Project Management 1

DM30 35

Study Section

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March 2006

Acknowledgements

The author would like to thank the Scottish Qualifications Authority, for inclusion of the National Unit Specification, General Information and Statement of Standards.

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How to Use this COLEG Study Section

What this COLEG Study Section is about

This single COLEG Study Section covers the contents of the Unit descriptor and has been designed to equip you with the knowledge and skills required to enable you to undertake and successfully complete assessments within the key areas involved in the management of projects using commercially available project management software. The Section has been designed using Microsoft Project 2003.

Aims of this COLEG Study Section

The Unit was designed to provide you with the knowledge and skills required to develop and manage a project plan using commercially available project management software. These skills will enable you to develop and implement a project plan, and to manage the key resources involved in the development of a project in terms of time, cost, and human and physical resources, as well as how to communicate information on the project both in report format and also integration with other applications tools.

The contents of this Study Section have been designed and prepared to assist you develop the expertise in applying the Knowledge and Skills required in order to achieve these Aims.

Although the Unit was written in generic terms enabling it to be completed using any commercially-available project management software tool, this Study Section has been developed using Microsoft Project 2003.

Objectives of this COLEG Study Section

By the end of this COLEG Study Section, you will be able to:

- Establish the Project environment
- Develop a Project Plan
- Manage Project Information
- Produce customised Project information

Approximate Study Time for this COLEG Study Section

The Unit has a notional SQA time allowance of 40 hours, to include an introduction to the Unit, teaching and Learning time (working through this Study Section), and also time for formative and summative assessment(s).

To help you plan your work, the following is offered as a guide. Please remember, these timing suggestions are for your guidance only and are based on an average learner. You may be able to work faster than this, or you may taker longer. If you have any concerns about your progress, then please do not hesitate to discuss this with your Tutor. You should note that these timings also include an allowance for the practical exercise at the end of each chapter.

Chapter	Suggested Time Required (Hours)
Introduction to Project Management	1
The Microsoft Project Interface	1
Setting the Project Environment	2
Creating Project Calendars	2
Developing the Project Schedule	3
Refining your Project Schedule	2
Managing Resources	2
Allocating Costs to Resources and Tasks	2
Dealing with Resource Overallocations	2
Making Use of Overtime	2
Formatting Views, Reports and Printing	2
Organising Project Information	2
Customising Tables, Views and Reports	2
Sharing Project Information	1

This makes a total of 26 hours of work to complete this Study Section, allowing you ample time to undertake the assessment(s).

Other Resources required for this COLEG Study Section

You will require access to a computer with Microsoft Project 2003 installed or a recent version.

You will also require copies of the following files. Your tutor will advise you where to locate these files and copy them onto your own personal file storage area. Before using them, you should check the File Properties dialogue box to ensure that you have both ***read and write*** access to the files.

The MS Project 2003 files:

overallocation.mpp
overtime.mpp
Short Film Project.mpp

The Word document:

Letter To Kevin.doc

Assessment Information for this Unit

How you will be assessed for this Unit

It is recommended that the Knowledge and Skills of this Unit be assessed holistically using a single project. Whether this is done using a single case study assessment or whether the case study is broken down into modular assessments for logistic reasons, is at the discretion of the centre. You will be assessed however, by a practical case study requiring you to develop and manage a project using project management software and to generate reports on the outcomes of the project and integrate the project information into other applications Sections.

This Study Section is divided up into chapters covering the Knowledge and Skills of the Unit and each of these chapters is supplemented with a further on-going case study project to re-enforce the knowledge and Skills learned in each chapter.

When and Where you will be Assessed for this Study Section

If the contents of the Unit are to be assessed by a single summative assessment, then this will take place after completion of this Study Section, otherwise if the Unit is to be assessed by a series of Summative assessments, then you be advised as to when and where you will be assessed by your tutor.

Opportunities for Re-assessment

If you do not achieve a pass in the summative assessment(s), you will be allowed one further re-sit attempt at the assessment.

