

EASTWOOD HARRIS PTY LTD.

Welcome to the
Eastwood Harris Pty Ltd
MICROSOFT® PROJECT 2010 AND
PMBOK® GUIDE FOURTH EDITION
 training course
 presented by

Paul E Harris

PMI REP No 3001 – Course Number TBA

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Administration

- Evacuation
- Timings, meals and facilities
- Mobile phones and emails
- Introductions
 - Your name
 - Your position or job
 - Experience in scheduling software
 - What you expect from the course
- Course attendance sheet.

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Module 1 – Introduction

Topics:

- Purpose of the course
- Required Background Knowledge
- Purpose of Planning
- Definition of Planning and Control
- *PMBOK® Guide* Process Groups and Knowledge Areas
- Project Planning
- Levels of Planning
- Monitoring and Controlling a Project
- Project Planning Metrics
- Planning Cycle
- *PMBOK® Guide* Processes and Microsoft Project

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Course Agenda

Day 1 Modules

- 1 Introduction
- 2 Creating a Project Schedule
- 3 Navigating and Setting the Options
- 4 Creating Projects and Templates
- 5 Defining Calendars
- 6 Adding Tasks
- 7 Organizing Tasks Using Outlining
- 8 Formatting the Display
- 9 Adding Task Dependencies
- 10 Network Diagram View
- 11 Constraints.

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Course Agenda

Day 2 Modules

- 12 Filters
- 13 Tables and grouping Tasks
- 14 Views, Details
- 15 Printing and Reports
- 16 Tracking Progress
- 17 Creating Resources and Costs
- 18 Assigning Resources and Costs to Tasks
- 19 Resource Optimization
- 20 Updating Projects with Resources.

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Purpose of the course

- Provide a method for planning, scheduling and controlling projects using Microsoft Project in an environment utilizing the *PMBOK® Guide* Fourth Edition processes,
- Up to an intermediate level.

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Controlling a Project

Controlling a project:

- Monitor the progress of products
- Compare the progress with the plan
- Review options
- Forecast problems as early as possible enabling corrective action to be taken as early as possible
- Record historical data for use in assisting in planning future projects
- Providing data required for preparing extension of time claims and for litigation

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Project Planning Metrics

- The components that are usually measured and controlled using planning and scheduling software:
 - Scope
 - Time
 - Effort (resources)
 - Cost and
 - Project Constraints.

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Planning Cycle

- The planning cycle is an integral part of managing a project. A software package such as Microsoft Project makes this task much easier for larger and more complex projects.

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PMBOK® Guide Processes and Microsoft Project

- It is possible to use Microsoft Project in almost all the *PMBOK® Guide* Processes,
- Even if it is just to schedule when the work is planned to be executed and by whom.
- The table on page 1-10 explains some practical ways to use Microsoft Project in many of the processes beyond scheduling and assigning resources.

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Module 2 – Creating a Project Plan

Topics:

- Understanding Planning and Scheduling Software
- Understanding Your Project
- Level 1 – Planning without Resources
- Level 2 – Tracking Progress without Resources
- Level 3 – Planning with Resources
- Level 4 – Tracking Progress of a Resourced Schedule.

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Four modes or levels

- There are four levels in which planning and scheduling software may be used.

	Planning	Controlling
Without Resources	LEVEL 1 Planning without Resources	LEVEL 2 Tracking progress without Resources
With Resources	LEVEL 3 Planning with Resources	LEVEL 4 Tracking progress with Resources

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Critical Path(s)

- The **Critical Path** is the shortest duration that a project may be completed in and a delay to any activity will delay the end date of the project, shown in red below:

Task Name	Dur	Start	Finish	Total Slack	Free Slack
1 Start Milestone	0d	1 Jun	1 Jun	0d	0d
2 Activity	5d	1 Jun	5 Jun	0d	0d
3 Activity	5d	8 Jun	12 Jun	0d	0d
4 Activity	5d	15 Jun	19 Jun	0d	0d
5 Activity	2d	1 Jun	2 Jun	11d	3d
6 Activity	2d	8 Jun	9 Jun	0d	0d
7 Finish Milestone	0d	19 Jun	19 Jun	0d	0d

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Total Float

- The **Total Float** is the amount of time an activity may be delayed without delaying the end of a project.
 - An activity may delay another activity.
 - Displayed in a column and the thin black bar below and may be in the negative.

