



Project 2016

TUTORIAL GUIDE
By Ian Ridley

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Introduction

The objective of this tutorial guide is to develop your skills in using Microsoft Project.

The following assumptions have been made when producing and writing this tutorial:

1. That you are using Microsoft Project Professional 2016.
2. That you are computer literate and have general understanding about using Microsoft Word and Excel.
3. That you are able to use the help facility within a software package and are able to search for information using the Internet when required.

In the time available this tutorial will give you a good grounding in the basic aspects of using Microsoft Project. It is expected that when you have completed this tutorial that you will explore and learn some of the other many features of this software.

Also, it important to remember that this is not a project management text book and therefore there will only be limited or no explanation of various project management concepts. If you do not understand a term or a concept mentioned in the Microsoft Project tutorial then I suggest that you go and read about it in a good project management text book.

Getting Started

The first thing I suggest you do is open Microsoft Project and get a feel for where things are within the software. Microsoft Project Professional 2016 the graphical ribbon menus that are used in all recent version of other Microsoft Office software. rather than the drop down menus that Microsoft used to use. It may be useful for you to read the “Getting Started” section of Project Help.

While Microsoft Project has a built in help function, I suggest that the online help be explored. This can be found at:

<https://support.office.com/en-us/project>

At the above URL you will find lots guidance on how to us Microsoft Project.

The British version can be found at the link below and now appears to be identical to the American version.

<https://support.office.com/en-gb/project>

Your First Microsoft Project Gantt Chart

Now that you are familiar with the look of Microsoft Project let us started by creating a very simple Gantt chart, this will be developed using the precedence chart in table 1.

Task	Duration	Precedence
Start	0	-
A	5	-
B	4	-
C	6	A
D	2	B
E	5	B
F	6	C, D
end	0	E, F

Standard Precedence Chart
Table 1

Task Name	Duration	Predecessors
start	0 days	
a	5 days	1
b	4 days	1
c	6 days	2
d	2 days	3
e	5 days	3
f	6 days	4,5
end	0 days	6,7

Microsoft Project Predecessors
Table 2

As you will have notice there are two tables above. Table 1 is a standard precedence chart as would be found in a text book, with the precedence listed by naming the tasks that are the predecessors.

Table 2 shows how predecessors are listed in Microsoft project. The numbers in the predecessor column refer to the line that is the predecessor for a particular task. That is if you look at the extreme left of the Microsoft Project columns you will notice that there are black line numbers against a grey background. These line numbers are similar to the line number that can be found at the extreme left of an Excel spreadsheet.

To create the Gantt chart follow these steps.

1. Open Microsoft project. Project will open with a new project sheet waiting for your data.
2. In the “Task Name” column type the task names from the chart above
3. In the “Duration” column type the duration from the chart above

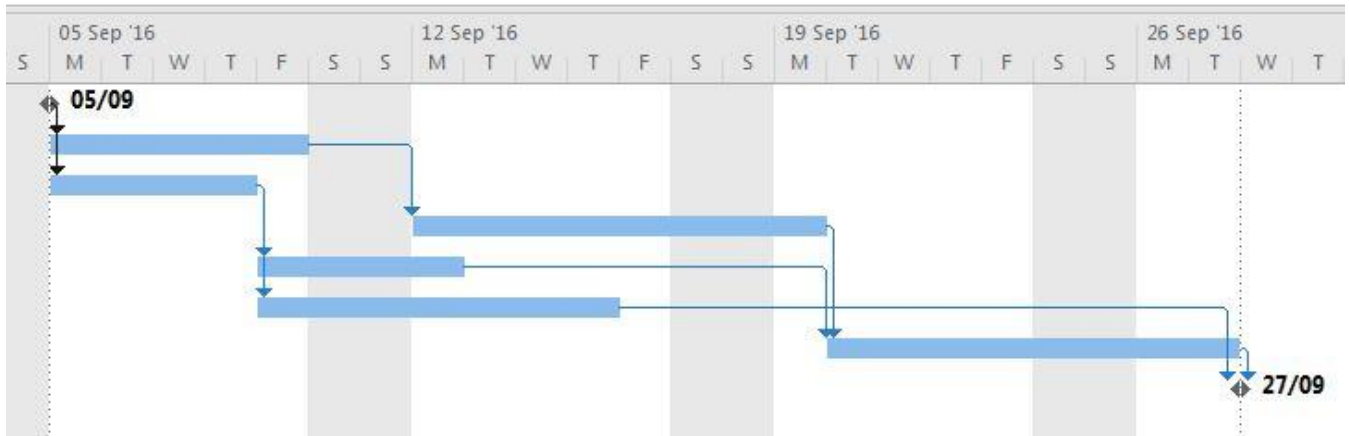
Notice that where there is a number in the duration column a pale turquoise bar appears in Gantt chart space, but where there is a zero there is a grey lozenge shape milestone. A task bar uses time and can also use resources and have a cost attached to it. A milestone never uses any time or resources and never has a cost. A milestone is purely an event indicating a particular stage of a project.

4. Now go to the “Task Mode” column and left click on the words “Task Mode”. This will cause all the “Task Mode” column to be highlight in grey.
5. Next in the task ribbon left click on “Auto Schedule”. The images in each used line of the task mode column will change from turquoise pins to blue rectangles and the bars in the Gantt chart space will change to pale blue.
6. At the moment, the predecessor column is probably not in view. To bring it into view on the vertical grey line that runs down to the left of the project graphical window, hover the mouse until the white arrow changes to two vertical line. Then hold down the left button and drag the mouse to the right until the “Predecessors” column is fully in view. Release the left button.
7. Now type in the predecessor numbers from table 2 above.

Notice that as you type each predecessor a link is put between the appropriate tasks in the graphical project window.

8. When all the predecessors have been entered the Gantt chart should look like the one in figure 1.

Note. Depending on the setting of your version of Microsoft Project the task bars and milestones may be a different colour. The dates will also be different.



Simple Gantt Chart
Figure 1

Now that you have made your first Gantt chart with Microsoft Project I will show you another way of connecting the tasks.

But first tasks in your Gantt chart must have their predecessors removed.

9. Hover the mouse over the grey area just above the figure “1” in the column at the extreme left of all the other columns.
10. Then left click. This will highlight all the columns.
11. Ensure that the task ribbon is displayed.
12. Left click on the “Auto Schedule” icon.
13. In the “Schedule” section there is a broken chain link icon and when you hover the mouse over it says “Unlink Tasks”.
14. Left click on “Unlink Task” icon

All the tasks should now be unlinked and have moved back to where they were before you added the predecessors.

Now the tasks need to be reconnected using the precedence chart above, but this time the mouse will be used to connect the tasks.

15. Hover the mouse over the start milestone, a black crosshairs will appear.
16. Hold down the left button and drag the crosshairs towards the middle of task “a”, as the crosshairs is dragged away from the milestone it will change into the image of a chain.
17. When the chain image is over the middle of task “a” release the mouse left button.
18. Repeat steps 15 to 17 but this time take the chain image to task “b” so it is connected to the milestone.
19. Next hover the mouse over the middle of task “a” until the crosshairs image appears, then hold down the left button and drag a link to task “c”, releasing the left button when the chain image is in the middle of task “c”
20. Now connect the rest of the task using the precedence chart in table 1 as a guide.

Note. As you add links to the task using the mouse the predecessor number automatically appear in the predecessor column.

You should now have the Gantt chart reconnected and it should look like the one figure 1. This means that you now have the basic skills to make a simple Gantt chart using Microsoft project.

The exercise above has demonstrated that there is more than one way to link tasks together. Tasks were linked in two different way, but there are several ways to link tasks you may, with the use of help, want to discover some more ways of linking tasks outside of class.

It is not just linking tasks that can be done in more than one way. As you use and discover more things about Microsoft Project you find various ways of doing the same things. These are to numerous for this tutorial list but by discovering them for yourself you are more likely to remember them. The only way to become proficient and confident using a software package like Microsoft Project is to use it and so discover its inner power. It would be hard for any tutorial to do this. The role of a tutorial is to develop your basic skills so that you can then go on to discover more about Microsoft Project and how it can be used.

Garden Project Part 1

The rest of this tutorial will now build on the exercise above so that you can develop a more substantial Microsoft Project plan that has a Gantt chart with resources and cost attached to it and which you will track as the project progresses.

Creating a garden was chosen as it is a very British thing and the plan has sufficient task to be of interest without getting complicated. The plan that will be created uses less than thirty task while a real-life project may have hundreds or thousands of individual tasks in the plan.

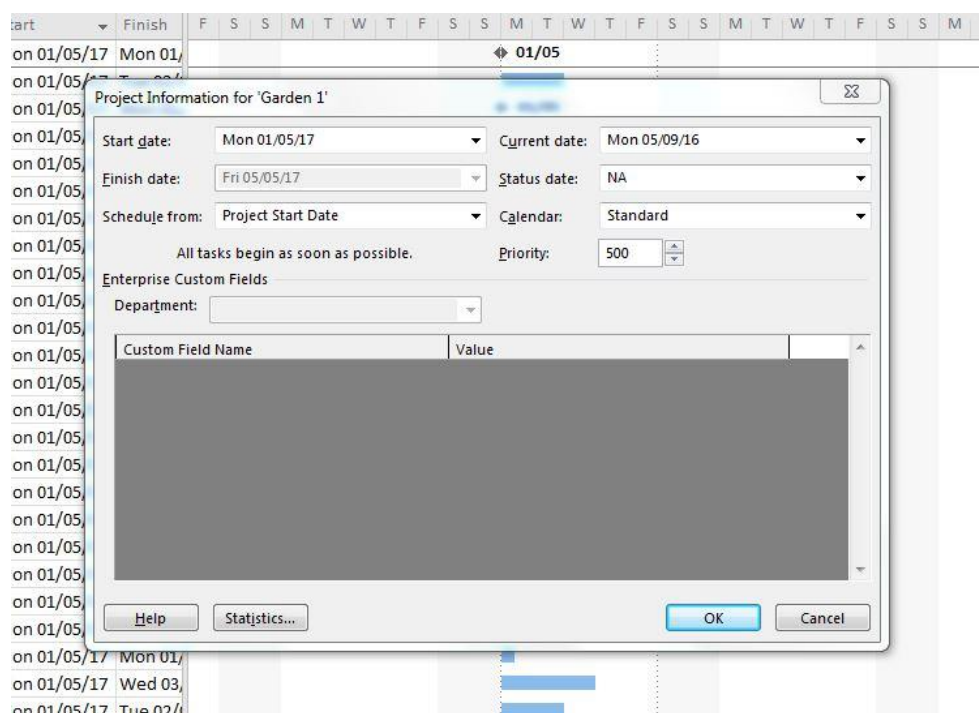
The garden that will be created will have several features:

- A lawn
- Two flower beds
- A pond
- A path
- A fence

There will be various tasks associated with each of these features. In, addition the design of the garden needs to be finalised.

To save you the time of typing the tasks and duration, there is a task and a duration list in appendix 1 and these can both be copied and then pasted in Microsoft Project.

The first thing that needs to be done is set the proposed project start date. This must be done using the project information box so that Microsoft Project processes the start date correctly, see figure 2 below.



Project Information Box
Figure 2

The project start date must not be set by changing the date in the Start column. If you do this, then project generally will not calculate project information correctly. This means that you will be making decision based of incorrect data!

To do this, follow these instructions:

1. Open Microsoft Project
2. Click on the Project tab at the top of the Microsoft project window, the Project ribbon tab will be displayed
3. In the properties section of the ribbon tab click on “Project Information”. The project information box will open
4. At the top left of the project information box will be seen the start date box. The date shown will generally be the current date.
5. Change the start date to the date to the first Monday in May next year.
6. Click OK which is in the bottom right of the box.

IMPORTANT

The date use must be the first Monday in May next year. If you do not use this as your start date you may have problems later in the tutorial.

The project start date is now set.

The way Microsoft Project schedules the project must now be set. This project will be scheduled using the auto schedule mode rather than manual schedule mode. A different method will now be used to set auto schedule mode compared to the method used in the first Gantt chart exercise.

7. Click on the Task tab at the top of the Microsoft project window, the Task ribbon tab will be displayed.
8. In the task section of the ribbon tab click on “Mode” then click on “Auto Schedule”.

Auto Schedule mode should now be set and the auto schedule symbol should appear in the Task Mode column when a task is added to a line.

9. Copy the garden task in appendix 1 and then paste the tasks into the Task Name column of Microsoft Project.

This will cause all the other columns to be populated.

Notice how the duration column displays “1day?”. The question mark symbol indicates that Microsoft Project has estimated the duration and that the user has yet to enter a duration for this task.