Introduction to Project Management

Before starting to learn how to use project management software, it is important to be clear as to what project management is all about and the role which such software plays in helping you to manage projects more efficiently and more effectively. To those of you who are familiar with the world of Project Management, then please feel free to skip to the next chapter and start to learn how to use MS Project to help you to manage a project. If, however, you are new to managing projects, then start with this chapter which introduces you to a few points about the practice and world of Project Management. At the end of this chapter, even by the end of this Unit, you will not be an expert in managing projects, but you will certainly have a good grasp of the world, and the problems, of managing projects, as well as having acquired a wide range of the skills required by a Project Manager using project management software, to put you in a much better position to take part in, and play a positive and constructive role in, a project team.

Firstly what is a 'Project'?

Projects are different from other areas of work in that they are identified by having a few specific features, different from those of more conventional 'operational' processes.

Conventional processes tend to be of a repetitive nature. For example, in a manufacturing establishment, the processes will consist of the repetitive production of goods, such as television sets, cars, processed food, paints, etc; or in the case of the service industry, the production of services, such as hairdressing, hotel accommodation, clubs, bars and restaurants, and the many processes involved in both types of industries such as purchasing, sales, accounts, stock systems etc. The goals of such establishments are usually based around increasing sales figures over a period such as a year, or improving efficiency and effectiveness of a range of systems in an attempt to lower production costs in order to ward off competition, and improve profitability.

'Projects' on the other hand, are quite different in that instead of consisting of a 'repetitive' nature, they are usually unique one-off operations which usually have an agreed budget or cost attached to them and a specific starting point and a clearly defined finishing point. In effect, projects can be identified and defined by the following features:

- they have a specific and unique goal;
- they are usually one-off activities;
- they will have a defined starting date point and specific and required finishing date point;
- they will have a defined and clear budget to work within.

Examples of such unique projects include a new shopping mall, a bridge, a new motorway extension, designing the next generation of computers, planning the next national election, or even a project which you have to undertake towards the end of your course - something unique where you might define your own specific goal, and which also has defined starting and finishing times.

Certainly, you might say that each and every shopping mall in the UK is the same as the next one, which is largely true, but when the shopping mall in town X is completed, the entire project team will come to the end of their contract, in fact be effectively redundant, and will no doubt move onto wherever the next shopping mall is to be constructed and be re-hired with new contracts all over again. In other words, each shopping mall is a complete project work in its own right.

What is Project Management?

Having considered what a project is, you might be getting some idea as to how managing a project is different from managing conventional processes.

Managing conventional processes is certainly a lot easier than dealing with a unique project. Especially where the work involved is of a repetitive nature, the same people are usually and regularly involved, in the same environment, with same customers and the same suppliers, and also the same and regular goals. Please do not underestimate the work of management however. Any task which involves the managing and control of other humans is no easy task and not to be taken lightly.

Managers in projects however, have to consider not only the above issues and problems, but are also responsible for many other issues such as:

- hiring new teams of staff at the start of every project;
- organising these new teams with all the resources required into suitable groups and work patterns;
- sourcing and purchasing of all of the materials and resources required;
- getting the project started on schedule;
- managing the whole thing through to completion;
- making sure it finishes on time;
- making sure it is completed within the agreed budget.

This is no easy task. All management books and the media in general will frequently quote the instances of projects, such as motorways and bridges, going way beyond their target finish date to construct, as well as going way above the original agreed project cost. To add insult to injury when this happens, there are usually also ‘penalties’ incurred against the project team’s company for such delays and overspends. Now you can perhaps understand why good Project Managers are not only paid much more than conventional managers, but are worth their weight in gold!

Like the goals of a project, the goals of a Project Manager are to ensure that the project is completed on time and also within budget or costs! Easier said than done!