Task Name	Dur	Start	Finish	Total Slack	Free Slack
1 Start Milestone	0d	1 Jun	1 Jun	0d	0d
2 Activity	5d	1 Jun	5 Jun	0d	0d
3 Activity	5d	8 Jun	12 Jun	0d	0d
4 Activity	5d	15 Jun	19 Jun	0d	0d
5 Activity	2d	1 Jun	2 Jun	11d	3d
6 Activity	2d	8 Jun	9 Jun	0d	0d
7 Finish Milestone	0d	19 Jun	19 Jun	0d	0d

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Free Float

- The **Free Float** is the amount of time an activity may be delayed without delaying another activity.
 - Displayed in a column or bar.
 - Is never in the negative.

Task Name	Dur	Start	Finish	Total Slack	Free Slack
1 Start Milestone	0d	1 Jun	1 Jun	0d	0d
2 Activity	5d	1 Jun	5 Jun	0d	0d
3 Activity	5d	8 Jun	12 Jun	0d	0d
4 Activity	5d	15 Jun	19 Jun	0d	0d
5 Activity	2d	1 Jun	2 Jun	11d	3d
6 Activity	2d	8 Jun	9 Jun	0d	0d
7 Finish Milestone	0d	19 Jun	19 Jun	0d	0d

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Constraints

- To correctly model the impact of events outside the logical sequence, you may use constraints. A constraint would be imposed to specific dates such as:
 - The availability of a facility to allow work to commence,
 - The predetermined time a project must be complete by,
- Constraints should be cross-referenced to the supporting documentation such as contract documentation Milestone Dates.

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Constraints Types

There are two types of constraints:

- Project Constraints** which includes the **Project Start Date** or **Project Finish Date** only in Microsoft Project and
- Task Constraints**: the two most common are **Start On or After** (Early Start) and **Finish On or Before** (Late Finish).

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Task Early Start Constraint

- A task will no longer start on the Data Date When a **Start No Earlier Than** constraint is assigned
- This is more commonly known as an **Early Start** constraint.

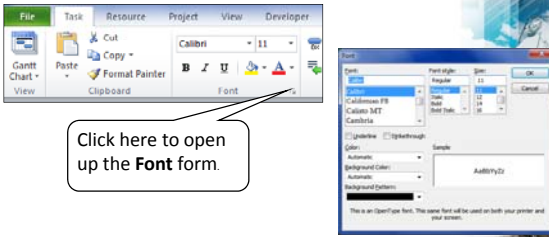
Task Name	Dur	Start	Finish	Total Slack	Free Slack
1 Start Milestone	0d	7 Jun	7 Jun	0d	0d
2 Activity	5d	7 Jun	12 Jun	0d	0d
3 Activity	5d	15 Jun	19 Jun	0d	0d
4 Activity C	5d	22 Jun	26 Jun	0d	0d
5 Activity D	2d	8 Jun	9 Jun	11d	3d
6 Activity E	2d	15 Jun	16 Jun	8d	8d
7 Finish Milestone	0d	29 Jun	29 Jun	0d	0d

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Forms Available from the Ribbon Groups

- Some Ribbon groups have a little arrow in the bottom right-hand corner of the Group box. Clicking on the arrow will open up a form:




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Right-clicking with the Mouse

- The right-click will normally display a menu,
- The right-click menu is context sensitive and is often different depending on the displayed View and Active Pane
- Try right clicking on the following:
 - A column header
 - A row number
 - A single cell
 - In the Gantt chart area.




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Finding the Task Bars in the Gantt Chart

When there are no bars displayed, to find a task bar:

- Select a task that you wish to find the corresponding bar,
- Select the **Task, Editing** group, **Scroll to Task** button,
- This will move the Gantt Chart Timescale to display the task bar.

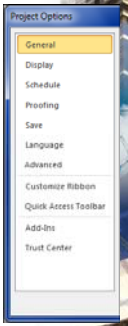


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Setting up the Options

- Microsoft project 2010 Options are set using the command **File, Options**,
- The default options make the software difficult to use as they are set to suit advanced scheduling,
- The basic parameters of the software must be configured so it will operate the way you desire,
- In order for the software to operate and/or calculate the way you want, some of the defaults must be turned on, or off, or changed,
- These will be set in the first workshop to make the software simpler to use.




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Mouse Pointers

- There are a number of mouse pointers and the table in para 3.9 will outline the important ones,
- The instructor will introduce these throughout the course.




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Workshop 1 – Navigation and Setting Your Project Options

In this workshop you will:

- Practice navigating around the screen,
- Set the options to allow durations to be entered in days,
- Ensure that a useful date format is displayed and
- Ensure other options are set so the software operates in a simpler mode than the standard defaults.