IMPORTANT

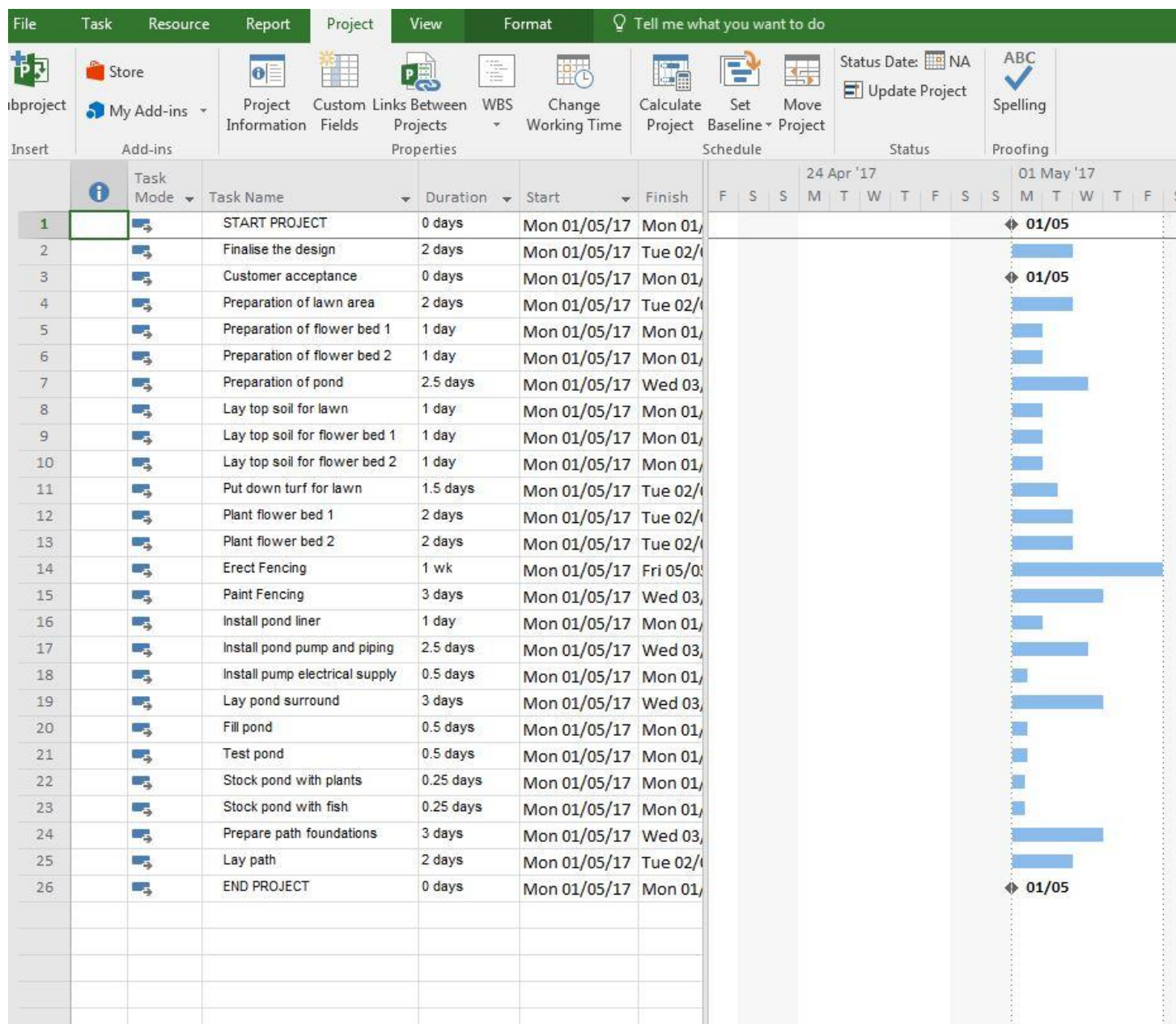
It is very important that you save files with the file name stated and that you save them when told to do so. If you are in a tutor led class the tutor should verify that what you have done is correct before you save it. Therefore, if you ever make a mistake or have a problem then the last saved Garden file should be correct and can be used to redo the next section.

10. Copy the various garden task durations in that are in appendix 1 and then paste them into the Duration column of Microsoft Project

The duration should now no longer display a question mark symbol. The Auto Schedule symbol should also be displayed in the Task Mode column.

11. The plan should now look like figure 3

12. Now save the project as Garden 1



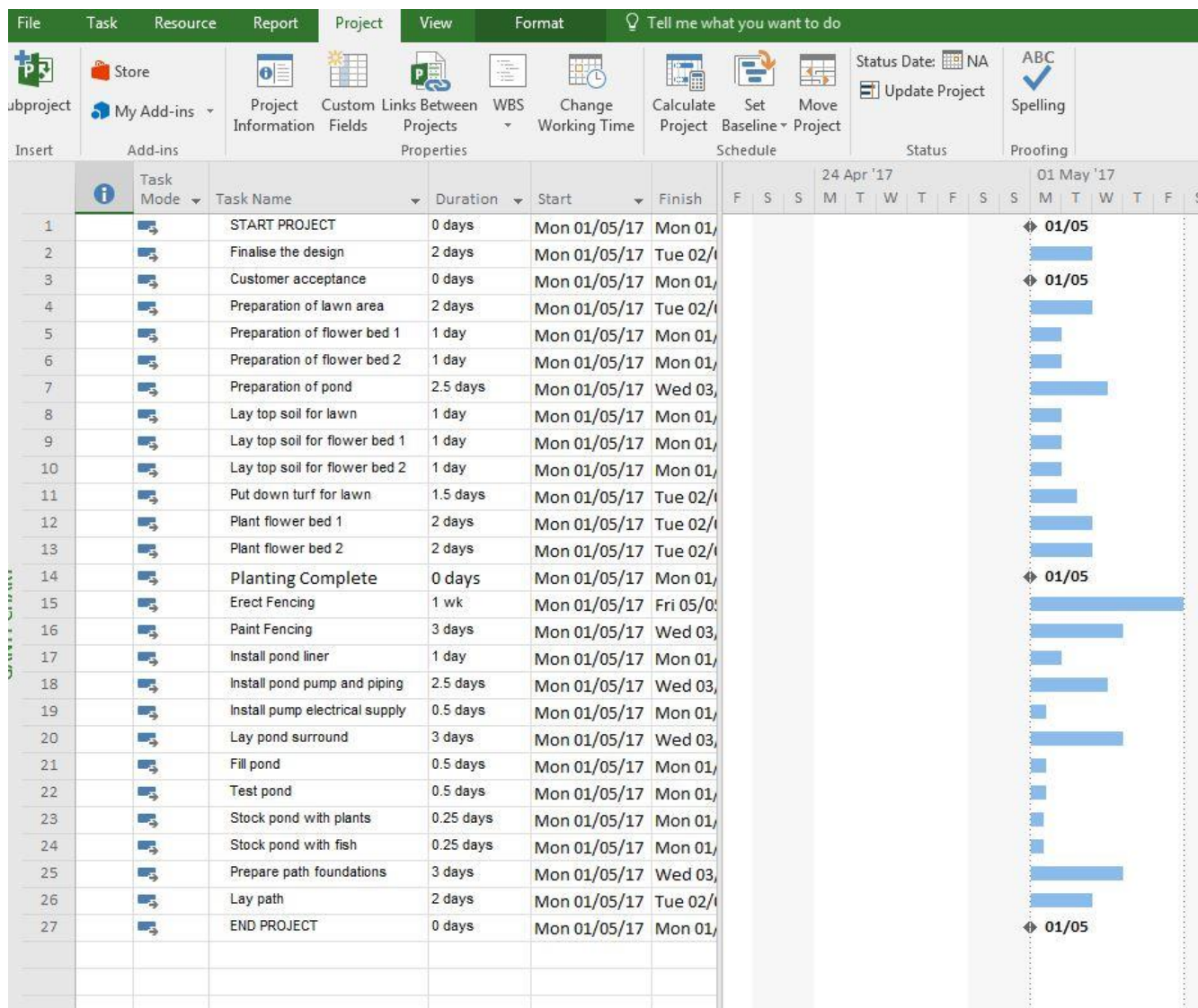
Garden 1
Figure 3

Garden Project Part 2

In this section the various task will be linked to form a basic plan in the form of a Gantt chart.

Before the tasks are connected let us learn how to add another task to a plan. A milestone will be added after planting is complete.

1. Open Garden 1
2. Right click on the “14” of line 14. This is the “erect fencing” task line.
3. On the drop down menu that appears click “insert task”. A new task line will appear on line 14, pushing the “erect fencing” task down to line 15
4. In the task name column of line 14 type “Planting complete”.
5. As this is a milestone add a duration of zero to the duration column of line 14. A milestone lozenge should appear in the graphical window to the right.
6. The plan should now look like figure 4.
7. Save as Garden 2

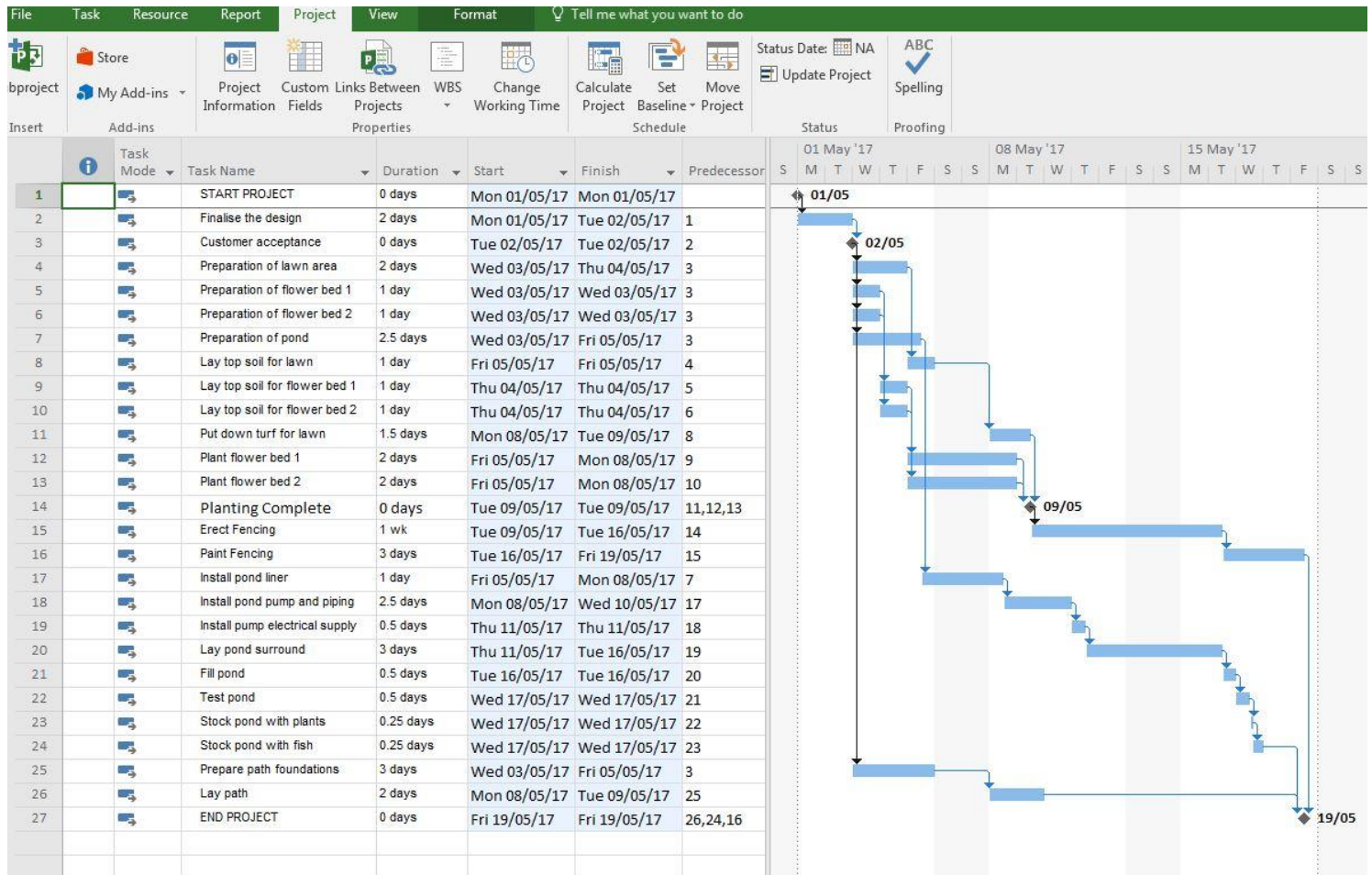


Garden 2
Figure 4

The next task is to connect the tasks so that you create a linked Gantt. I suggest that you do this using the mouse using the method you learnt in the getting started section. The precedence chart to be used for linking the various tasks for the garden project is shown below.