The Processes of Project Management

Using all of the skills referred to for both conventional management and project management, there are three main processes, or areas of responsibility, for project managers to consider. These are as follows:

1 Initiating and Planning the Project

2 Executing and Controlling the Project

3 Summarising and Communicating the Project Information

Each of these three processes would include the following tasks as a minimum:

1 Initiating and Planning the Project

- Planning and starting the project
- Identifying the project's milestones, deliverables and tasks
- Developing and refining the project schedule
- Identifying the skills, equipment and materials needed

2 Executing and Controlling the Project

- Hiring and creating a pool of resources (both human and physical)
- Assigning resources to the various tasks to execute the project
- Saving a baseline plan for comparison
- Tracking progress on the tasks
- Analysing project information and controlling accordingly

3 Summarising and Communicating the Project Information

- Generating reports from the project management software;
- Incorporating project information into other applications for wider use

These tasks will be covered by this Study Section as you learn how to use project management software to help you manage a project.

Using MS Project

Like most software applications, there are several products available to assist with the management of projects. One of the most widely used, however, is Microsoft Project 2003 and it is the application used throughout this COLEG Study Section. During the course of this COLEG Study Section, you will make use of a wide range of the facilities of MS Project 2003 to assist in the management of projects, similar to the list of processes and tasks listed previously. In fact, MS Project contains all of the tools you will need to assist you with the management of your project concerning stages and sub-tasks of the project, management of the project's resources and their usage and allocation, scheduling and timing of the tasks, determining the costs of the project, as well as a wide range of reporting facilities about the project information.

These topics will include:

At the Initiating and Planning stage:

- Setting the project environment
- Creating project stages, milestones and task lists
- Estimating task durations
- Linking tasks in the order of execution
- Setting and imposing any deadlines and constraints
- Setting up a pool of resources and assigning them to the tasks
- Establishing resource costs and task costs
- Managing the plan to achieve the targeted finish date within the budget cost

During the Execution and Controlling stage:

- Saving copies of the project plan
- Updating the task progress
- Comparing variances between planned and actual task information
- Reviewing planned, actual and scheduled costs
- Adjusting the plan to respond to changes in scope, finish date, and the budget

And finally at the Summarising and Communicating stage:

- Reporting on progress, costs, resource utilisation and much more
- Incorporating project information into a range of different documents

Keys to Successful Project Management

Like all jobs and projects to be done, there are a few guidelines which will help you perform to the best of your ability. In the case of managing projects, these might include:

1 Start by determining the specific gaols and objectives of your project

2 Be aware of the scope of the project - for example exactly what is required of the outcome or deliverables of the project

3 Make sure you know the deadlines and constraints imposed on the project

4 Know the budget - what are your financial limits?

5 Always find and use the best resources - both human and physical

6 Make sure you always enter accurate project information - don't just guess

7 Adjust your initial plan to make sure it meets requirements – such as the finish date!

8 Save, or capture, this plan and get started

9 Constantly monitor, or track progress

10 Based on this tracking, make sure you make any necessary adjustments as you go

11 Make sure you communicate all of this information to all stakeholders - absolutely critical for survival

12 And finally, and hopefully, arrive at a successful conclusion!

1

1 Identify at least three different projects which you know of and have taken place near where you stay.

(Note that this does not necessarily have to be computing projects. Most projects take place, out of sight, within large organisations such as government departments, the health boards, power companies, etc. Such projects often take place without the knowledge of most of us outside the organisation. Likewise, they will remain unknown unless you happen to read specialised journals such as 'Computer Weekly' in the case of computing, where a project may only be referred to where it represents a phenomenal technological step forward - or as more often the case, where the project is a complete failure with millions of pounds wasted).

2 Describe at least two features which set projects apart from conventional manufacturing processes and systems.

3 Name two major areas of responsibility affecting managers of projects as opposed to managers of conventional processes and systems.