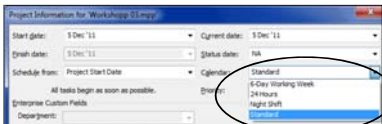


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Assigning a Calendar to a Project

- In all versions of Microsoft Project a new blank project is assigned the **Standard** calendar as the **Project Calendar** when the project file is created. The **Project Calendar** is changed using the **Project Information** form by:
 - Selecting **Project, Properties** group, **Project Information**, and
 - Selecting the alternative calendar from the **Calendar:** drop-down box:



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Calendar Calculation

- The finish date (and time) of an task is calculated from the start date (and time) plus the duration over the calendar assigned to the task,
- Therefore, a five-day duration task that starts at the start of the workday on a Wednesday, and is associated with a five-day workweek calendar (with Saturday and Sunday as non-work days) will finish at the end of the workday on the following Tuesday:

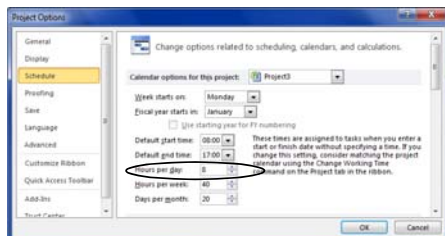
Duration	21 August					28 August						
	M	T	W	T	F	S	S	M	T	W	T	F
5 days												

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Calculation of Duration in Days

- Microsoft Project effectively calculates in hours and the value of the duration in days is calculated using the parameter entered in the **Hours per day:** field in the **File, Options, Schedule** tab:



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Calculation of Duration in Days

- The picture below shows:
 - Task 1 has the correct duration in days,
 - Task 2 shows a duration that is clearly misleading,
 - Task 4 and 5 display the duration in hours and are not misleading when the calendar column is also displayed,

Task	Calendar	Duration	Start	Finish	Mon 1	Tue 2	Wed 3	Thu 4	Fri 5
1	8 Hours per Day	5 days	Mon 8:00 AM	Fri 5:00 PM					
2	24 Hours per Day	5 days	Mon 8:00 AM	Wed 12:00 AM					
3									
4	8 Hours per Day	40 hrs	Mon 8:00 AM	Fri 5:00 PM					
5	24 Hours per Day	40 hrs	Mon 8:00 AM	Wed 12:00 AM					

- Microsoft Project works best if all calendars have the same number of hours per day.
- Ensure you understand this subject completely before changing the number of hours per day in any calendar.

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Effect on 2007 Calendars when Saving to 2000 – 2003

- When a project file is saved from Microsoft Project 2010 or 2007 format to 2000 – 2003 format all the calendar notes are lost and each repeating nonwork period becomes an individual nonwork period without the note,
- Before saving to 2000 – 2003 format:

Name	Start	Finish
1 New Years Day 2011	30/12/2011	30/12/2011
2 Easter 2011	25/03/2011	25/03/2011
3 Christmas & Boxing Day 2011	24/12/2011	27/12/2011
4 New Years Day 2012	29/12/2011	29/12/2011
5 Easter 2012	14/04/2012	14/04/2012
6 Christmas	25/12/2012	25/12/2012
7 Boxing Day	26/12/2012	26/12/2012

- After saving to 2000 – 2003 format:

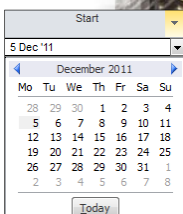
Name	Start	Finish
1 Unnamed	30/12/2011	30/12/2011
2 Unnamed	25/03/2011	25/03/2011
3 Unnamed	24/12/2011	27/12/2011
4 Unnamed	29/12/2011	29/12/2011
5 Unnamed	14/04/2012	14/04/2012
6 Unnamed	25/12/2012	25/12/2012
7 Unnamed	26/12/2012	26/12/2012
8 Unnamed	25/12/2013	25/12/2013

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Selecting Dates

- With the introduction of Microsoft Project 2007 there was a slight loss of functionality in selecting dates by the removal of the drop-down box that allowed the selection of months and the ability to scroll by year.
- A calendar form is displayed by clicking on a date cell with the mouse pointer:
 - The month may be scrolled forward or backward by clicking on the blue arrows,
 - A date is selected by clicking on it, and
 - When a date is selected a constraint will be set, without warning.

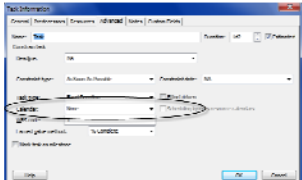


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Assigning Calendars to Tasks

- Tasks often require a different calendar from the **Project Calendar** and Microsoft Project allows each task to be assigned a unique calendar.
- A Task Calendar may be assigned by:
 - Using the **Task Information** form, **Advanced** tab, or
 - Displaying the **Task Calendar** column.



