

Developing a Gantt and PERT Chart

October 2004 Edition



UNITAR

**UNITAR-executed GEF Medium-Sized
Project, on behalf of UNDP**

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Module 1. Creating a Gantt Chart Using MS Project

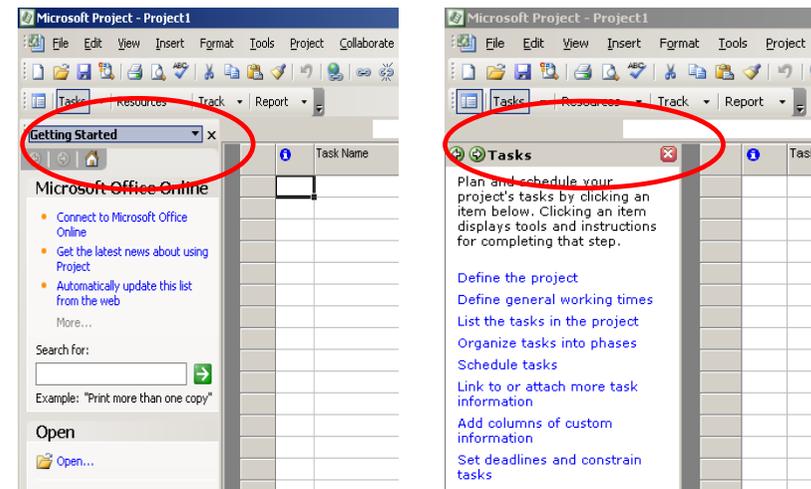
Introduction

Microsoft Project is a planning software programme that can facilitate the planning and management of projects. It can assist project participants in developing a clear visual representation of a project as well as help to efficiently organise and track tasks (and resources) to keep the project on time (and within budget).

This document/part of the workshop will guide participants through the basic features of the software in order to develop (and later edit) a Gantt chart to the level of detail required in a 'real life' setting. Since the computer knowledge of readers/participants may range widely, the guidance presented here is intended to ensure that all participants can comfortably work through the following steps.

1. Open Project

- ▶ On the left side of the screen, a column entitled **Getting Started** appears. Click on the **X** to close.
- ▶ Once the **Getting Started** column is closed, a column entitled **Tasks** will appear. Click on the **X** to close.¹



¹ This column allows the user to plan and schedule the project's tasks by clicking on a listed item and following the tools and instructions provided for completing that step. This guidance provided in this document/workshop, however, aims to ensure that participants become familiar with the software so that such software instructions are not necessary.

2. Format calendar

What: Adjust the timescale to a scale that is most appropriate to the project.

How:

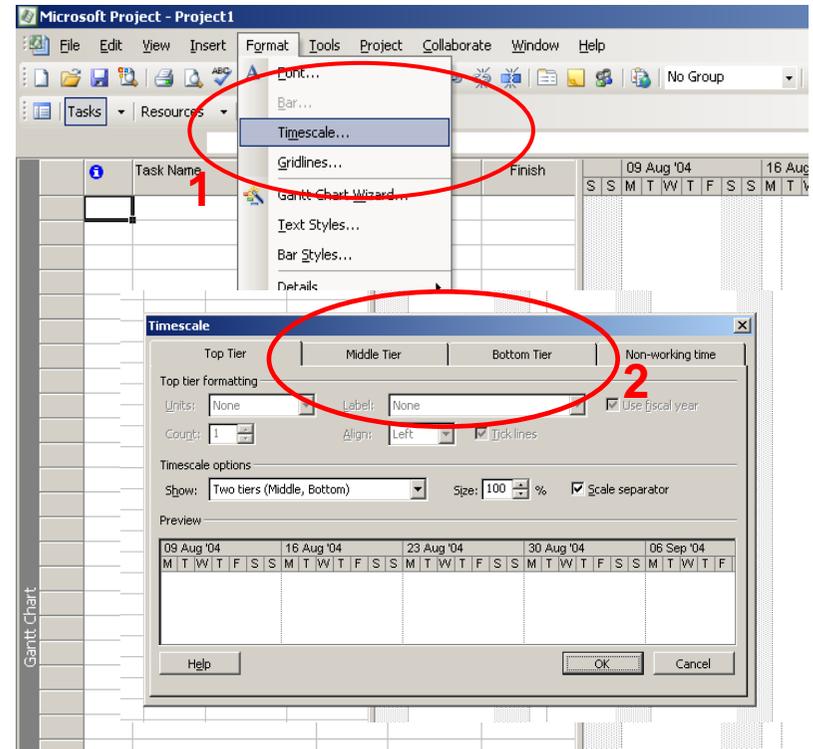
- ▶ Double click on the timescale *or* On the **Format** menu, click **Timescale** (1).
- ▶ Select the appropriate **Units**, **Labels**, etc. for the **Middle** and **Bottom Tier** (2).