Task Name	Duration	Precedence
START PROJECT	0 days	-
Finalise the design	2 days	START PROJECT
Customer acceptance	0 days	Finalise the design
Preparation of lawn area	2 days	Customer acceptance
Preparation of flower bed 1	1 day	Customer acceptance
Preparation of flower bed 2	1 day	Customer acceptance
Preparation of pond	2.5 days	Customer acceptance
Lay top soil for lawn	1 day	Preparation of lawn area
Lay top soil for flower bed 1	1 day	Preparation of flower bed 1
Lay top soil for flower bed 2	1 day	Preparation of flower bed 2
Put down turf for lawn	1.5 days	Lay top soil for lawn
Plant flower bed 1	2 days	Lay top soil for flower bed 1
Plant flower bed 2	2 days	Lay top soil for flower bed 2
Planting Complete	0 days	Put down turf for lawn, Plant flower bed 1, Plant flower bed 2
Erect Fencing	1 wk	Planting Complete
Paint Fencing	3 days	Erect Fencing
Install pond liner	1 day	Preparation of pond
Install pond pump and piping	2.5 days	Install pond liner
Install pump electrical supply	0.5 days	Install pond pump and piping
Lay pond surround	3 days	Install pump electrical supply
Fill pond	0.5 days	Lay pond surround
Test pond	0.5 days	Fill pond
Stock pond with plants	0.25 days	Test pond
Stock pond with fish	0.25 days	Stock pond with plants
Prepare path foundations	3 days	Customer acceptance
Lay path	2 days	Prepare path foundations
END PROJECT	0 days	Paint Fencing, Stock pond with fish, Lay path

8. Link the garden project tasks as per the precedence chart
9. The plan should now look like figure 5.
10. Save as garden 3.



Garden 3
Figure 5

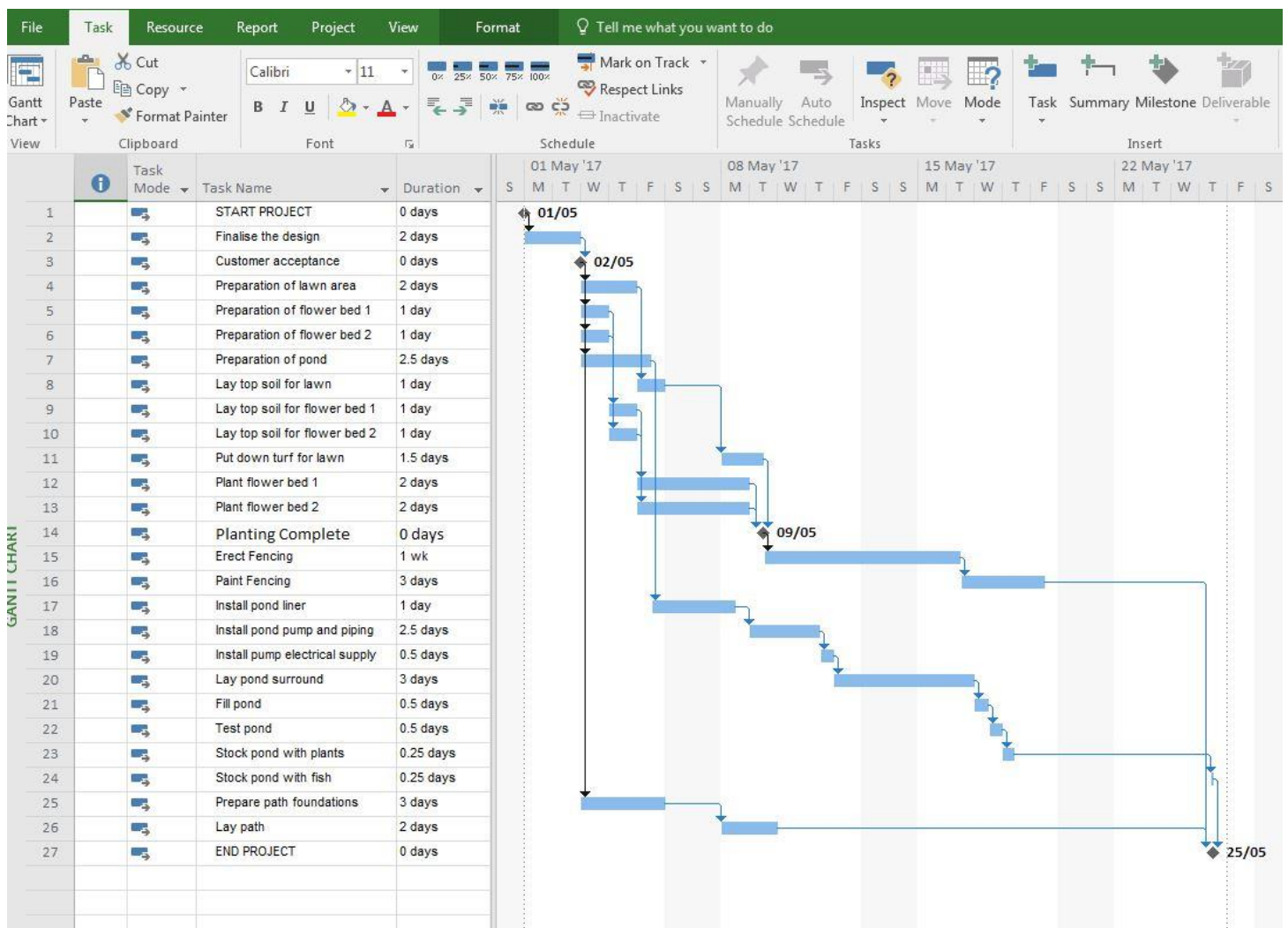
The basic Gantt chart for the garden project can now be seen.

At the moment all the tasks start straight after its predecessor has completed. In most cases this is what is required, but sometimes for a particular reason it is necessary to delay the start of a task because of the nature of the task itself or the preceding task. The type of delay being referred to here is a delay that needs to be inserted within the plan before the start of a project *e.g. waiting for paint to dry*, rather than a delay to a task cause by an issue that arises after the project begins *e.g. material is delivered late*.

Note. The delays put into the project before the start of the project are referred to as a lag within Microsoft Project.

Two lags will be added to the project. The first lag is to allow the pond liner to settle before the pond pump is installed. The second lag is to allow the plants to settle before the fish are added. Now add the lags.

11. Double click on the task “Install pond pump and piping”. The task information will open.
12. On task information window click on the predecessors tab.
13. At the moment the Lag is shown as 0d. Add a ½ day delay by changing the 0d to 0.5d
14. Click OK
15. Double click on the task “Stock pond with fish”
16. On task information window click on the predecessors tab.
17. At the moment the Lag is shown as 0d. Add a 1 week delay by changing the 0d to 1w
18. Click OK
19. The plan should now look like figure 6.
20. Save as garden 4



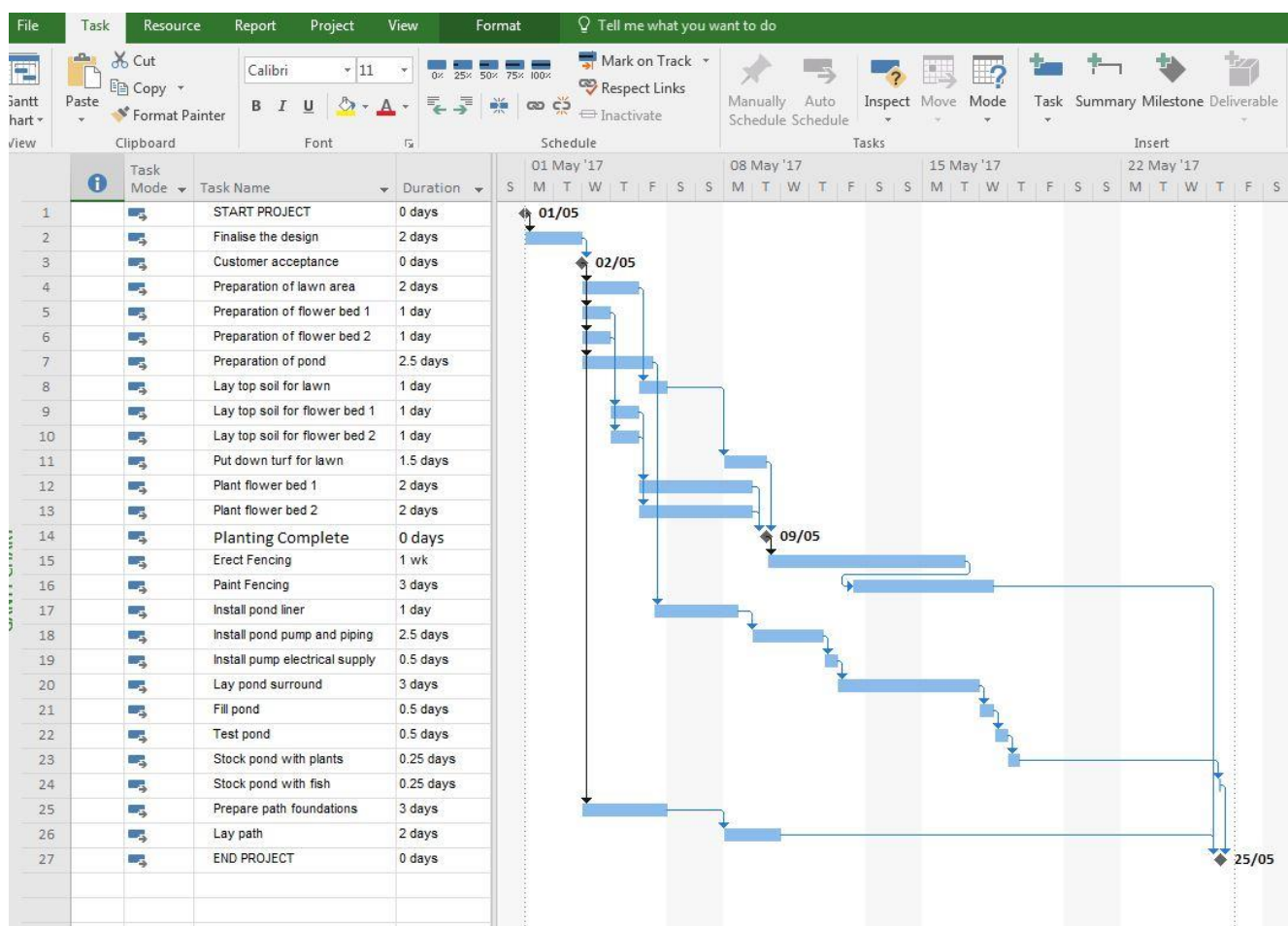
Initial Garden 4
Figure 6

The 1 week delayed added to the “Stock pond with fish” is very obvious in the Gantt chart as can be seen in figure 6.

As well as delaying the start of an activity with relation to its predecessor, it is also sometime desirable to advance the start time of an activity relative to the finish time of it predecessor. Therefore, the link is still a “finish to start” link but the task starts ahead of its predecessor finishing. An easy way to do this is by using a negative lag.

To demonstrate this, a negative lag will be added to the painting of the fence of two days. This will allow the painting of to start two days before the end of the erection of the fence.

21. Double click on the task “Paint Fence”. The task information will open.
22. On task information window click on the predecessors tab.
23. At the moment the Lag is shown as 0d. Change the lag to -2 days (minus two days) by changing the 0d to -2d the use of the minus will create a minus lag that is an advance rather than a delay.
24. Click OK
25. The plan should now look like figure 7.
26. Save as the current garden 4 this mean over-writing the garden 4 file that you saved at stage 20.



Final Garden 4
Figure 7

As with the week delay that was added earlier, the two day advance is very obvious to see visually in the Gantt chart, as can be seen in figure 7.

The next stage is to outline the project using summary tasks below which are various subtasks. Summary task will now be added to the project this will result in all the current project tasks becoming subtasks.

The summary tasks are Design, Preparation, Lay Soil, Planting, Fencing, Pond and Path.