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Workshop 4 - Adding Tasks

- We will add the tasks for this project and then add the WBS in the next workshop.

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Module 7 – Organising tasks Using Outlining

Topics:

- Creating an Outline
- Promoting and Demoting Tasks
- Summary Task Duration Calculation
- Summarizing Tasks
- Project Summary Task
- Workshop 5 - Entering Summary Tasks.

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Organising tasks Using Outlining

- Outlining is used to summarize and group tasks under a hierarchy of **Parent** or **Summary Tasks**,
- These headings are normally based on your project **Work Breakdown Structure (WBS)**, **Control Accounts** or **Planning Packages**. The development of the **WBS** is covered in *PMBOK® Guide* Knowledge Area **Project Scope Management** and the development of the **WBS** is covered in detail in section 5.5 **Create WBS**.
- They are used to present different views of your project during planning, scheduling and updating,

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Creating an Outline, Promoting and Demoting Tasks

- Microsoft Project 2010 has a new function titled **Insert Summary Task**,
- The instructor will demonstrate:
 - The Insert Summary Task** function and
 - The traditional way of creating summary tasks by promoting and demoting tasks.

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Summary Task Duration Calculation

- The summary task duration is calculated from the Start to the Finish over the calendar assigned to the task, thus changing the summary task calendar will change the displayed duration:

Task Name	Duration	Task Calendar	26 Feb	5 Mar	12 Mar
Summary 1	14 days	7 Day/Week	T	W	T
Task	5 days	5 Day/Week	F	S	M
Task	5 days	5 Day/Week	T	W	T
Summary 2	10 days	5 Day/Week	F	S	M
Task	5 days	5 Day/Week	T	W	T
Task	5 days	5 Day/Week	F	S	M

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Format Colors

Colors are formatted in a number of forms and there is no single form for formatting all colors:

- **Nonworking time** colors in the Gantt Chart are formatted in the **Timescale** form,
- **Text** colors are formatted in the **Text Styles** and **Font** forms,
- **Gridline** colors are formatted in the **Gridlines** form,
- **Hyperlink** colors are formatted under **File, Options, Advanced, Display options for this project**;
- **Timescale** colors are with the **File, Options, General** tab, **User Interface Options, Color scheme**: option.
- The **Logic Lines**, also known as **Dependencies, Relationships, or Links**, inherit their color from the predecessor's bar color in the Gantt Chart view and may be formatted in the Network Diagram view by selecting **Format, Format group, Layout**.

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Workshop 6 - Formatting the Bar Chart

- Management has received your draft report and requests some changes to the presentation.

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Module 9 – Adding Task Dependencies

Topics:

- Understanding Dependencies
- Understanding Lags and Leads
- Restrictions on Summary Task Dependencies
- Displaying the Dependencies on the Gantt Chart
- Scheduling the Project
- Workshop 7- Adding the Relationships.

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What is Network Logic

- The next phase of a schedule is to add logic to the tasks
- There are two types of logic:
 - Dependencies (Relationships or Logic or Links between tasks), and
 - Imposed Constraints to task start or finish dates. These are covered in the Constraints chapter,
- Microsoft Project's Help file and other text uses the terms "**Dependencies, Relationships and Links**" for Dependencies but does not use the term "**Logic.**"
- The *PMBOK® Guide* section **6.2 Sequence Activities** describes both **Precedence Diagramming Method (PDM)** and **Arrow Diagramming Method (ADM)**. Microsoft Project is a PDM software package.

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Understanding Dependencies

- Two other terms you must understand are:
 - **Predecessor**, a task that controls the start or finish of another immediate subsequent task.
 - **Successor**, a task whose start or finish depends on the start or finish of another immediately preceding task.
- There are four types of dependencies available in Microsoft Project:
 - **Finish-to-Start (FS)** (also known as conventional)
 - **Start-to-Start (SS)**
 - **Start-to-Finish (SF)**
 - **Finish-to-Finish (FF)**.

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Dependency Types

The **FS** (or conventional) dependency looks like this:

While the **SS** dependency is like this:

The **FF** dependency looks like:

The **SF** dependency would be:

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Formatting the Task Boxes and Formatting Individual Boxes

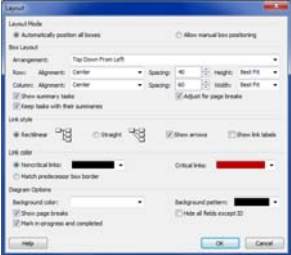
- Task Boxes may be formatted from the **Box Styles** form, which is displayed by:
 - Selecting **Format, Format** group, **Box Styles**:
- Once highlighted, a **Task Box** may be formatted differently from all the others by:
 - Selecting **Format, Format** group, **Box** to open the **Format Box** form, or
 - Double-clicking on the outside edge of a box.