3. Save file

What: Save the file for the first time.

How:

- ▶ On the **File** menu, click **Save** or click Ctrl + s.

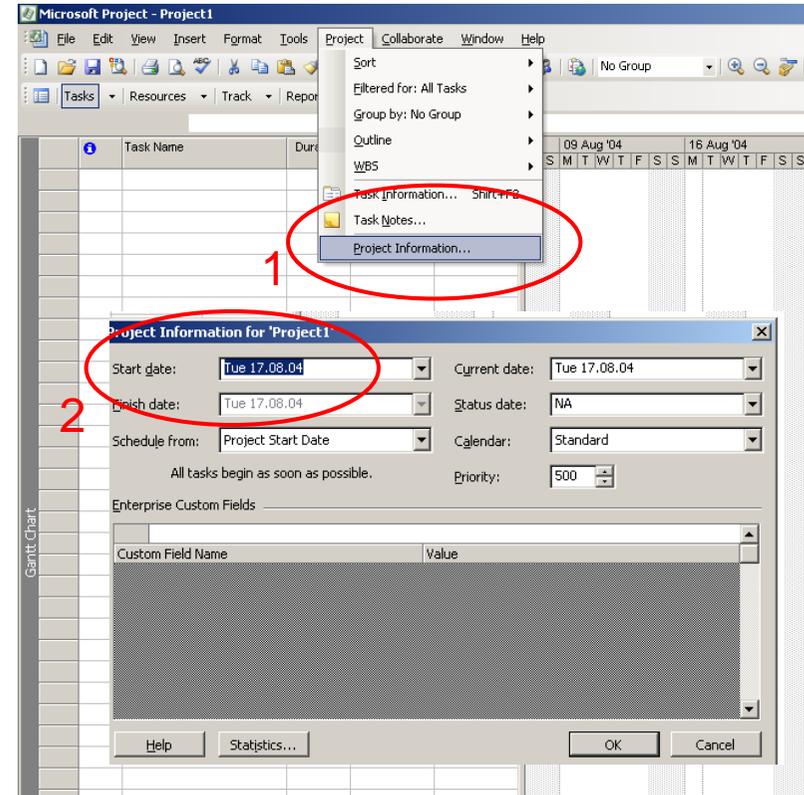


4. Enter project start date

What: At this stage, estimate a starting date for the project.

How:

- ▶ On the **Project** menu, click **Project Information** (1). Enter **Start Date** (2).



5. List activities and tasks and organise into phases/groupings

What: Enter the names of each activity and related tasks (and groupings).

How:

- ▶ In the **Task Name** field, enter the activity (1). Beneath each activity, enter the various tasks which must be completed in order to complete the respective activity.
- ▶ Select the tasks that make up the corresponding activity in the **Task Name** field, then right mouse click on shaded row(s) (2) and click **Indent** (3) to indent the tasks thereby moving these to a lower level in the hierarchy.
- ▶ This process can be repeated to create a third level in the hierarchy – a set of subtasks which together complete a particular task (4). This breakdown process can continue to a level of detail deemed useful by the user.²

The screenshots illustrate the steps in Microsoft Project:

- Task List:** A table showing task hierarchy and dates.

Task ID	Task Name	Duration	Start	Finish
1	Default Activity	7 days	Tue 17.08.04	Wed 25.08.04
2	Task 1.1	3 days	Tue 17.08.04	Thu 19.08.04
3	Task 1.2	4 days	Wed 18.08.04	Mon 23.08.04
4	Task 1.3	4 days	Fri 20.08.04	Wed 25.08.04
- Context Menu:** A right-click menu is shown over the task list, with the 'Indent' option highlighted.
- Final Gantt Chart:** The Gantt chart view shows 'Subtask 1.3.1' indented under 'Task 1.3'.