Now let us add the summary tasks

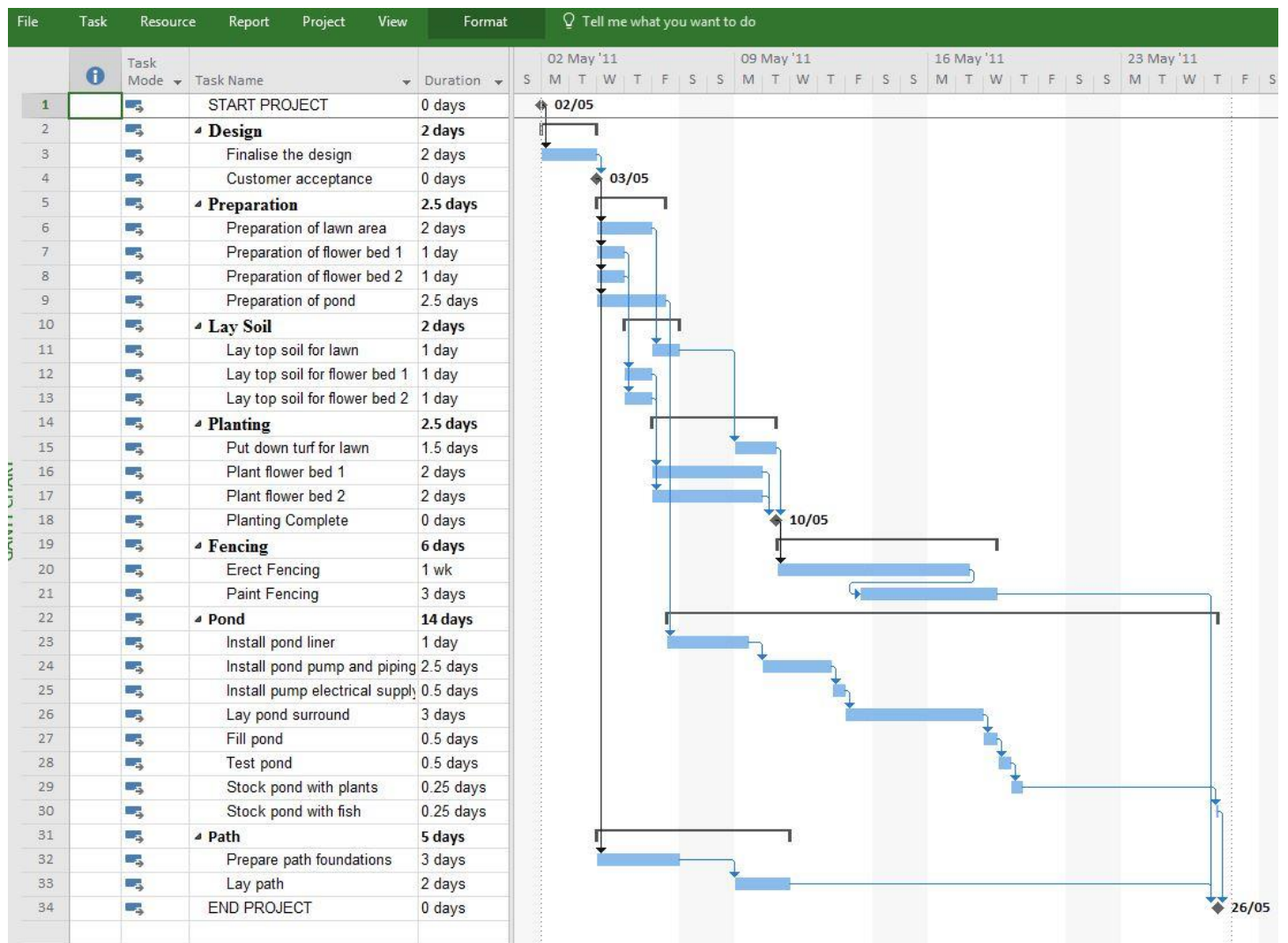
27. Right click on line 2
28. On the menu that opens click on insert task
29. In the task name column at line 2 where it says <New Task> type Design
30. Highlight both lines 3 and 4 so that they are both selected
31. In the task tab ribbon menu in the schedule section click on the indent icon.

The two task highlighted should now have been justified to the right under Design and they should be embraced by a black bar on the Gantt chart.

32. At line 5 repeat 28 to 31 above, but this time type in the word Preparation. Preparation is automatically made a subtask of design, which is not what is wanted.
33. Now click on the task tab ribbon menu in the schedule section click on the outdent icon. The word preparation should now be fully left justified and no longer a subtask of Design.
34. Highlight lines 6 and 9 so that they are all selected
35. In the task tab ribbon menu in the schedule section click on the indent icon.
36. At line 10 repeat the above for Lay Soil indenting lines 11 to 13
37. At line 14 repeat the above for Planting indenting lines 15 to 18
38. At line 19 repeat the above for Fencing indenting lines 20 to 21
39. At line 22 repeat the above for Pond indenting lines 23 to 30
40. At line 31 repeat the above for Path indenting lines 32 to 33.
41. The plan should now look like figure 8.
42. Now save as garden 5

The garden project now has a set of summary task, with each summary task having under it subtasks. These vary in number from two to eight.

The basic garden Gantt chart is now complete, but it lacks resources and costs. These will be added in the next section.



Garden 5
Figure 8

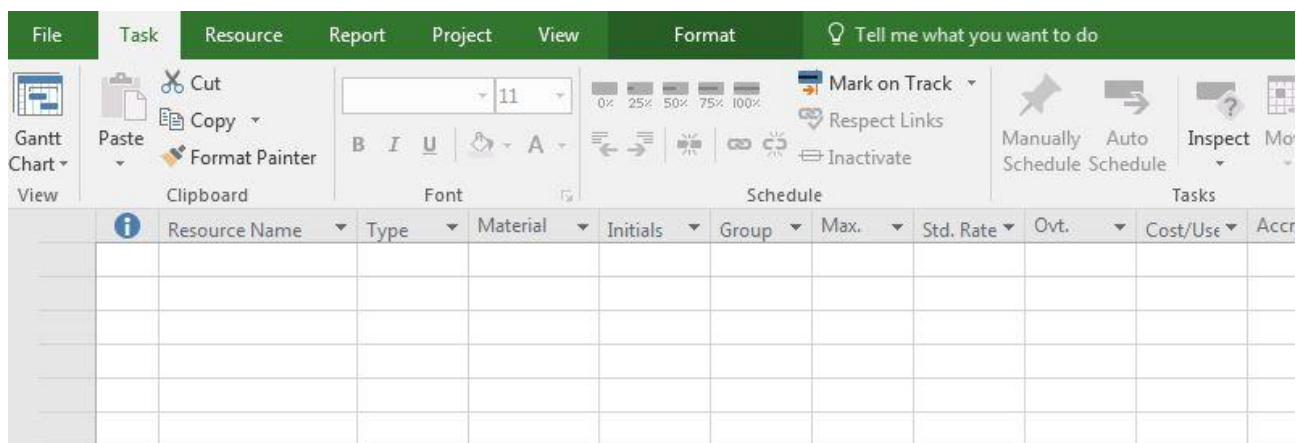
Garden Project Part 3

Once a basic Gantt chart plan has been created this can be developed into something more useful for managing a project by adding the various resources that will be utilised during the project.

The garden project uses the following human resources:

Human Resource	Work group	How many	Hourly Rate
Designer	Management	one	£20
Labourer	Unskilled	three	£6.10
Gardener	Skilled	two	£8.60
Pool Specialist	Skilled	one	£9.50
Pavior	Semi-skilled	one	£7.50

Garden Project Human Resources
Table 3



Empty Resource Sheet
Figure 9

Now let us add the project human resources

1. Open garden 5
2. Click on Task in the top left hand corner to open the task ribbon menu
3. Click on Gantt chart at the extreme left of the ribbon menu. A drop down menu will open.
4. Click on Resource Sheet. The Gantt chart view will change the resource sheet view.
5. Now add the resources as per the table above.
6. Save as garden 6

When the resources have been added, the Resource Sheet should look figure 10.

IMPORTANT

While in table 3 the number of each resource is stated as a number, for example there are three labourers. In Microsoft Project a resource is stated as a percentage, with each full unit of a resource equal to 100%. In Microsoft Project terms this means that each of the labourers is a full resource of 100%. Therefore, because there are three of them, each equal to 100%, this means they are entered in Microsoft Project as 300% maximum units.

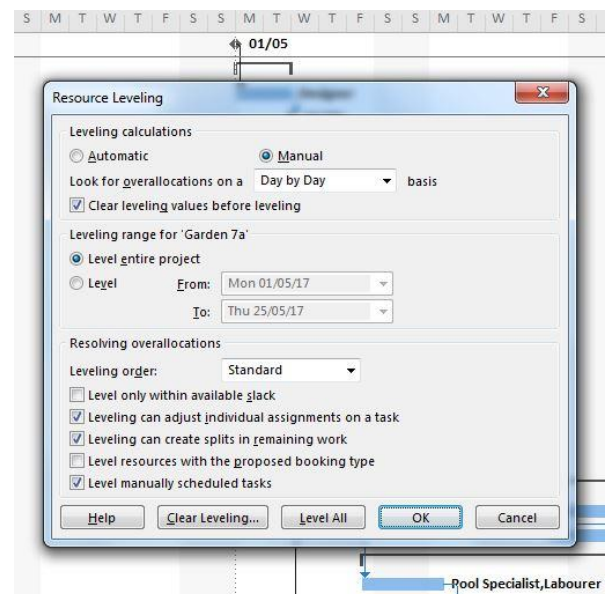
	Resource Name	Type	Material Label	Initial	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	
1	Designer	Work		D	Management	100%	£20.00/hr	£0.00/hr	£0.00	Prorated	Standard	
2	Labourer	Work		L	Unskilled	300%	£6.10/hr	£0.00/hr	£0.00	Prorated	Standard	
3	Gardener	Work		G	Skilled	200%	£8.60/hr	£0.00/hr	£0.00	Prorated	Standard	
4	Pool Specialist	Work		P	Skilled	100%	£9.50/hr	£0.00/hr	£0.00	Prorated	Standard	
5	Pavior	Work		P	Semi-skilled	100%	£7.50/hr	£0.00/hr	£0.00	Prorated	Standard	

Populate Resource Sheet
Figure 10

Now that the plan has a set of human resources, they can now be assigned to the various project tasks.

Before this is done the following need to be checked

- Click on the Resource tab at the top of the screen open the resource ribbon menu
- Click on levelling options, the resource levelling box will open.
- Ensure that the manual is selected for the levelling calculation.
- Click Ok
- Go to the Task ribbon and ensure that the plan is in Gantt Chart view.
- Click on the Format tab at the top of the screen open the format ribbon menu
- In the show/hide section tick the outline number box.
- The outline numbers will now appear next to each task.
- Now resave as garden 6 overwriting the current version of garden 6



Resource levelling window
Figure 11

Note. Summary tasks and milestones never have resources assigned to them. Only tasks can use resources.

Microsoft Project allows resources to be assigned to a task in several different ways. It is suggested that by utilising the online help you explore these various ways resources can be assigned.

Two methods of assigning resources are explained below.

- You should still be using garden 6
- Double click on task 2.1 Finalise design. The task information box should open.
- Click on the resource tab so that it appears.

19. Click on the top box of the resource name box.
20. Click on the down arrow that appears in the right hand side of the box. A drop down menu of the various resources that you have entered will appear.
21. Click on Designer. This will assign the designer to this task. You will note that the designer has been added as a complete single unit of 100%
22. Click Ok at the bottom left of the task information box. The box will close and the designer will be assigned to the task. The designer name will appear next to the task in the Gantt chart.

Task Name	Resource
START PROJECT	
Design	
Finalise the design	Designer
Customer acceptance	
Preparation	
Preparation of lawn area	Labourer
Preparation of flower bed 1	Labourer
Preparation of flower bed 2	Labourer
Preparation of pond	Labourer
Lay Soil	
Lay top soil for lawn	Labourer
Lay top soil for flower bed 1	Labourer
Lay top soil for flower bed 2	Labourer
Planting	
Put down turf for lawn	Gardener
Plant flower bed 1	Gardener
Plant flower bed 2	Gardener
Planting Complete	
Fencing	
Erect Fencing	Labourer
Paint Fencing	Designer
Pond	
Install pond liner	Pool Specialist, Labourer
Install pond pump and piping	Pool Specialist
Install pump electrical supply	Pool Specialist
Lay pond surround	Pool Specialist
Fill pond	Labourer
Test pond	Pool Specialist
Stock pond with plants	Pool Specialist
Stock pond with fish	Pool Specialist
Path	
Prepare path foundations	Labourer
Lay path	Pavior
END PROJECT	

Resource Allocation List
Table 4

Below is another way to assign a resource.

