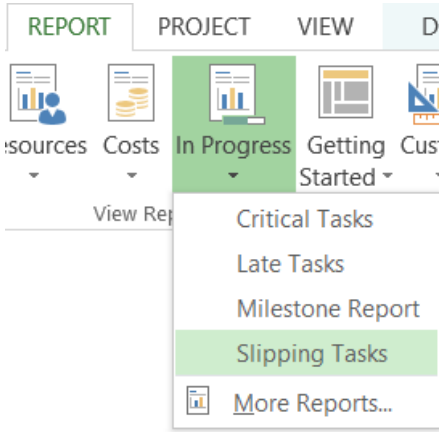
Lesson objectives

- Report schedule variance
  - Did tasks start and finish on time?
- Report cost variance
  - Did tasks run under budget or over budget?

Report slipping tasks

Communicating project status to key stakeholders, such as customers and sponsors, is the most important function of a project manager

In real cases, scheduled and what is actually realized differ
Work variance = scheduled – actual
Cost variance = scheduled - baseline



What is the difference between status report and progress report?

Project Statistics for 'Pure training center construction project.mpp'

	Start	Finish
Current	Wed 3/10/21	Tue 6/8/21
Baseline	Wed 3/10/21	Mon 5/24/21
Actual	Wed 3/10/21	NA
Variance	0d	11d

In this example, finish date has slipped by 11 days

You can also **variance table** to view schedule, baseline and variance for each task

Report task and resource cost

Current cost = actual cost value – remaining cost value

Task cost over budget when *actual cost > baseline cost*

Open task sheet, then **tables < cost**

Task Name	Fixed	Fixed Cost	Total	Baseline	Variance	Actual	Remaining
Pure training center construction project	**$0.00**	**Prorated**	**$1,780.00**	**$890.00**	**$890.00**	**$50.00**	**$1,730.00**
design phase	$0.00	Prorated	$75.00	$75.00	$0.00	$50.00	$25.00
construction phase	**$0.00**	**Prorated**	**$435.00**	**$735.00**	**($300.00)**	**$0.00**	**$435.00**
Five classes buidling	$0.00	Prorated	$0.00	$470.00	($470.00)	$0.00	$0.00

For the design phase task

Budgeted is $75

We have used $50 so far

We have only $25 left

Open resource sheet, then **tables < cost**

Resource Name	Cost	Baseline Cost	Variance	Actual Cost	Remaining
Group: No Value	**$880.00**	**$890.00**	**($10.00)**	**$50.00**	**$830.00**
Cost: $200.00 - <$300.00	**$440.00**	**$450.00**	**($10.00)**	**$50.00**	**$390.00**
Construction firm	$200.00	$450.00	($250.00)	$50.00	$150.00
Vehicle	$240.00	$0.00	$240.00	$0.00	$240.00