Task ID	Task Name	Duration	Start	Finish
1	Default Activity	7 days	Tue 17.08.04	Wed 25.08.04
2	Task 1.1	3 days	Tue 17.08.04	Thu 19.08.04
3	Subtask 1.1.1	3 days	Tue 17.08.04	Thu 19.08.04
4	Task 1.2	4 days	Wed 18.08.04	Mon 23.08.04
5	Task 1.3	4 days	Fri 20.08.04	Wed 25.08.04
6	Subtask 1.3.1	4 days	Fri 20.08.04	Wed 25.08.04

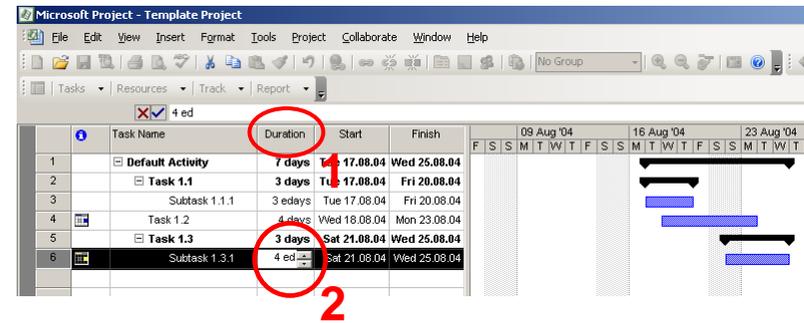
² The use of indenting tasks, as explained above is part of what can be referred to as the “Outline Structure”. This is a hierarchical structure for a project that shows how some tasks fit within broader groupings. In Microsoft Project, subtasks are indented under summary tasks. The Outline Structure helps to organise tasks into summary tasks and subtasks. [need to harmonise terminology]

6. Estimate task durations

What: Enter the estimated durations for each task, subtask, etc.

How:

- ▶ For each task, subtask, etc., enter the time required to complete the task in the **Duration** field (1). Durations can be entered in days (d), weeks (w), and months (mo).
- ▶ Simply typing in the number of days, for example, will provide a *normal duration*, which is the total span of active working time that is required to complete a task, based on the defined working hours per day/week (e.g. an 8-hour day/5-day week). In the context of this workshop, it is more useful to enter the *elapsed duration*, which is the amount of time that will pass between the start and finish of a task, based on a 24-hour day/7-day week schedule, including holidays and other nonworking days.
- ▶ To enter the *elapsed duration* of a task, in the **Duration** field type a number followed by “e” and the corresponding timeframe (2) (for example, for elapsed days, “ed”, for elapsed weeks, “ew”).
- ▶ The **Start** and **Finish** for each task will be generated in the next step (see step 7).

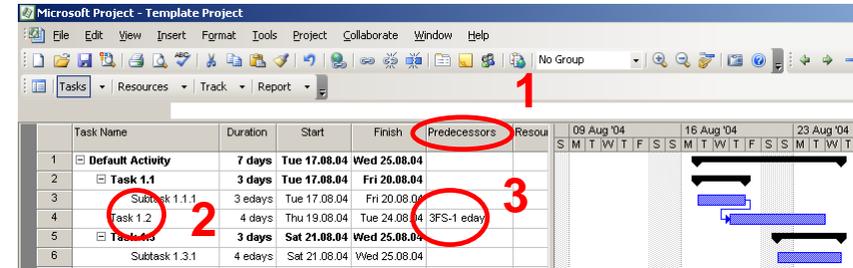


7. Enter relationships (dependencies)

What: Designate relationships (dependencies) with other tasks.