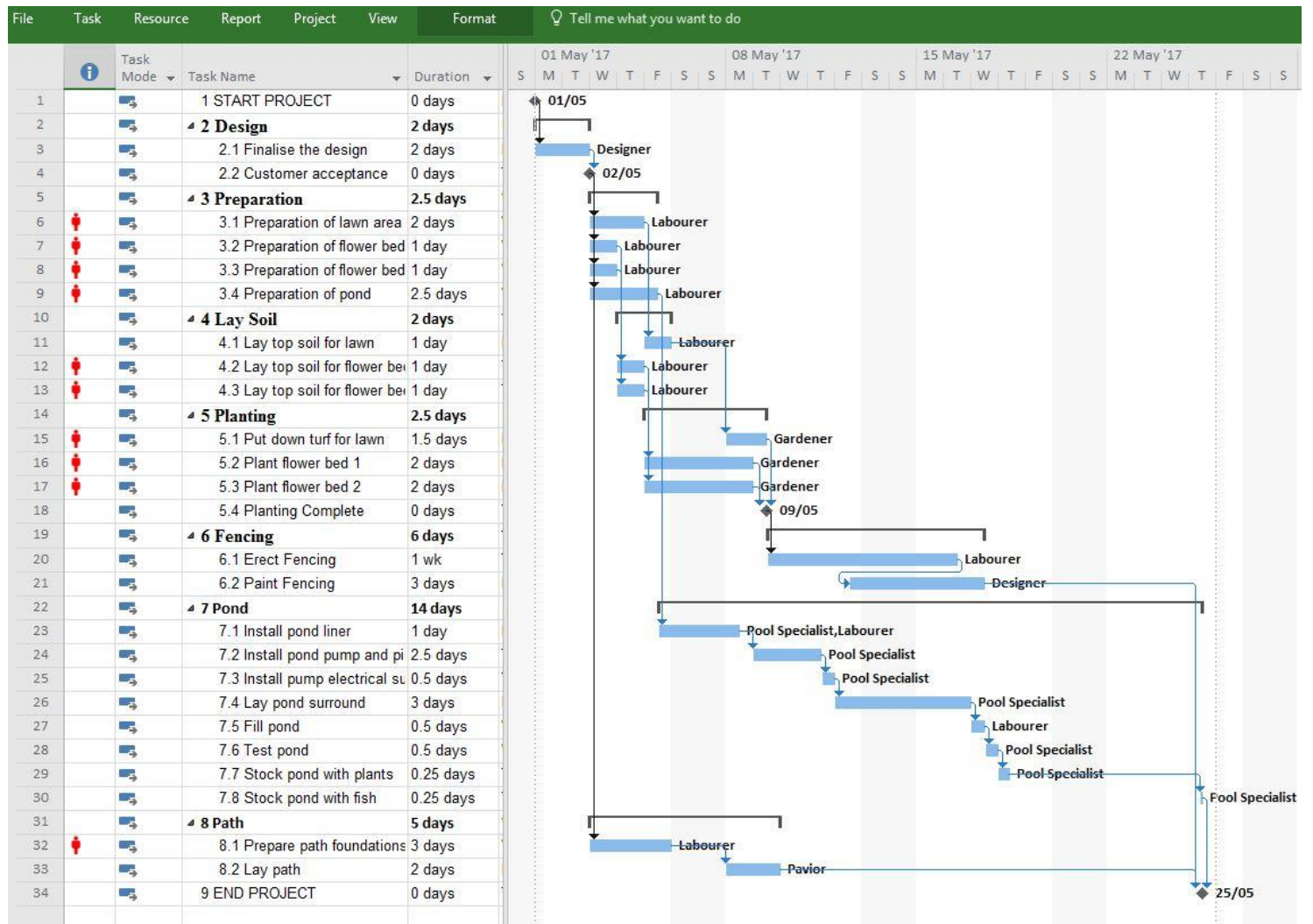
23. Right click on task 3.1 preparation of the lawn area. A vertical bar menu box will open.
24. Click on Assign Resources which is about half way down the menu box. The assign resources box will open.
25. Click on Labourer. Labourer will appear in the white box just above Resource Name.
26. Click assign. Labourer will be assigned to task 3.1, but the assign resources box will not close.
27. Click task 3.2. Task 3.2 will become the active task but the Assign Resources box will stay on the top.
28. As before click on Labourer and then click assign.
29. Continue as above adding the human resources to each task using the information given in the table 4 till you get to task 7.1 Install Pond Liner.

At task 7.1 it will be noted that both the pool specialist and a labourer are assigned to this task.

30. Click on task 7.1
31. In the assign resources box click on pool specialist then click on assign.
32. Next click on labourer then click assign. Both the pool specialist and a labourer have now been assigned to task 7.1 as can be seen by from the resource names next to the task in the Gantt chart.
33. Continue to add the rest of the resources
34. When the resource has been added to task 8.2, click the close button on the assign resources box
35. The plan should now look like figure 12.
36. Now resave as garden 6 overwriting the current version of garden 6

Hopefully you will have noticed little red figures have appeared next to certain task, if you hover the mouse over one of the red figures you will see that a box opens that say the resource is over allocated.

The next section will look at how over allocation can be dealt with.



Garden 6
Figure 12

Garden Project Part 4

In this section the scheduling of tasks will be investigated to explore how task over allocation can be eliminated from a plan. This will be done in three different ways, manually, using the task inspector function, and finally automatically.

Where it is found that tasks conflict and there is a resource issue there are various ways of dealing with this.

IMPORTANT

I do hope you have been saving the various plans with the file names mentioned.

Because, in this section we will modify garden 6 in several different ways to demonstrate some of the ways a project can be balanced within Microsoft Project and how each levelling solution will be different while still allowing the project to finish at the same time in each case.

a. Increase the number of resources that are available at the time of the over allocation. In reality, this can be difficult to do as rarely will there be resources, particularly human resources, waiting around for something to do. Though human resources can often be found at short notice if contract staff are used, but it must remember that contract staff often cost a lot more to employ than company staff members and therefore may have a detrimental effect on the project budget.

b. Another way is too utilised under allocated resources to undertake the task assuming they have the required skills. Now while this may sound a good idea in many organisations for example a skilled person would not do an unskilled workers job certainly not for any significant period. This situation becomes more acute if the staff are unionised.

- c. Often the easiest and most cost effective way is to delay a task or tasks so that the over allocation is avoided.
- d. Overtime payments can be used to pay staff to work longer but as this has a cost implication over and above the standard hourly rate it is best used only as a temporary measure.
- e. If the over allocation are noticed before the project is started a solution to extend the normal working hours paid at the standard rate.

Note: remember that the little red man  in the information column means that task is has a resource allocation clash.

In this next part of the tutorial we will investigate various ways of levelling the project. The first way we will do this is by levelling the project manually.

As you are going to use garden 6 several times you need to ensure that the garden 6 file is not modified. Therefore, in this section as soon as you open garden 6 you will save it with another file name as given in the instructions.

To start with the project will be levelled manually this will be done by:

- a. Adding an extra labourer.
- b. Allocating a gardener to do one of the tasks done by a labourer.
- c. Delaying a task.
- d. Using overtime for a task.

So now let us level the garden project manually.

1. Open garden 6
2. Save it as garden 7a

You now need to ensure that that resource levelling is set to manual. This should have been done in part 3. But to check that resource levelling is set to manual follow steps 7 to 10 in part 3.

We are now ready to start actually levelling the garden 7a file manually.

The first task is to add an extra labourer

3. Click on Task in the top left hand corner to open the task ribbon menu
4. Click on Gantt chart at the extreme left of the ribbon menu. A drop down menu will open.
5. Click on Resource Sheet. The Gantt chart view will change the resource sheet view.
6. Now increase the labourer Max Units from 300% to 400%, so adding an extra labourer.
7. Resave the Garden 7a file.

Note. At this point, none of the resources clashes will have disappeared.

Next a gardener will be used to prepare flower bed 1 in place of a labourer. This will be done by utilising the Resource Allocation view and the “go to next over allocation” function.

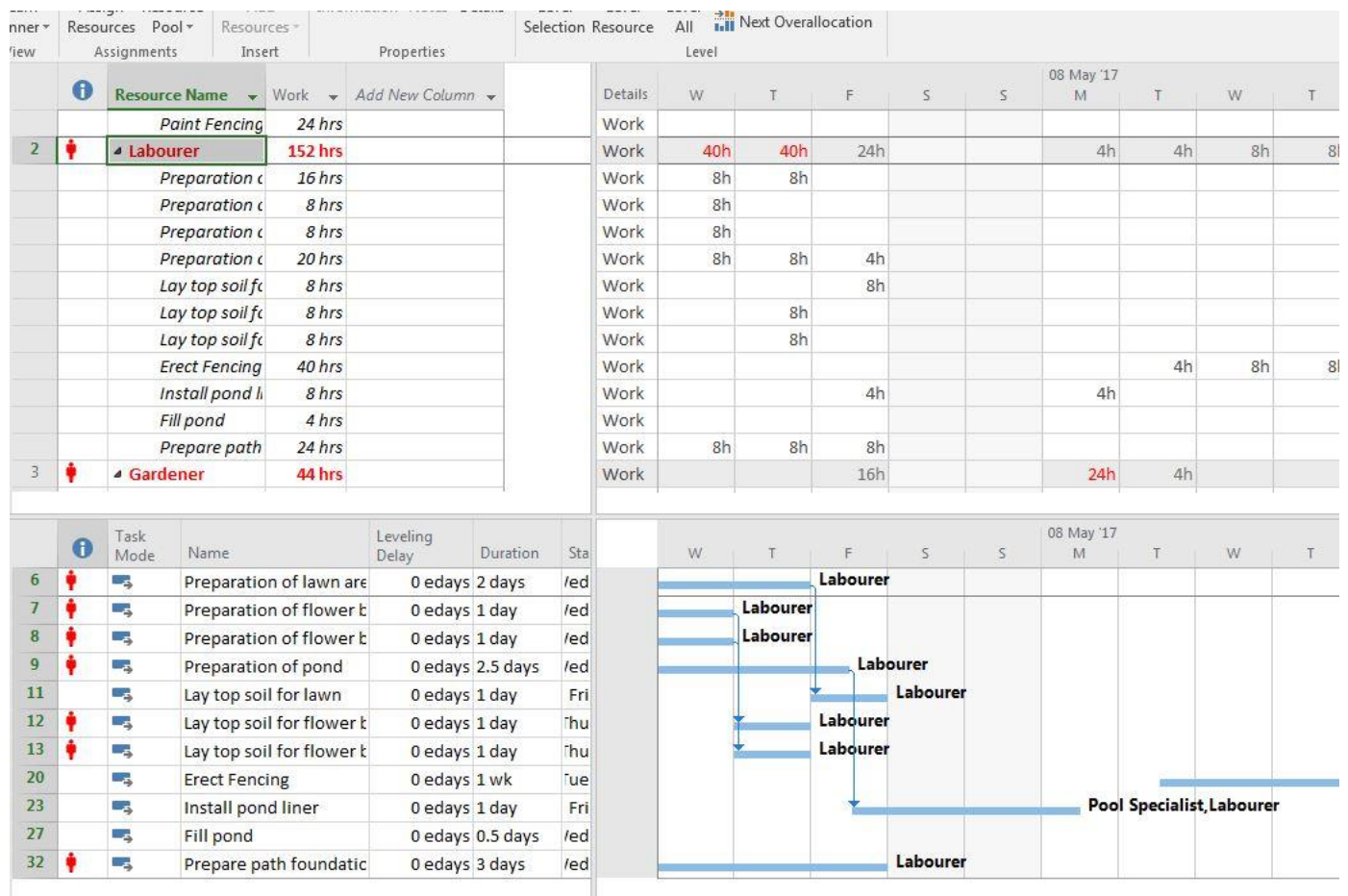
8. Click on Resource in the top left hand corner to open the resources ribbon menu
9. Click on words Team Planner at the extreme left of the ribbon menu. A drop down menu will open.
10. Click on More Views which will be found right at the bottom of the drop down menu. This will open the More Views box.
11. Scroll down the list of views and left click on Resource Allocation then click apply. The resource allocation view will open.

It can be seen that the resource allocation view is split and shows two different views. The top view is Resource Usage while the bottom view is the Levelling Gantt.

12. The resource ribbon should still be open therefore left click on Next Over Allocation icon. This can be found at the far right of the ribbon menu in the level section. This should cause a move to the first over allocated resource, in this case the labourer.

Note. The various tasks undertaken by the labourer have now appeared in the Levelling Gantt section.

13. Scroll the Resource Usage view so that all the tasks associated with the labourer can be seen.



Levelling Labourer
Figure 13

You should now be able to see that for the first day that the labourers are used, the labourers are allocated to 40 hours of work. But, as there is only four labourers the maximum amount of work they can do together on a standard eight hour day is 32 hours.