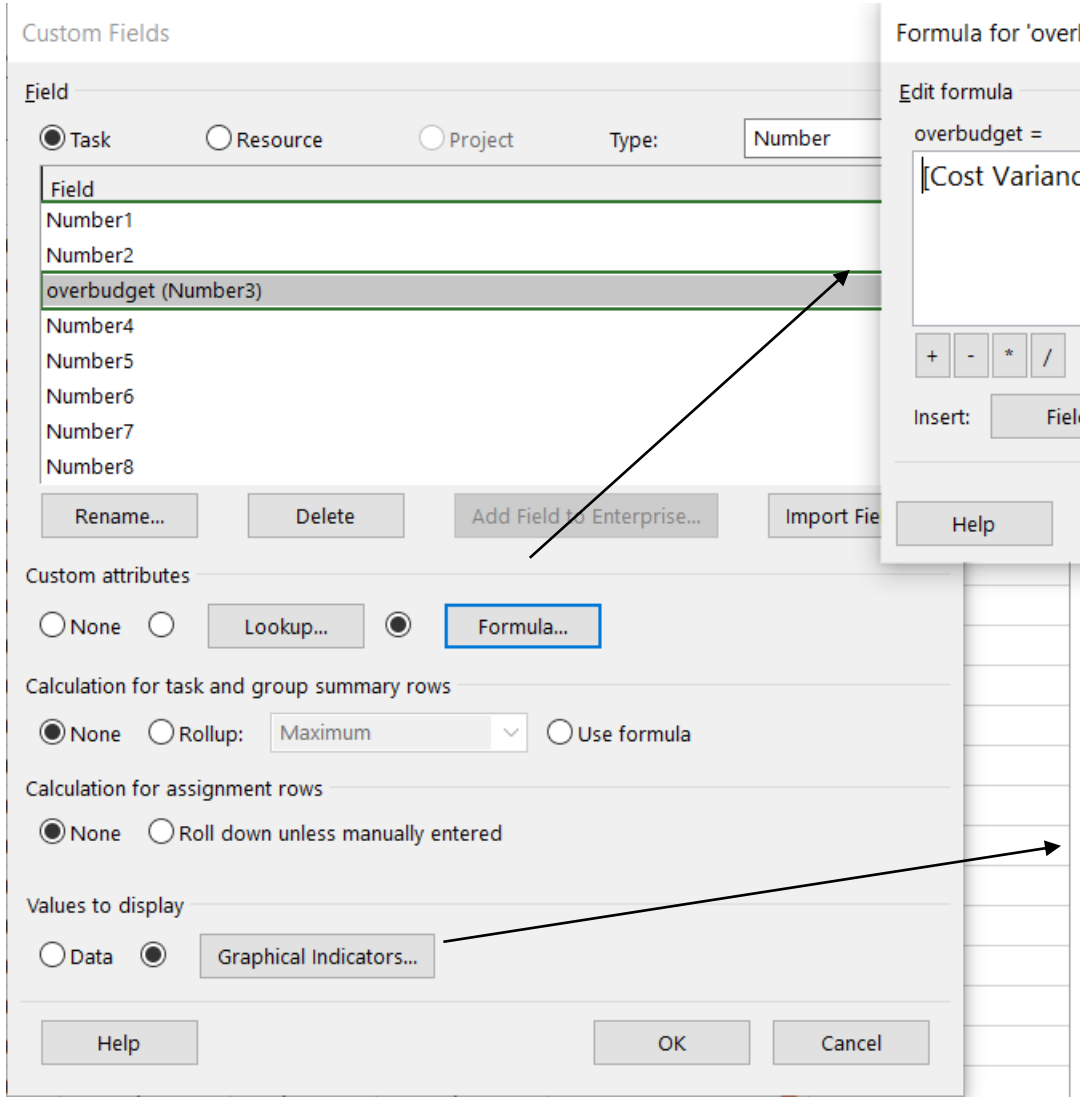
For the construction firm resource

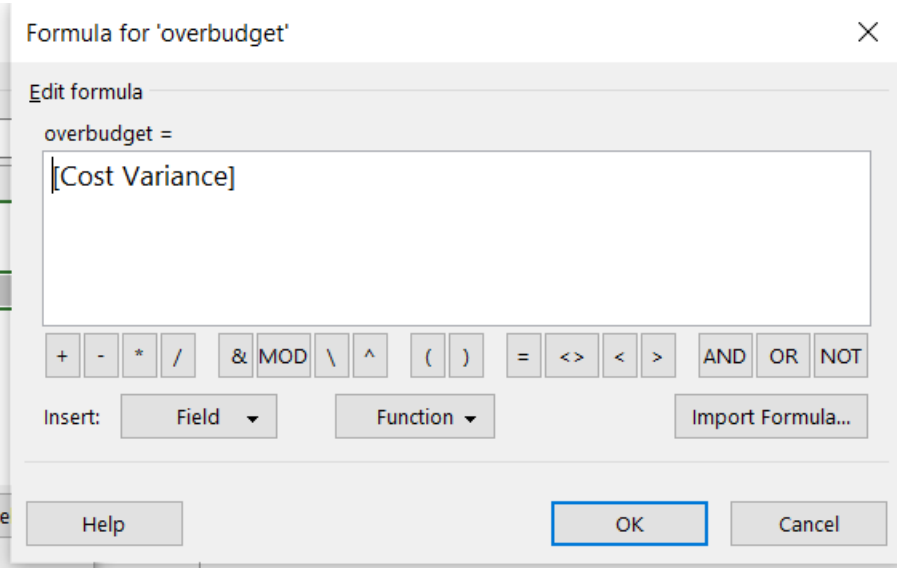
Cost = $450

Incurred cost so far = $50

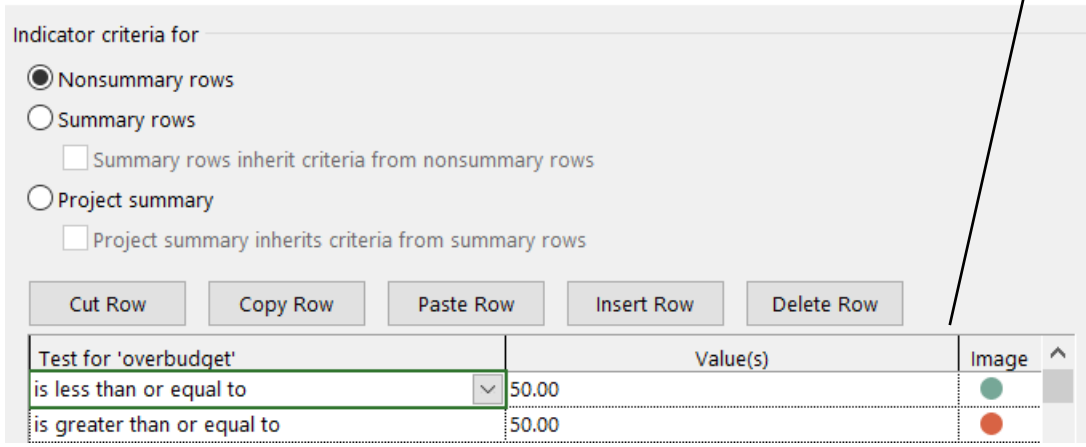
Remaining cost = $390

Stoplight view of project report



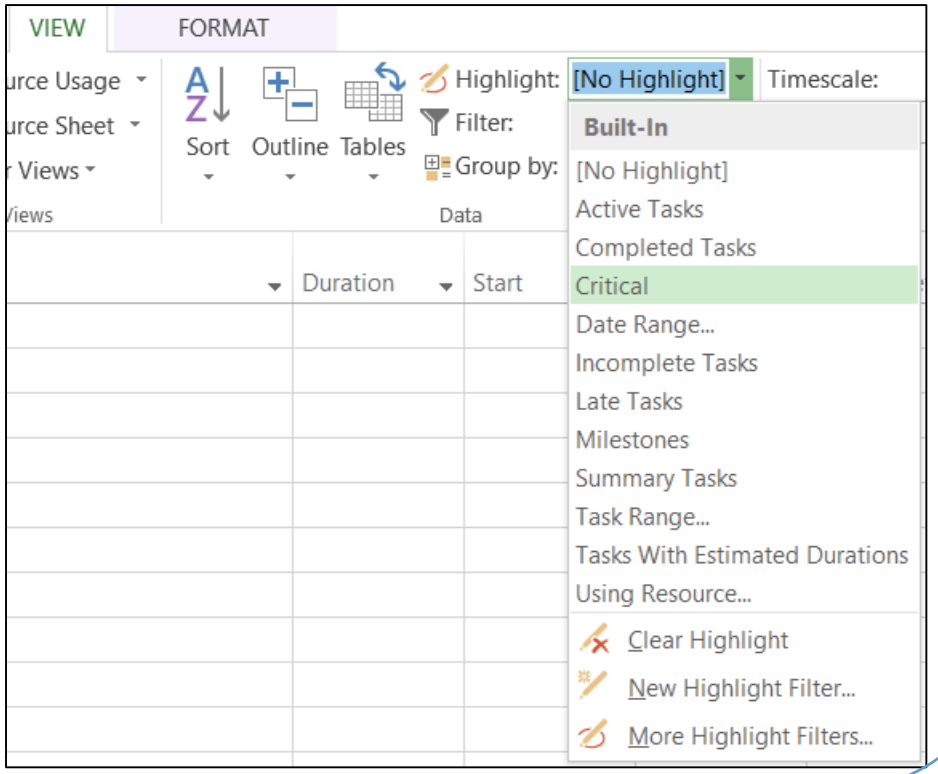


Variance	Actual	Remaining	overbudget
$60.00	$650.00	$20,000.00	
$0.00	$0.00	$0.00	
$410.00	$410.00	$0.00	



Critical path duration shortening (crushing)

Highlight critical path tasks on the Gantt view



This milestone task (construction complete) has exceeded its deadline on 24 May, and it is on critical path

Setup internet	2 days	Mon 5/24/21	Tue 5/25/21	internet[$80.00]
M & E	**2 days**	**Mon 4/26/21**	**Tue 4/27/21**	
construction complete	0 days	Tue 5/25/21	Tue 5/25/21	5/25

To solve the missing deadline, we can crush (shorten) Duration of its predecessor task that has not yet completed

Setup internet	1 day	Mon 5/24/21	Mon 5/24/21	internet[$80.00]
M & E	**2 days**	**Mon 4/26/21**	**Tue 4/27/21**	
construction complete	0 days	Mon 5/24/21	Mon 5/24/21	5/24

Milestone task Deadline restored

You may need to increase resources for the crushed task. You can also increase overtime