How:

- ▶ Starting at the top of each grouping, read down the list and ask the following questions for each task: Does this task need to be completed before the next task begins? (or do any other tasks need to be completed before this task can begin?) Can or must this task take place at the same time as other tasks? Etc.
- ▶ In the **Predecessor** field (1), identify a task (2) whose relationship (or dependency) should be defined. In other words, identify the dependency between their start and finish dates. There are four kinds of task dependencies: Finish-to-start [FS], Start-to-start [SS], Finish-to-finish [FF], and Start-to-finish [SF].
- ▶ To set the dependencies, enter in the **Predecessor** field the number of the task to which the selected task is linked, followed by the type of dependency – FS, SS, FF, SF (3). For example, if task 1.2 (row #4) can only start when task 1.1.1 (row #3) is completed, enter in the **Predecessor** field for task 1.2, “3FS”. This can be modified by additional information, such as a delay or overlap in the schedule. For example, if task 1.2 must start 1 day before task 1.1.1 ends, enter in the **Predecessor** field (3) for task 1.2, “3FS-1ed”.
- ▶ By setting the duration for each task and establishing the relationships between the various tasks, Microsoft Project automatically calculates the start and finish dates for each task based on this information. This is the most effective way to schedule tasks. This allows any changes regarding duration to be made simply with the dates of other tasks automatically adjusted. Entering the **Start** and **Finish** dates of a task in the relevant fields should only be used when absolutely required, i.e. when certain activities are based on a certain date. This is known as a *constraint date*.

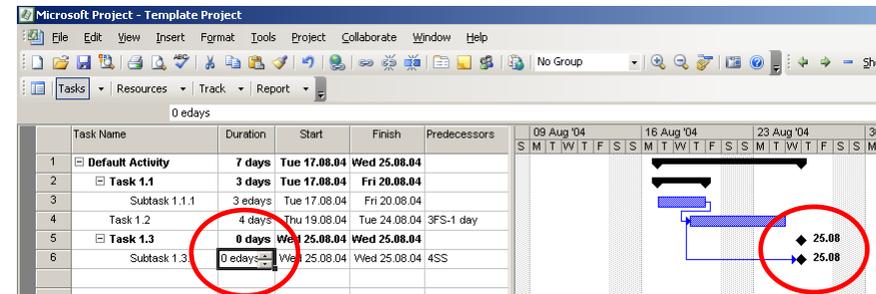


8. Define milestones

What: To indicate which tasks are key events, achievements or decision points (typically marking a major event in a project and used to monitor the project's progress) milestones are designated.

How:

- ▶ To mark a task as a milestone, simply enter 0 in the **Duration** field. Any task with zero duration is automatically displayed as a milestone.

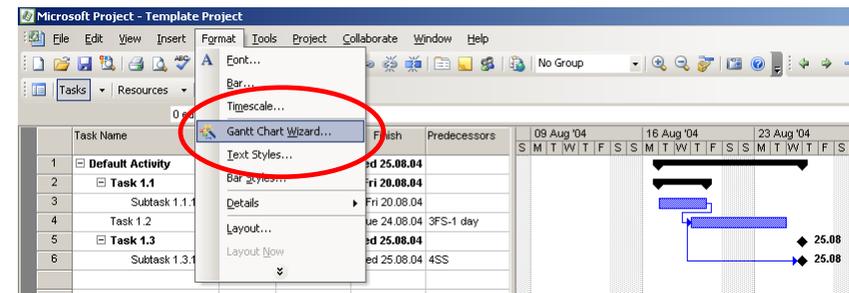


9. Follow Gantt chart wizard (Format view)

What: To adjust the look of the Gantt chart from the default styles, use the Gantt Chart Wizard. If the default version is adequate, this step can be ignored.

How:

- ▶ On the **Format** menu, click **Gantt Chart Wizard** or click the **Gantt Chart Wizard** icon. Following the steps presented by the Wizard, it is possible to quickly adjust the format of various items, such as link lines between dependent tasks, as well as select colour options and patterns for Gantt/task bars representing summary tasks, subtasks or milestones.