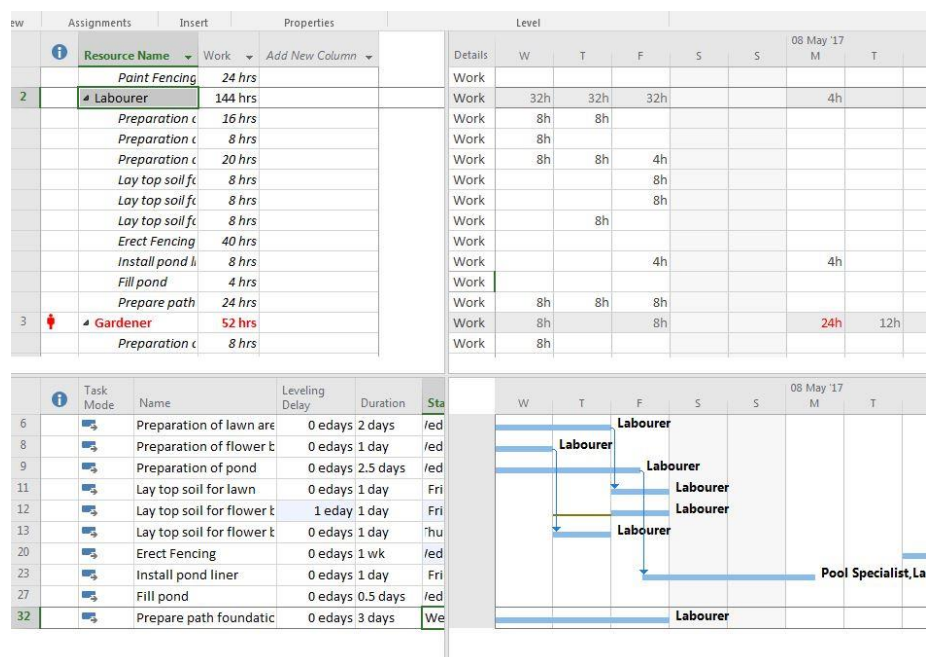
14. In the Levelling Gantt view double click “preparation of flower bed 1”. The task window for “preparation of flower bed 1” will open.
15. Click on resources tab.
16. Then using the method that you learnt in 18 to 21 of part 3 change labourer to gardener. The labourers on the first day should now be level, indicated by the total work time for the day changing colour from red to black and the hours changing from 40 hours to 32 hours.
17. Resave the Garden 7a file

That is $P \times WD = M/Hr$

where P is the number of people available in this case 4 labourers, WD is the number of hours in the working day in this case 8 hours, and M/Hr is the resulting number of man hours available in the working day for them

The next over allocated day for the labourers will now be levelled by delaying the laying of the topsoil for flower bed 1 by 1 day. This will result in this task happening on the third day that the labourers work, where currently they are only being used for 24 man hours and so have 8 slack hours available.

18. In the Levelling Gantt view the column after Name should be Levelling Delay.
19. Click on the levelling delay for “lay top soil for flower bed 1”,
20. Change the levelling delay for “lay top soil for flower bed 1” from zero days to one day.
21. Then click somewhere else on the plan or hit return,
22. The labourers should now be level and the all figures involved with the labourer will now be black. Also, the red over allocation icon should have gone for all labourer related tasks.
23. Resave the Garden 7a file



Levelled Labourers
Figure 14

The over allocated gardeners will now be levelled.

IMPORTANT

At this point it should be possible to click on the next over allocation icon and move to the over allocated gardener. But Microsoft Project gives a message stating that there is no allocation. This appears to be a bug in Microsoft Project.

To get around this in the Resource Views resource name column click on the task either just before or just after Labourer.

The click on "Next Overallocation" in the resource ribbon. You should now be taken to the gardener.

24. In the Resource Name column click on Gardener. The various task associated with the gardener should appear in the Levelling Gantt window.

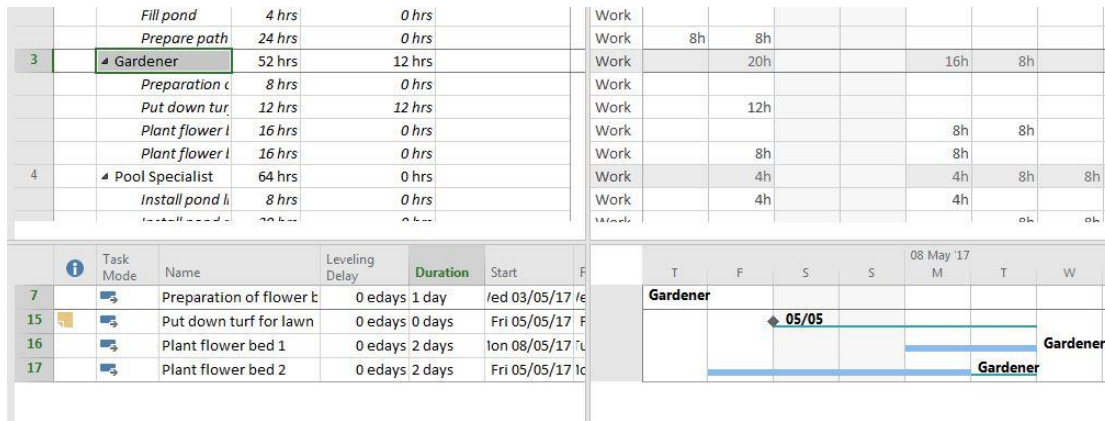
Note. On the overallocated day the gardeners have been assigned to 24 hours of work, this means that they are 8 hours overallocated. But to demonstrate the use of overtime the whole of the "put down turf" task will be allocated to overtime work.

25. In the Resource Usage window click on the Add New Column header. A drop down menu of column choices will open.
26. Select Overtime Work
27. As the Gardeners are over allocated by 12 hours add 12 hours overtime to the "put down turf" task in the Overtime Work column.

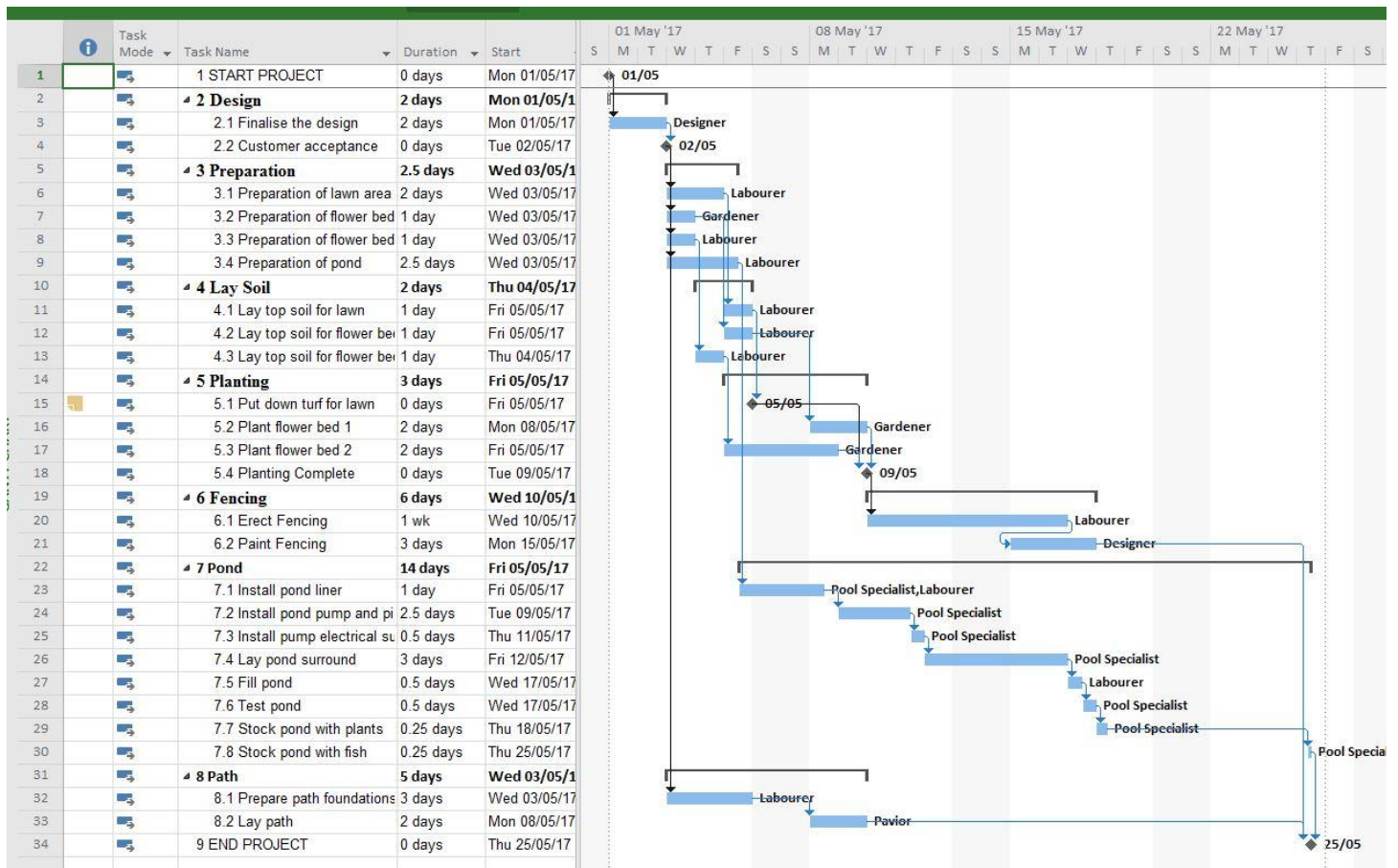
Note: When a task is allocated to overtime the task Gantt bar becomes a thin line for the part covered by overtime. If a whole task is allocated to overtime, then the start of the task is marked by a milestone.

So that you do not miss tasks where the whole task is allocated to overtime a note should be added to the task information box.

28. In the levelling Gantt, double click on the "put down turf".
29. The task information box should open
30. Click on the notes tab.
31. Add a note in the note space that says something like "This task is carried out using overtime",
32. Click okay
33. A yellow note symbol should now have appeared in the Indicators column of the "put down turf" task row. See figure 15
34. Resave the Garden 7a file