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Formatting the Display and Relationship Lines

- Most formatting, except formatting the boxes, is set within the **Layout** form. Select **Format, Format** group, **Layout** to open the **Layout** form:



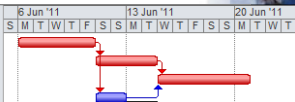
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Early Date, Late Date and Float/Slack Calculations

- To help understand the calculation of late and early dates, float and Critical Path, we will now manually work through an example,
- The boxes below represent tasks working 7 day per week,
- The forward pass calculates the Early Dates,
- The backward pass calculates the Late Dates,
- The Total Float is the Late Date minus the Early Date:

Duration	Start	Finish	Total Float
5 days	6 Jun '11	10 Jun '11	0 days
4 days	11 Jun '11	14 Jun '11	0 days
6 days	15 Jun '11	20 Jun '11	0 days
2 days	11 Jun '11	12 Jun '11	2 days



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Workshop 8 – Schedule Calculations

- We want to look at the Network Diagram and practice calculating Early and Late dates with a simple manual exercise.

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Module 11 – Constraints

Topics:

- Understanding Constraints
- Assigning Constraints
- Deadline Date
- Task Notes
- Workshop 9 – Constraints.

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Task Constraint Types

The *PMBOK® Guide* discusses project constraints in section **5.2.3 Project Constraints** from a broader perspective and includes contractual provisions and budget under constraints.

Constraints are used to impose logic on tasks that may not be realistically scheduled with logic links.

This module will deal with the following constraints in detail:

- Start No Earlier Than** more commonly called an **Early Start constraint** and affects the tasks Early Start date,
- Finish No Later Than** more commonly called an **Late Finish constraint** and affects the tasks Late Start date,

These are the minimum number of constraints that are required to effectively schedule a project.

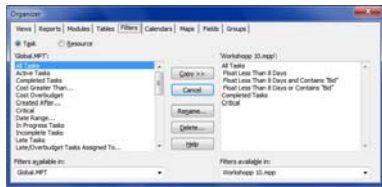
There are many other types that may be used:

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Copy a filter to and from another open project

- Click on **Organizer** button in the **More Filters** form to open the **Organizer** form where you may copy a filter to and from another open project, rename or delete a filter:




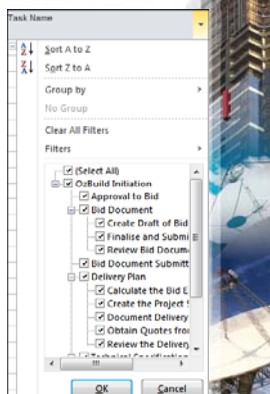
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AutoFilters

To create an **AutoFilter**:

- Turn on the **AutoFilter** function by selecting **View**, **Data** group, **Filter**: drop-down box, **Display AutoFilter**,
- The column headers will display the  button in the column header,
- Click on this button in one of the columns to display a drop-down box,
- The instructor will explain the options of this drop down box.



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Workshop 10 - Filters

- Management has asked for some reports to suit their unique requirements.




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Module 13 –Tables and Grouping Tasks

Topics:

- Understanding Project Breakdown Structures
- Tables
- Custom Fields
- Grouping
- Workshop 11 - Reorganizing the Schedule.




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Understanding Project Breakdown Structures

- A Project Breakdown Structure often represents a hierarchical breakdown of a project into logical functional elements,
- The following are examples of such structures:
 - WBS - Work Breakdown Structure,
 - PBS - Product Breakdown Structure,
 - OBS - Organization Breakdown Structure,
 - CBS - Contract Breakdown Structure,
 - SBS - System Breakdown Structure,
- This module will look at functions available in Microsoft Project to represent these structures in your schedule.




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Tables

- A table selects and formats the columns of data to be displayed in a View,
- The formatting of tables is covered in the **Formatting the Display** module,
- A table may be applied to one or more Views which display data in tables,
- There are two types of tables:
 - Task** tables that are applied to **Task Views** and
 - Resource** tables that are applied to **Resource Views**.
- A View is permanently changed when it is assigned a different Table,
- The instructor will demonstrate how to create a new Table and edit an existing Table.