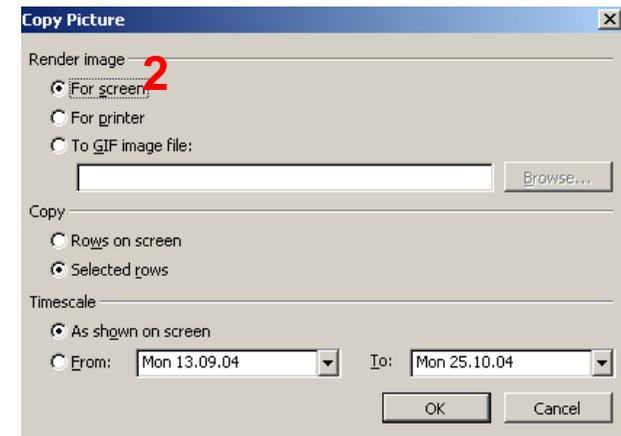
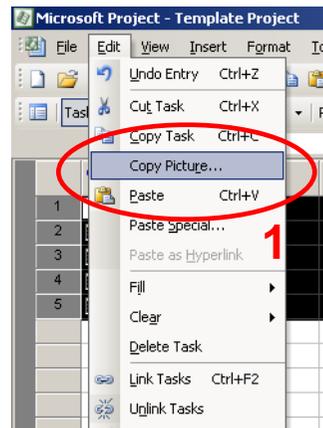


10. Publish chart (Save in MS Word)

What: To save the Gantt chart in a Microsoft Word document, use the Copy Picture tool. This may be necessary when it is desirable to circulate the Gantt chart to those who do not have Microsoft Project. In other cases, this tool enables one to insert the Gantt chart, for example, as an annex to a document.

How:

- ▶ First, select the rows to be published. Second, on the **Edit** menu, click **Copy Picture** (1). Enter the details required in the Copy Picture window (2).
- ▶ Open a Microsoft Word document. On the **File** menu, select **Page Setup** and choose the “Landscape” orientation. Click **Paste** to insert the Gantt chart into the document (3).
- ▶ The size of the chart can be adjusted by double-clicking on the chart. In the **Format Picture** window, select the **Layout** tab, click the “Tight” wrapping style. The size of the chart can then be adjusted by positioning the mouse on the corner of the chart and dragging the chart diagonally. By positioning the mouse in the middle of the chart, its location on the page can be adjusted.
- ▶ It is also possible to use the **Copy Picture to Office Wizard** and copy the Gantt chart to Microsoft Word (as well as PowerPoint and Visio) in a more automated process. On the **Analysis** toolbar, click **Copy Picture to Office Wizard**. (If the toolbar is not displayed, on the **View** menu, point to **Toolbars**, and then click **Analysis**). Follow the instructions in the **Copy Picture to Office Wizard**.



Module 2. Creating a PERT Chart Using MS PowerPoint

1. Draft on paper

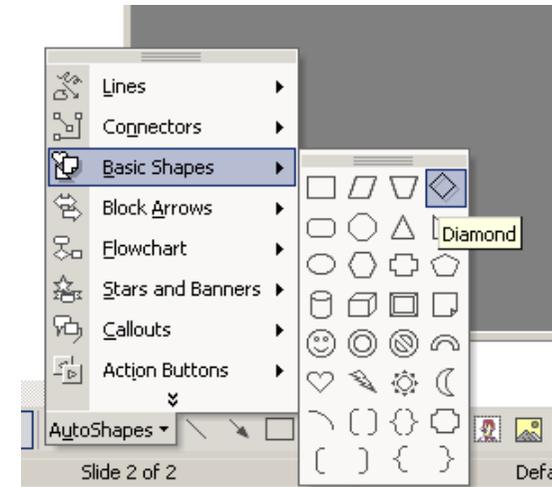
- ▶ On a PERT Chart, activities, tasks, subtasks, etc. are recorded in boxes and linked to each other with arrows that indicate the relationships between them. This allows the viewer to quickly grasp the planned activities, etc. and related sequence. Key decision points can also be included, represented by diamond shapes. (Boxes and diamonds are typically used in PERT but any shapes can be used as long as a legend is included).
- ▶ The easiest way to begin developing a PERT Chart is to create a first draft on paper.