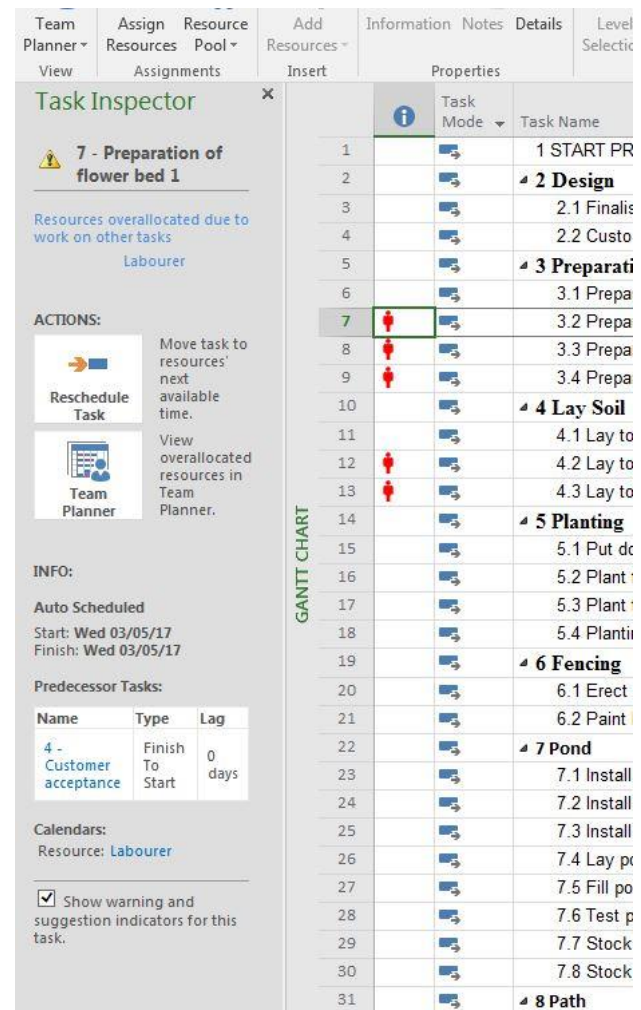
Levelled Gardeners
Figure 15



Garden 7a
Figure 16

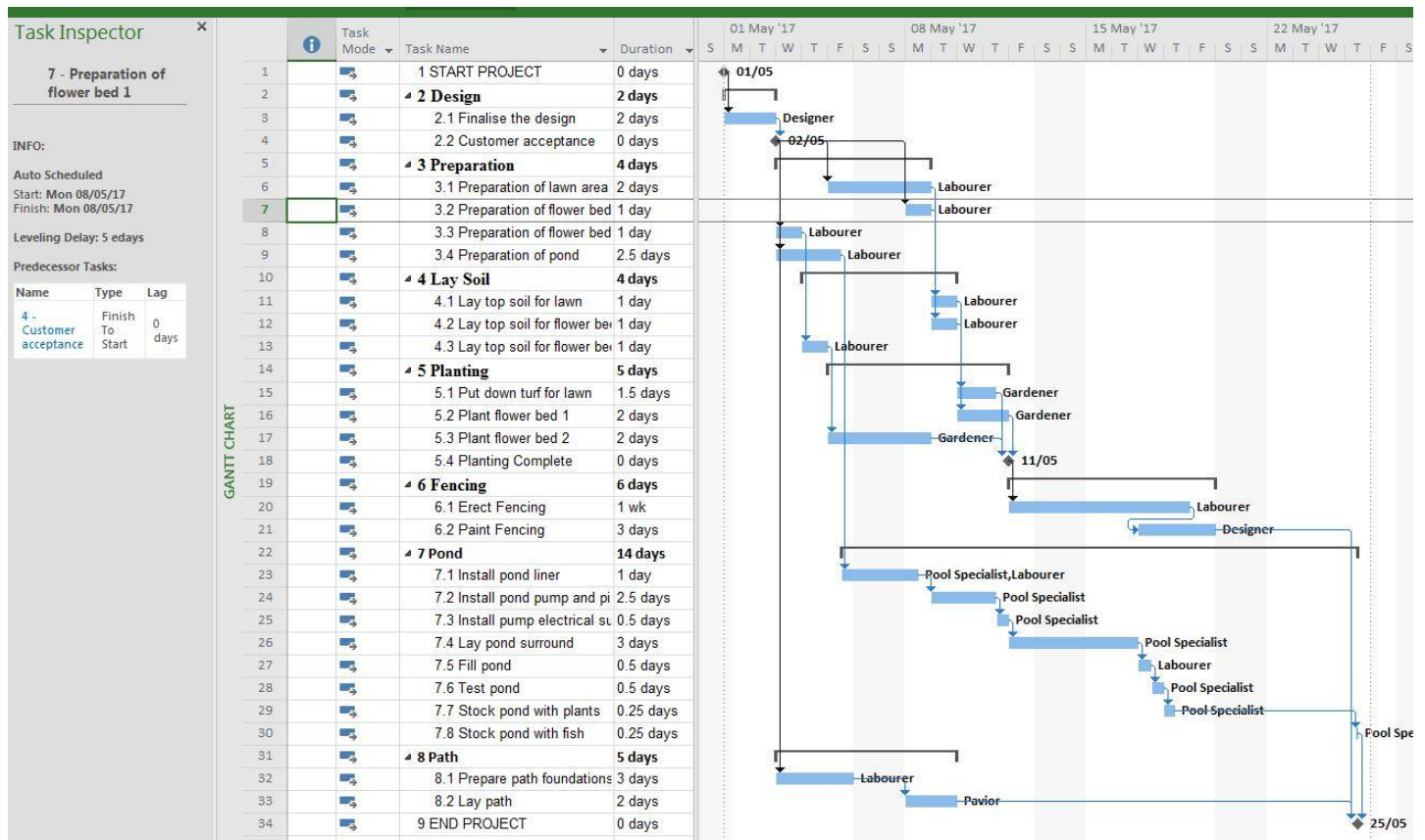
Let us now look some of the automatic ways of levelling the project. This will be done in three different ways. The reason for this is to demonstrate that automatic levelling will level the project in different depending on how levelling is done.

1. Open garden 6
2. Save it as garden 7b
3. Ensure that you are in Gantt view
4. Right click on the first little red man in the Information column, this should be at line 6, “preparation of the lawn area”.
5. Left click of “Reschedule to Available Date”. The “preparation of the lawn area” task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 6 will also disappear.
6. Next, right click on the next little red man in the Information column, this should be at line 7, “preparation of flower bed 1”.
7. This time left click on “Fix in Task Inspector”. The task inspector will open at the left of the screen and will give some repair options. In this case two choices are given. The Team Planner will not be used but it is suggest that you explore this option and how it can be used before continuing.
8. Left click on the first option “Reschedule Task”. The “preparation of flower bed 1” task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 7 will also disappear along with all the other little red men. As there are now little red men it means that the project is now level.
9. Click on the cross at the top right of Task Inspector to close the Task Inspector.
10. The levelled plan is shown at figure 17
11. Resave file as garden 7b



Task Inspector
Figure 16

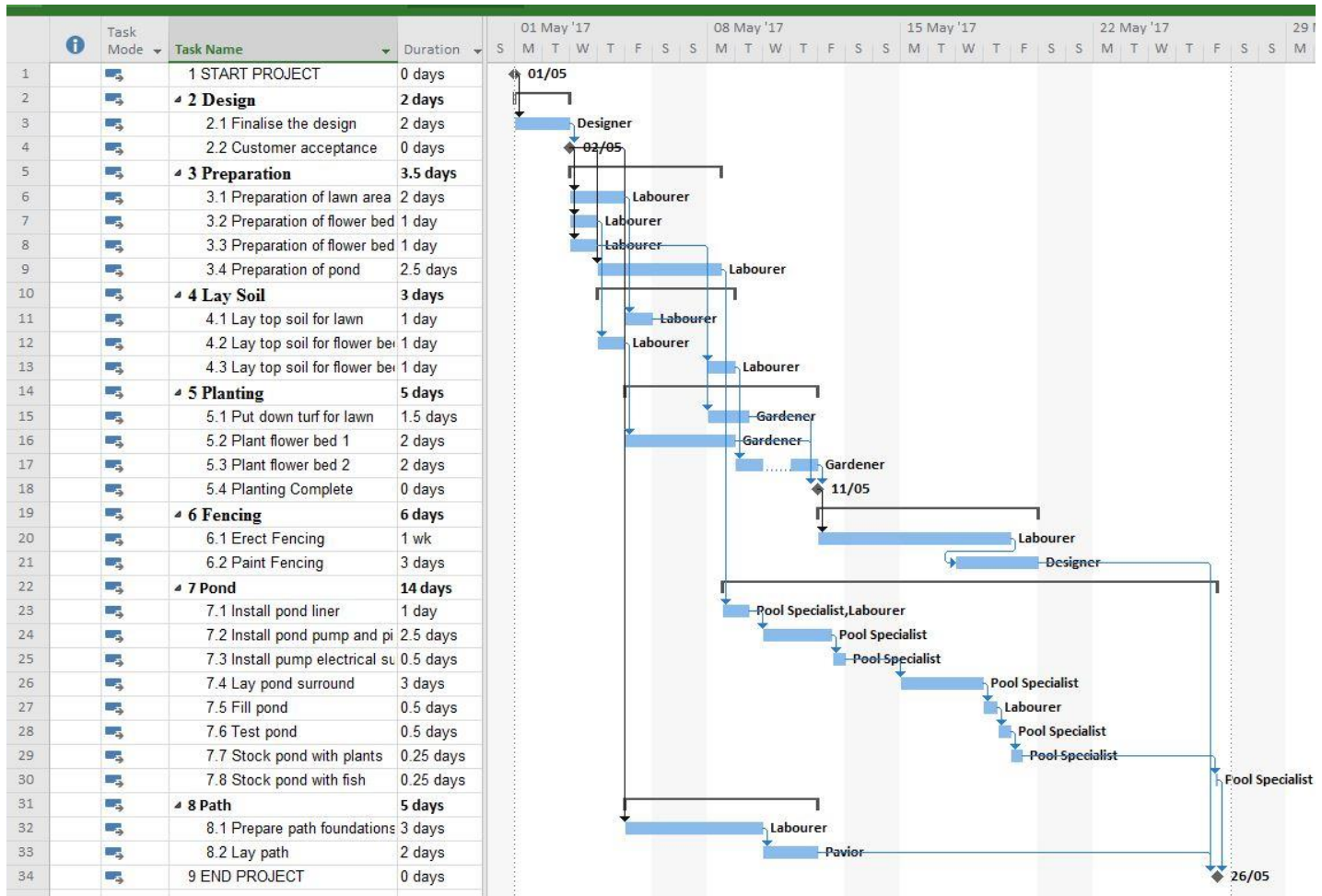
We will use the above techniques to automatically level the project again but will achieve a different result this will be done by starting with the last over allocated task and then moving up the list rather than down the list as was done above.



Garden 7b
Figure 17

1. Open garden 6
2. Save it as garden 7c
3. Ensure that you are in Gantt view
4. Right click on the last little red man in the Information column, this should be at line 32, "prepare path foundation".
5. Left click of "Reschedule to Available Date". The task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 32 will also disappear.
6. Now move up to the next red man this should be at line 17 and right click on the little red man.
7. Left click of "Reschedule to Available Date". The task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 17 will also disappear along with those at lines 15 and 16.
8. Now move up to the next red man this should be at line 13 and right click on the little red man.
9. Left click of "Reschedule to Available Date". The task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 13 will also disappear along with the one at line 12.
10. Now move up to the next red man this should be at line 9 and right click on the little red man.

11. Left click of “Reschedule to Available Date”. The task will now be rescheduled to a later date and this will be visible when looking at the Gantt chart. The little red man on line 9 will also disappear along with remaining little red men.
12. Resave file as garden 7c.

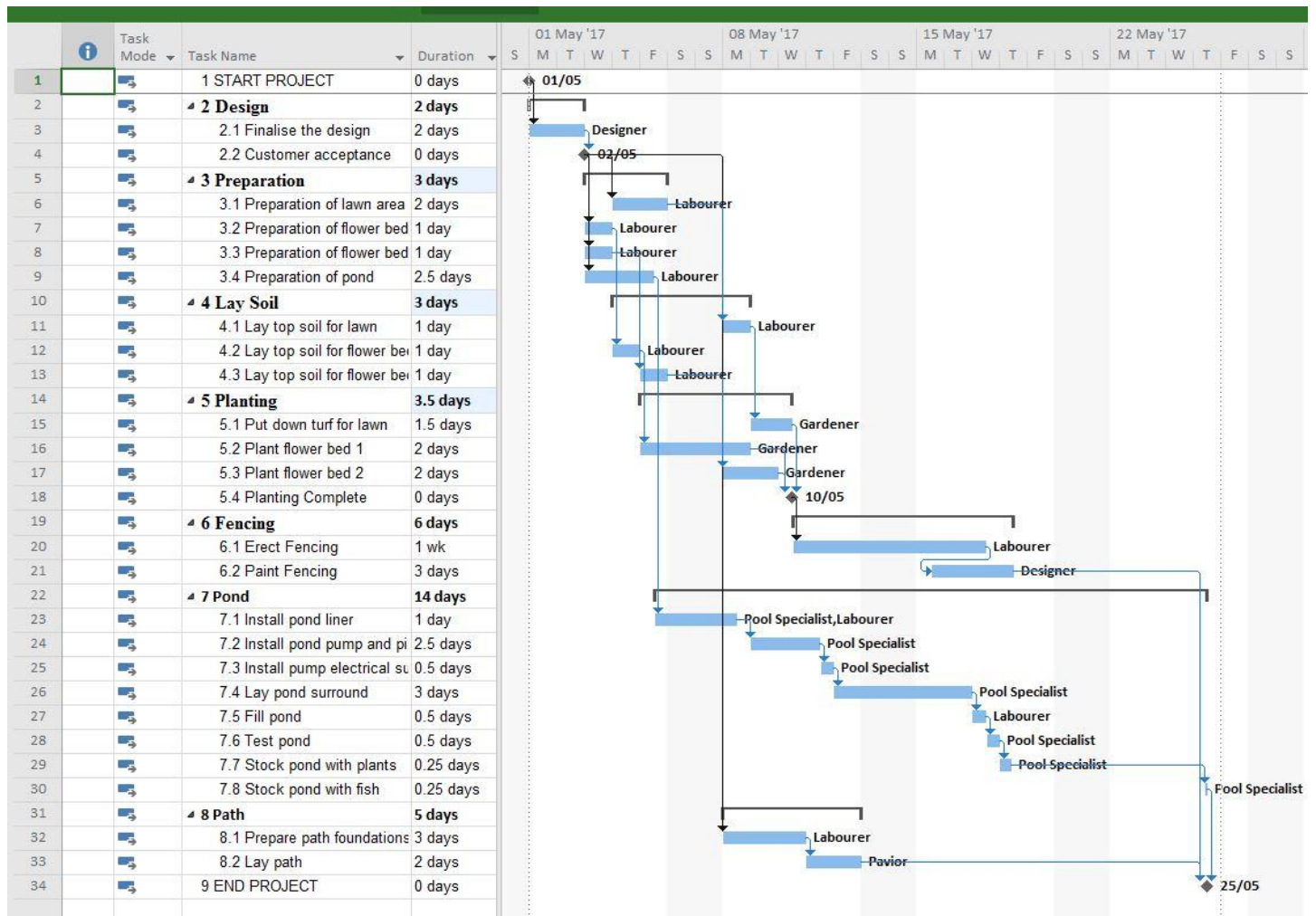


Garden 7c
Figure 18

The next method of automatic levelling will level the whole project in one go rather than doing the automatic levelling task by task.