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Printing and Reports

- There are two tools available to output your schedule to a printer:
 - The **Printing** function prints the data displayed in the current Active View,
 - The **Reporting** function prints reports, which are independent of the current View. Microsoft Project supplies a number of predefined reports that may be tailored to suit your own requirements.

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Printing

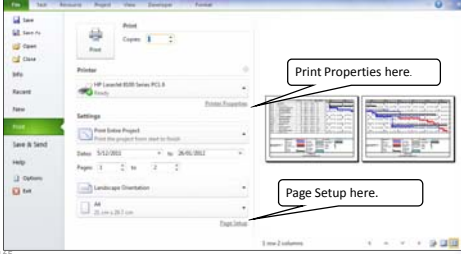
- Only the active View may be printed when a screen is split,
- The active view normally has a dark highlighted bar down the left-hand side of the screen,
- Views created from **Forms** (for example, the Task Form) may not be printed, so the printing options will be shown in gray when the forms are active,
- Print settings are applied to the individual Views and the settings are saved with the currently displayed View,
- Microsoft Project sometimes makes it difficult to print a Gantt Chart on one page, adjusting the timescale so the whole project Gantt Chart fits into half the screen before selecting **Print Preview** makes this process simpler.

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File, Print Form

- To preview the printout:
 - Select **File, Print**, or
 - Click on the **Quick Access Toolbar Print Preview** button or the **Ribbon**.




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Page Setup

- Page Setup is unique to each View. To open the **Page Setup** form:
 - Click the **Page Setup** link at the bottom of the **Settings** section, or
 - Place a **Page Setup** button on the **Quick Access Toolbar** or **Ribbon**,
- The instructor will demonstrate the tab functions of this form.



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Manual Page Breaks

- Manual page breaks are inserted by:
 - Placing the **Manual Page Break** button on the **Ribbon** or **Quick Access Toolbar**,
 - Highlighting the row above where a page break is required. Then click on the **Manual Page Break** button,
 - A dotted line will indicate the location of the manual page break,
- To remove a manual page break, highlight the row above where there is a page break and the **Manual Page Break** button,
- Note:** Manual page breaks did not print on the author's install of Microsoft Project 2010, this issue may be resolved at a later time with a software upgrade.

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Reports

- The **Reports** are found at the **Project, Reports** group. There are two types of reports:
 - Visual** which were introduced with Microsoft Project 2007 and
 - Reports** which have been available for a long time,
- The instructor will demonstrate these two functions.

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Important Points – Un-Started Tasks

- The Un-started tasks should have durations and logic adjusted as required,

Act. Start	Act. Finish	% Comp.	Act. Dur.	Rem. Dur.
8 Feb '11	22 Feb '11	100%	11d	0d
18 Feb '11	NA	46%	6d	7d
NA	NA	0%	0d	5d

- New Un-started tasks without predecessors will stay on the project start date and ignore the Status date unless a constraint is assigned, say by dragging the task.

Act. Start	Act. Finish	% Comp.	Act. Dur.	Rem. Dur.
8 Feb '11	22 Feb '11	100%	11d	0d
18 Feb '11	NA	46%	6d	7d
NA	NA	0%	0d	5d

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Split In-Progress Pasks

- There are two options in the **File, Options, Schedule** tab for calculating the finish date of the successor when the successor task starts before the predecessor task is finished. This option will operate when:
 - The Project Option **Split in-progress tasks** is checked,
 - There is an **Actual Start**, and
 - A **% Complete** between 1% and 99% is assigned to the successor task,
- Before updating,

Act. Start	Act. Finish	% Comp.
1	NA	NA
2	NA	0%
- Split in-progress tasks unchecked**,

Act. Start	Act. Finish	% Comp.
1	4 Nov	50%
2	9 Nov	10%
- Split in-progress tasks checked**

Act. Start	Act. Finish	% Comp.
1	4 Nov	50%
2	9 Nov	10%

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Simple Procedure for Updating a Schedule

- This process is outlined in the book and is for people who require just one simple method of updating a schedule utilizing the **Update Project** function then the following process should be considered,
- It may not suit all situations especially when a project is way off plan,
- It is ideally suited to a situation when the plan is being closely followed and only minor adjustments are required to the actual dates and durations.

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Procedure for Detailed Updating

- This procedure is suited to people who wish to update a schedule properly and make sure the Actual dates and durations are correct.
- It has small but important differences to the previous process.