2. Open programme

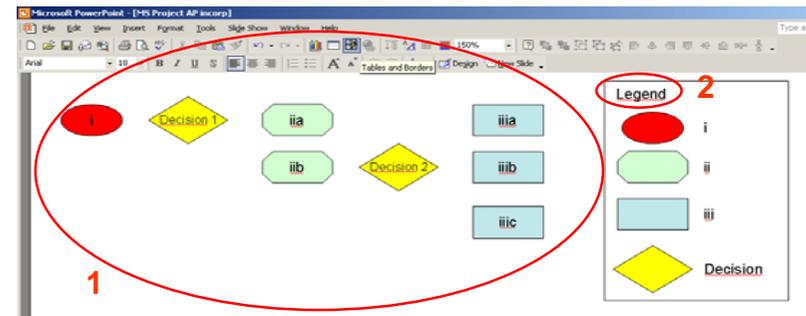
- ▶ It is possible to use a variety of software programmes to create an electronic version of a PERT Chart. The simplest and most effective programmes are probably PowerPoint, Visio and Word. For this document/workshop, Microsoft PowerPoint will be used.
- ▶ In order to make the best use of limited space, a first step might be to change the **Font Size** to a smaller number, such as 10.

3. Enter activities, tasks, decision points, etc.

- ▶ If the **Drawing** toolbar is not available on the screen (check the bottom of the screen), then on the **View** menu, select **Toolbars** and click on **Drawing**.
- ▶ On the **Drawing** toolbar, click on the Rectangle icon, then click on the workspace. To adjust the size and dimensions of the rectangle, move the mouse to any corner or edge and drag. On the **Drawing** toolbar, clicking **AutoShapes** provides access to a range of drawing options.
- ▶ To insert text into each box, simply click on a box and type the desired text.
- ▶ To copy a box, click on a box and select **Copy** and **Paste** (or Ctrl + c and Ctrl + v respectively). A faster shortcut involves placing the mouse over a box, holding down the Ctrl key and clicking and dragging the mouse to create a copy of the box.
- ▶ To move boxes around the page, simply place the mouse over a box, hold down the mouse button and move to the desired location.



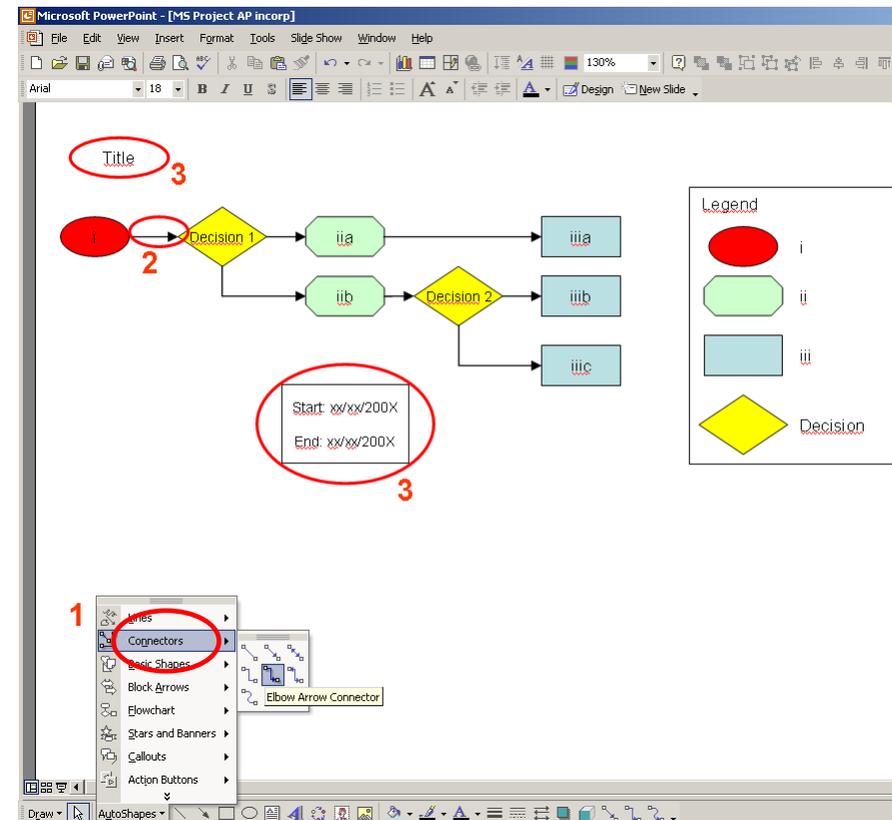
- ▶ To include decision points in the PERT chart, follow the process outlined above for activities, only in this case diamonds rather than rectangles might be used. To insert a diamond, on the **Drawing** toolbar, click **AutoShapes**, followed by **Basic Shapes**, and finally click on the Diamond icon.
- ▶ At this stage, the boxes and diamonds will probably begin to take the form of a logical sequence of events. Play with the arrangement to ensure that it accurately represents the intended process. The process typically starts on the left side and flows to the right (1).