4 List three key processes, or stages, involved in a project.

5 For each of these three processes, state at least 2 tasks which take place for each.

6 Without referring back to the notes, recall at least 5 of the keys listed to help with successful Project Management.

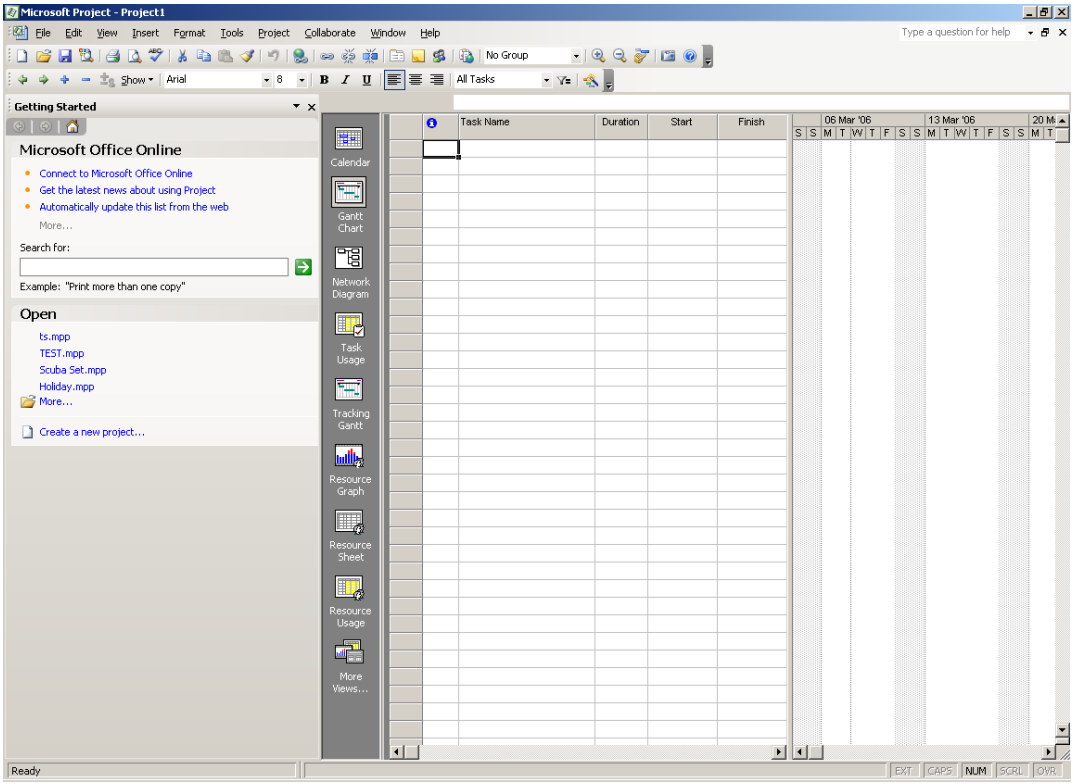
Once you have completed responses to these questions, you should check your responses with those suggested at the end of this Study Section.

The Microsoft Project Interface

If this is your first time using Microsoft Project, then please take a few moments to familiarise yourself with the screen layout of the application.

Firstly, open the application as instructed by your tutor.

Unless, it has been configured specifically during installation, you are likely to be presented with something similar to the following screen display.



For the most part, it is not much different from the other Microsoft applications, Word, Excel, etc. you may have used, as well as applications from other manufacturers, you might be familiar with. If you have used these before, you will recognize the typical layout.

At the top of your screen is the **Title Bar** which tells you the name of the application package, in this case, **Microsoft Project**, and once you have opened a project, the name of the project will also be displayed. Also on this Title Bar are the standard System, Minimise, Maximise and Close buttons. See the next page for what your screen display might look like.

Below the Title Bar is the **Menu Bar**, followed by the **Tool Bar**

The **Menu Bar** lists the menu options you would expect in any application such as File, Edit, View, Insert, Format, etc, along with a few extra menu options specifically oriented towards Microsoft Project, such as **Project** and **Collaborate**. You will learn what these options are for and how to use them later in this Study Section.