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Comparing Progress with Baseline

- To display the **Baseline Bar** in the **Gantt Chart** you may use any of the functions covered in the **FORMATTING THE DISPLAY** chapter,
 - The **Format, Bar Styles** group, **Baseline** button, or
 - The **Format, Bar Styles** group, **Format, Bar Styles** function, or
 - You may use the **Gantt Chart Wizard**,
- The Start and Finish Date variances are available by displaying the **Start Variance** and **Finish Variance** columns.

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In-Progress Schedule Check List

- This check list may be used to check an in-progress schedule before it is published.

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Fixed Costs

- Fixed costs are a function where you may assign costs to a task without creating resources,
- It is a useful function if you require a cash flow only but not so useful with a progressed schedule as actual costs are linked to the % Complete,
 - A fixed cost is assigned using the **Fixed Cost** column.
- The fixed cost may be accrued at the **Start, End** or **Prorated** over the duration of the task,
- Fixed Costs are added to resource costs and the total is shown in the **Cost** column.

Task Name	Fixed Cost	Fixed Cost Accrual	Resource Initials	Cost
Summary	\$0.00	Prorated		\$8,000.00
\$200.00 Fixed cost accrued at Start	\$200.00	Start		\$200.00
\$200.00 Fixed cost Prorated	\$200.00	Prorated		\$200.00
\$200.00 Fixed cost accrued at End	\$200.00	End		\$200.00
Activity With Resources Only	\$0.00	Prorated	PEH	\$4,000.00
Activity With Costs & Resources	\$200.00	Prorated	PEH	\$4,200.00

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Assigning Work without a Resource

- Display the **Work** column and type in the hours to assign work to a task which does not have resources,
- A resource assigned to a task with work will inherit the work value assigned to the task.

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Resource Definitions

- When a resource is assigned to a task, it has three principal components:
 - Quantity**, in terms of **Work** or **Material** required to complete the task,
 - Units**, which represents the number of people working on a task or material quantity, often called **Units per Time Period** and
 - Cost**, calculated from the **Standard Rate, Overtime Rate** and **Cost per Use**,
- The **Units** (per Time Period) of a **Work** resource may be entered against a task and the **Work** (Quantity) will be calculated, or
- The **Work** entered and the **Units** will be calculated,
- The resource cost is calculated from the resource **Work** times the resource **Rate**.

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Task Type

- Duration x Units**(per Time Period), = **Work**
- There are three options for the **Default task type**: which decide how this relationship operates. They are:
 - Fixed Duration** - The **Duration** stays constant when either the **Units** (per Time Period) or **Work** is changed,
 - Fixed Units** - The **Units** (per Time Period) stays constant when either the **Duration** or **Work** is changed,
 - Fixed Work** - The **Work** stays constant if either **Duration** or **Units** (per Time Period) is changed,
- Each task may have the **Task Type** changed at any time.

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Task Type and Effort-Driven

- Once a resource has been assigned to a task, the task **Effort** is the combined number of hours of all resources assigned to a task,
- The **Effort-driven** option decides how the effort is calculated when a resource is added or when a resource is removed to a **Fixed Units** or **Fixed Duration** task.
- There are two options:
 - Effort-driven** - When a resource is added or removed from a task, the **Task Effort** assigned to a task remains constant,
 - Non Effort-driven** - When a resource is added to or removed from a task, the **Resource Effort** or **Work** of other resources remains constant. Adding or deleting resources increases or decreases the total task effort.

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Resource Calendars

- The simplest method of scheduling is when all tasks and resources share the same calendar,
- This is often not desirable and Microsoft Project allows three levels of calendars, project, task and resource,
- The interaction among these calendars when resources are assigned is difficult to understand,
- The order that resources are assigned to tasks and assignment of task calendars may result in different calculated task durations and work,
- It is recommended that you practice with a small schedule with one or two tasks and resources until you are confident on how the software is calculating.

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Team Planner View

- This view allows a **Production Planning** type view where tasks may be assigned to resources as opposed to **Project Planning** where resources are assigned to tasks.
- The picture below clearly shows where the Project Manager is overloaded as he/she is assigned to two tasks at the same time and then another resource is assigned to the task:

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Printing Resource Profiles and Tables

- To **Print** a **Task Usage**, **Resource Usage**, or **Resource Graph**, make the appropriate **Pane** active and use the print functions as described in the **PRINTING AND REPORTS** chapter.

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Creating Resource Graphs, Crosstab Tables, S-Curves in a Spreadsheet

- Resource Graphs, Crosstab Tables, S-Curves and may be created for displaying:
 - Planning information, such as the number of people required or a project cash flow,
 - Progress in terms of hours spent or cost to date, and
 - Performance, for example comparing planned and actual hours or costs to date,
- The information for creating these is in the book but will not be covered as part of this course,
- S-Curves are often used to display data created using **Earned Value Management (EVM)** which is outlined in the *PMBOK® Guide* section **7.3 Control Costs**.