- ▶ With any set of shapes, including a legend (2) is a useful tool to explain to the reader which shapes represent the various elements of the project.

4. Link items and insert additional details (dates, title, legend, etc.)

- ▶ Once the sequence of events is established, the boxes and diamonds can be linked with the use of lines of arrows.
- ▶ On the **Drawing** toolbar, click on Line or Arrow icon (1). On the workspace, click on the location where the line or arrow should begin and drag to the location where it should end (2). Another option involves using **Connectors**. On the **Drawing** toolbar, click **AutoShapes**, followed by **Connectors**, and select one of the options. Then repeat the process outlined above (in this case, connecting points on the rectangles and diamonds will appear to guide the process).
- ▶ Using Text Boxes, additional information can be added to the workspace, such as Start and Finish dates for each item, and a title for the project (3). To create a Text Box, on the **Drawing** toolbar, click on the Text Box icon. Adjustments can be made using the same process outlined above for rectangles and diamonds.



5. Review

- ▶ Once completed, ask whether a logical sequence of events has been captured/is represented. It may be necessary to adjust the location and content of the various items.

6. Publish

- ▶ In order to retain the formatting specifications set in PowerPoint, it is best to share the diagram as a PowerPoint file. If there is a need to paste the diagram into a MS Word document, one useful tool involves the Window's **Print Screen** option. In PowerPoint, select the **Slide Show** option by selecting **Slide Show** on the **View** menu, or simply press **F5**. With the diagram on the full screen, press Alt + PrtSc, then open Microsoft Word and paste the diagram in the desired location.
- ▶ [note to self: A nice feature of Visio is that copying the contents into Word maintains the formatting specifications. With PowerPoint, the diagram usually requires additional formatting in Word (unless you use the print screen option)].

Glossary

The following terms are commonly used in MS Project.

Outline	A hierarchical structure for a project that shows how some tasks fit within broader groupings. In Project, subtasks are indented under summary tasks. The Outline structure helps to organise tasks into summary tasks and subtasks.
Summary task	A task that is made up of subtasks and summarises those subtasks. Use outlining to create summary tasks. Project automatically determines summary task information [such as duration and cost] by using information from the subtasks.
Indenting	Moving a task to a lower outline level [to the right] in the Task Name field. When you indent a task, it becomes a subtask of the nearest preceding task at a higher outline level.
Outdenting	Moving a task to a higher outline level [to the left] in the Task Name field.
Duration	The total span of active working time that is required to complete a task. This is generally the amount of working time from the start to finish of a task, as defined by the project and resource calendar.
Elapsed duration	The amount of time that a task will take to finish, based on a 24-hour day and a 7-day week, including holidays and other nonworking days. For example: emin = elapsed minute, ehr = elapsed hour, eday = elapsed day, ewk = elapsed week.) instead. This method schedules a task's duration across both working and nonworking time. For example, if you enter an elapsed duration for the task "Allow for concrete to cure," which is expected to take 48 hours, the task can start on Friday and be completed by Monday, even if Saturday and Sunday are nonworking time.
Estimated duration	A duration for which you have only enough information to determine a tentative value. So that its status is clearly visible, an estimated duration is clearly marked by a question mark immediately following the duration unit.
Linking	In a project, establishing a dependency between tasks. Linking tasks defines a dependency between their start and finish dates. In OLE, establishing a connection between programs so that data in one document is updated when it changes in another.

Task dependencies A relationship between two linked tasks; linked by a dependency between their finish and start dates. There are four kinds of task dependencies: Finish-to-start[FS], Start-to-start [SS], Finish-to-finish [FF], and Start-to-finish [SF].

Milestone A reference point marking a major event in a project and used to monitor the project's progress. Any task with zero duration is automatically displayed as a milestone; you can also mark any other task of any duration as a milestone.



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 - b. Environmental and Natural Resource Management Training Programmes;
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