Work distributed to the resources, 8 hours for each resource

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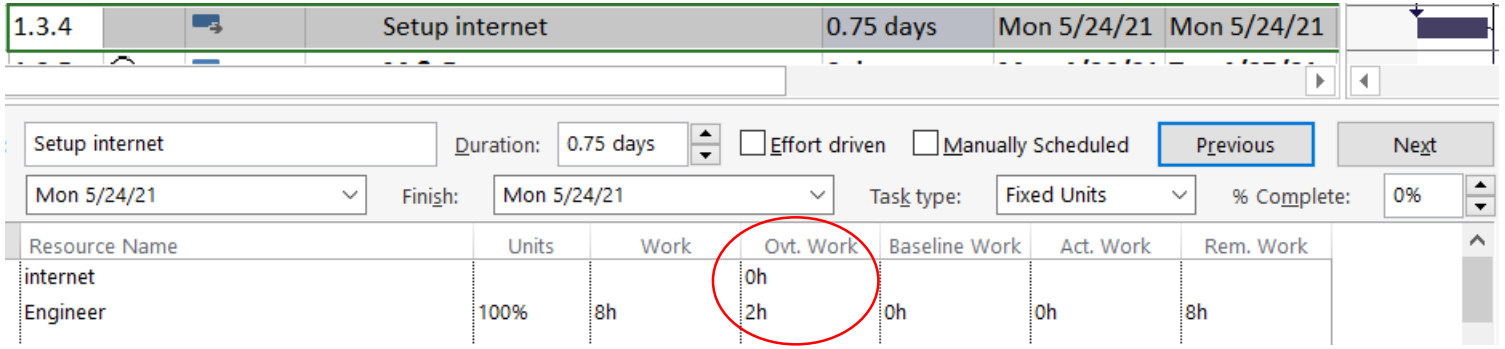
Project crushing by adding over time to assigned resources

Duration reduced to 0.75 days, but overtime increased to 2hrs. Same amount of work is performed by the resource



If the resource has overtime pay rate, then project cost increases

Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate
Engineer	Work		E		100%	$15.00/day	$0.00/hr

Address budget problems by optimizing resource cost

Baseline cost was $890
Current cost is $1,791.25 ⟶ Project over-budget = 890 / 1791.25 = 49.8%

	Duration	Work	Cost
Current	64d?	432h	$1,791.25
Baseline	53d	440h	$890.00
Actual	2.11d	8h	$50.00
Remaining	61.89d?	424h	$1,741.25

Right now, the vehicle resource takes the most
Resource cost for the remaining tasks as shown below

Resource Name	Cost	Baseline	Variance	Actual Cost	Remaining
Vehicle	$240.00	$0.00	$240.00	$0.00	$240.00
fuel	$150.00	$0.00	$150.00	$0.00	$150.00
Construction firm	$200.00	$450.00	($250.00)	$50.00	$150.00
Engineer	$86.25	$195.00	($108.75)	$0.00	$86.25
internet	$80.00	$80.00	$0.00	$0.00	$80.00
driver	$50.00	$0.00	$50.00	$0.00	$50.00

The project manager will then check which tasks the vehicle resource is assigned to

Task Mode	Task Name	Duration	Start	Finish	% Complete	Resource Names
	students enrollment	3 days	Tue 6/1/21	Thu 6/3/21	0%	Vehicle

T W T F S
Vehicle

The vehicle resource is assigned to the register office team that will enroll students for 3 days at $80 / day
After consulting with team, it was suggested 2 days would be enough

Resource Name	Cost	Baseline Cost	Variance	Actual Cost	Remaining
Vehicle	$160.00	$0.00	$160.00	$0.00	$160.00

	Duration	Work	Cost
Current	64d?	424h	$1,711.25

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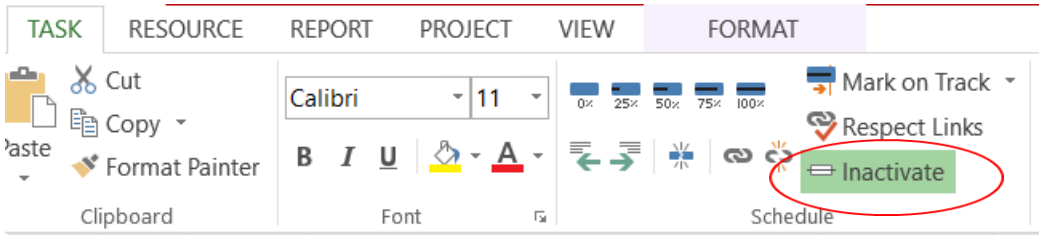
Remove no-so-important tasks to reduce project cost

In some situations, the project sponsor may not approve your project plan because of over-budget
You may then discuss with them reducing the number of tasks required, as those maybe postponed later in Operational phase as project ends



Inactivated tasks will not effect Scheduling and cost

	Duration	Work	Cost
Current	64d?	416h	$1,620.00
Baseline	53d	440h	$890.00
Actual	2.17d	8h	$50.00
Remaining	61.83d?	408h	$1,570.00

Project cost reduced to $1,620
Duration not changed, but work reduced

Share project report with stakeholders

One of the most important tasks required from the project manager is to ***communicate and communicate*** all the time

Various reports could be generated

- Completed tasks
- Incomplete tasks
- Cost over budget
- Milestones
- Critical tasks
- And so on

Project closure

- End of project learning (stakeholder meeting)
- Verify scope and deliverables (work plan vs work completed)
- Evaluation of accomplishments
- Contracts closure (financial, supplier)
- Administrative (archives)
- Project handover to customer
- Final report and presentation that mirror project proposal