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Resource Optimization

- There are many techniques to optimize resource requirements caused by:
 - Overloading or peaks in resource requirements, or
 - To resolve uneconomical use of resources due intermittent resource use resulting in additional costs required to demobilize and remobilize crews,
- These techniques include:
 - Turning off Automatic Calculation and Dragging Tasks
 - Constraining Tasks
 - Sequencing Logic
 - Leveling Function.

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Resource Leveling function

- Microsoft Project has a basic resource leveling function that is set up through the **Resource Leveling** form by selecting **Resource**, **Level** group, **Leveling** Options.

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Workshop 17 – Resource Graphs and Tables

- We will create a copy of our current project file for this workshop,
- Then use Usage Views and Graphs to isolate the resources that are over allocated and
- Level the schedule using the Microsoft Project Leveling function.

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Updating Resources

- There are many permutations available in the **File, Options** form for calculating resource data,
- Due to the number of resource options and numerous forms available in Microsoft Project, it is not feasible to document or teach all the combinations available,
- One or more resources may be applied to a task and you may want to enter both the **Actual Work** and the **Remaining Work** independently,
 - In this situation you will need to unlink **% Complete** and **Actual Work** with the **Updating task status updates resource status** option in the **File, Options, Schedule** tab,
 - Now the **% Work** field will be linked to the **Work, Actual Work** and **Remaining Work** fields and will now operate independently of the **% Complete** field.

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Updating Resources


- You may want to enter both the **Actual Work** and **Actual Costs** separately,
- This process is very time consuming and requires significant organizational commitment to succeed,
- In this situation you will need to:
 - Unlink **% Complete** and **Actual Work** with the **Updating task status updates resource status** option in the **File, Options, Schedule** tab, and
 - Unlink the **Actual Work** and **Actual Costs** by disabling the **Actual costs are always calculated by Project** option in the **File, Options, Schedule** tab.

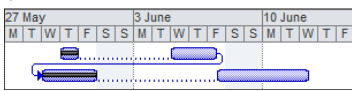
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Splitting Tasks

When the **Split in-progress tasks** option is enabled, a task may be **Split** by:

- Dragging the incomplete portion of a task in the bar chart, or
- Clicking on the  button and then moving your cursor over the point on the task bar where you want a split and dragging the task, or
- Using the **Project, Status** group, **Update Project, Reschedule uncompleted work to start after:** function, or
- Commencing a task before its predecessor finishes,
- In the picture below the upper task was split using the **Split** button and the lower task was split because it commenced before its predecessor.



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Summary Tasks and Earned Value

- Actual Costs** and **Work** may be summarized at any level in the same way as **Work** and **Costs**,
- The picture below is showing the **Earned Value** table. The costs have been summarized up to the Project Level:

Task Name	Planned Value - PV (BCWS)	Earned Value - EV (BCWP)	AC (ACWP)	SV	CV	EAC	BAC	VAC
1 OzBuild Initiation	7,440.00	7,900.00	8,040.00	468.00	-132.00	55,979.06	55,060.00	-919.06
2 Approval to Bid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 Technical Specificati	7,440.00	7,900.00	8,040.00	468.00	-132.00	20,130.50	19,900.00	330.50
4 Determine Installation	6,720.00	6,720.00	5,040.00	0.00	1,680.00	5,040.00	6,720.00	1,680.00
5 Create Technical Sp	720.00	1,180.00	3,000.00	468.00	1,812.00	21,717.17	0,600.00	13,117.17
6 Identify Supplier Cor	0.00	0.00	0.00	0.00	0.00	1,120.00	1,120.00	0.00
7 Validate Technical S	0.00	0.00	0.00	0.00	0.00	3,360.00	3,360.00	0.00
8 Delivery Plan	0.00	0.00	0.00	0.00	0.00	21,520.00	21,520.00	0.00
14 Bid Document	0.00	0.00	0.00	0.00	0.00	13,740.00	13,740.00	0.00
18 Bid Document Submitt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Summary Tasks and Earned Value

- The method that Microsoft Project uses to calculate the Earned Value data is documented in the Help file and should be read carefully, as different versions of Microsoft calculate these fields differently,
- Should different Earned Value calculations be required then Custom Data Fields should be considered as an alternative.

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Workshop 18 - Updating a Resourced Schedule

- We need to update the tasks and resources,
- The instructor will demonstrate this workshop first.

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