1. Open garden 6
2. Save it as garden 7d
3. Ensure that you are in Gantt view
4. Left click on the Resource tab. This will open the resource ribbon menu.
5. In the level section of the resource ribbon menu click on “Level All”. The whole project should now be level and all the little red men should have disappeared.
6. Resave as garden 7d.

You now have four versions of the project all of which are level. You should now compare all four and note down the different ways the projects have been levelled.



Garden 7d
Figure 19

The project plan is now complete and levelled. As the various resource costs, will now have been calculated by Microsoft Project let us now review these.

1. Open garden 7d
2. Save as garden 8
3. Click on Task in the top left hand corner to open the task ribbon menu
4. Click on Gantt chart at the extreme left of the ribbon menu. A drop down menu will open.
5. Click on Task Sheet. The Gantt chart view will change the task sheet view.
6. After the Resource Name column add a new column called Cost chosen from the "add new column" drop down menu choice of column names. The cost of the resource for each task can now be seen.

If you look down the list of costs two costs appear excessive, the cost of digging the hole for the pond and the cost of painting the fence.

The pond cost is excessive because it is being dug manually and the fence painting cost is excessive because the designer is doing the painting. This must be changed.

A person with a mechanical digger will dig out the pond for a fixed cost of £60 and will take no more than half a day.

In addition, a painter will paint the fence for a fixed cost of £200 and a will take 2 days.

As both of the above is a fixed cost for doing each task this is referred to in Microsoft Project as a “cost per use”.

7. Add the digger and the painter to the resource sheet, using the technique you learnt in part 3 but this time the cost is put the “cost/use” column.
8. Now go to back to the Gantt chart view.
9. For the “Preparation of Pond” task change the labourer resource for the digger and reduce the duration to 0.5 of a day.
10. Now on the paint fence task swap the designer for the painter, reduce the duration to 2 days, and reduce the lag to -1 day.
11. Resave as Garden 8

Note. What effect have the above changes had on the project?

The project has been shortened by two days as “preparation of pond” task is on the projects critical path. The overall cost has been reduced by £342

Something that will often happen with projects is a resource human or otherwise will not be available when they are required by the actual project plan. This will require that the plan is modified to accommodate this fact.

The way this can be done is by using the various task constraint choices provided within Microsoft Project. The default task constraint type is “start as soon as possible”.

The other choices available are:

- a) Finish as late as possible
- b) Finish no earlier than
- c) Must finish on
- d) Must start on
- e) Start no earlier than
- f) Start no later than

When one of the constraint listed above are used they can cause scheduling errors and conflicts if they are not used correctly. Therefore, when they are used you need to understand the consequences of the constraints that you are setting.

Let us look at an example of this but first

1. Open garden 8

2. Save it as garden 9temp. This file will be used to explore the scenario below.

We will assume that the pavior has informed us that he is only available to start laying the path either 7 days or 14 days after the start of the project.

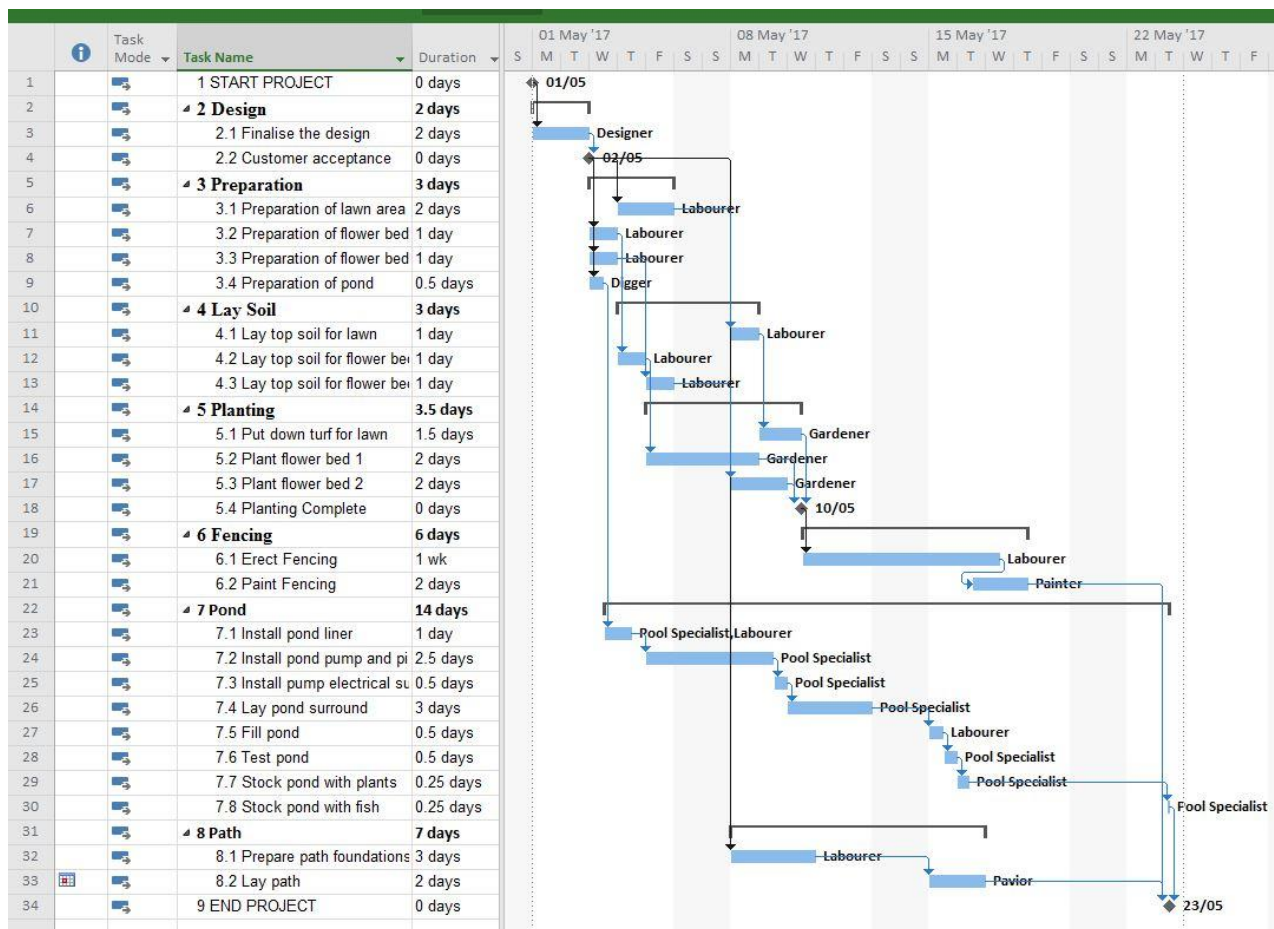
Using the “garden 9temp” explore the various things that can happen if the pavior’s start date is set to 7 days after the start of the project using the “must start on” constraint. What are the different ways this can affect the project and the pavior?

Hopefully you will have realised that a start date 7 days after the start of the project cannot be used for the pavior.

Therefore, the option of the pavior starting work 14 days after the start of the project will be used. Let us add this to the main project plan.

1. Open Garden 8
2. Save as garden 9
3. Open the task information box for the “lay path” task and click on the advanced tab.
4. Add the “must start on” on day 14 after the start of project constraint to the lay path task. A constraint indicator will appear in the Indicator column
5. Resave garden 9

The project plan is now complete.



Garden 9

Garden Project Part 5

This section will explore using Microsoft Project as a tracking, monitoring and control tool.

The first thing that needs to be done is the addition of a baseline to the project. The baseline provided a reference starting point for the various project tracking function. In most cases this will be the start date of the project. The garden project is no exception to this and the baseline will be set at the project start date.

1. Open garden 9
2. Save as garden 10

Before the baseline is set it should be confirmed that the project does not already have a baseline set.

3. Click on the Project tab, this will open the Project ribbon menu.
4. In the properties section click on Project Information. The project information box will open.
5. At the bottom left of the project information box click on Statistics. The project information box will close and the project statistics box will open. The baseline start and finish date should be “NA”. This indicates no baseline is set.
6. Now click on close on the project statistics box so that it closes.

Now to set the base line

7. Click on the Project tab, this will open the Project ribbon menu.
8. In the schedule section click on Set Baseline. Two options appear Set Baseline and Clear Baseline.
9. Then click on the Set Baseline option. The set Baseline box will open.
10. Ensure that the Set Baseline button is click and has a black dot inside it.
11. Click OK. The set baseline box will close.

Let us confirm that the baseline has been set

12. Click on the Project tab, this will open the Project ribbon menu.
13. In the properties section click on Project Information. The project information box will open.
14. At the bottom left of the project information box click on Statistics. The project information box will close and the project statistics box will open. The baseline start and finish date should now be the same as the date in the “current” row. This indicates that the baseline is now set.
15. Now click on close on the project statistics box so that it closes.
16. Resave as garden 10

Now that we have a baseline set let us explore what can happen as we start to track the project.

1. Open garden 10
2. Save as garden 11
3. Set the current date to 5 days after the start of the project. The current date can be set in the Project Information box.

You should now update project manually. To do this you will need to use help to find out how to do this.

4. Referring the Task Outline Numbers, Tasks 1, 2.1. and 2.2 were completed on time as per the current plan.
5. Task 3.1 is complete but started on day 5 of the project and ended on the same day.
6. Tasks 3.2 were completed as per the current plan.
7. Task 3.3 started on time but is only 50% complete (task duration estimate is accurate but there was a delay finishing the job)
8. Tasks 3.4 was completed as per the current plan.
9. Tasks 4.2 started on time and has used 1 day, but still requires a further 0.5 day (original task duration estimate was incorrect).
10. Task 4.3 cannot start as 3.3 is not complete
11. Task 5.2 cannot start as 4.2 is not complete.
12. Tasks 7.1, 7.2 were completed as per the current plan.
13. Save as garden 11.
14. Investigate the plan to see any effects, for example changes to end date, the critical path etc. by comparing garden 11 with garden 10.
15. Select all the tasks and reschedule work
16. Save as garden 12 and investigate the plan again.
17. Investigate any overloads of resources. Level any overloaded resources.
18. Save as garden 13

This brings to an end this basic introduction to Microsoft Project.

Further Exploration of Microsoft Project

So far only the basics of using Microsoft Project have been covered in this tutorial guide. There is so much more to project and it would now be worth spending some time exploring of these option.

Areas that it is suggest that you explore include defining the work breakdown structure for your project, use of filters, report generation and use of the timeline facility.

But if you cannot be bothered to explore any of the above I urge you to at least explore the printing option available in Microsoft Project and how you can printout project that will appear meaningful to the reader of the printout.

Appendix 1

The Garden Task










START PROJECT
Finalise the design
Customer acceptance
Preparation of lawn area
Preparation of flower bed 1
Preparation of flower bed 2
Preparation of pond
Lay top soil for lawn
Lay top soil for flower bed 1
Lay top soil for flower bed 2
Put down turf for lawn
Plant flower bed 1
Plant flower bed 2
Erect Fencing
Paint Fencing
Install pond liner
Install pond pump and piping
Install pump electrical supply
Lay pond surround
Fill pond
Test pond
Stock pond with plants
Stock pond with fish
Prepare path foundations
Lay path
END PROJECT

The Garden Durations

0 days
2 days
0 days
2 days
1 day
1 day
2.5 days
1 day
1 day
1 day
1.5 days
2 days
2 days
1 wk
3 days
1 day
2.5 days
0.5 days
3 days
0.5 days
0.5 days
0.25 days
0.25 days
3 days
2 days
0 days

Appendix 2

Getting started

		Task Mode ▾	Task Name ▾	Duration ▾	Start ▾	Finish ▾	Predecessors ▾	Re N
1			Start	0 days	Mon 05/09/16	Mon 05/09/16		
2			A	5 days	Mon 05/09/16	Fri 09/09/16	1	
3			B	4 days	Mon 05/09/16	Thu 08/09/16	1	
4			C	6 days	Mon 12/09/16	Mon 19/09/16	2	
5			D	2 days	Fri 09/09/16	Mon 12/09/16	3	
6			E	5 days	Fri 09/09/16	Thu 15/09/16	3	
7			F	6 days	Tue 20/09/16	Tue 27/09/16	4,5	
8			End	0 days	Tue 27/09/16	Tue 27/09/16	7,6	