The **Standard Tool Bar** likewise lists a range of 'Hot keys' or tools offering the most commonly used menu options including New, Open, Save, Print, Preview, Spell Check, etc, etc, and again with a few extra options specifically oriented towards Microsoft Project.

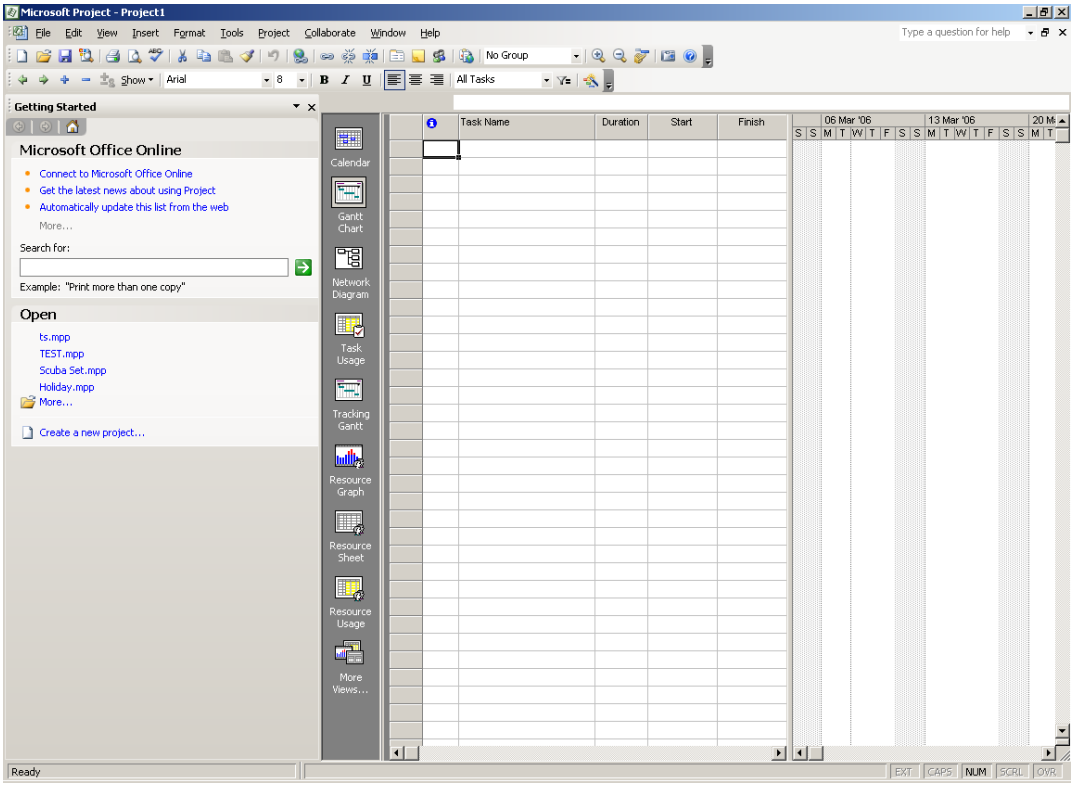
Slowly scroll the cursor or pointer over a few of these icons, pointing to each in turn, to identify what each means when the 'cue tip' appears explaining what each is. Try to locate the icons for linking and unlinking tasks, inserting a hyperlink (i.e. linking directly to a website on the Internet), and also splitting a task. You will use these later in these notes.

If any of them is not there, check with your tutor to see whether it should be on display or not. Also from the **View** menu, you can select **Toolbars** and see a range of other options icons which can be displayed or removed from this displayed list according to your personal requirements.

Finally, on my display above, there is the **Formatting Tool Bar**, which contains buttons to some of the most common formatting options such as font face, font size, paragraph justification, and filtering of data. Two other buttons you will use a lot are Outdent and Indent, used when establishing the organisational structure, or hierarchy, of tasks in a project. Again, move the pointer / cursor over the icons, and try to locate and identify each of them.

Now let's consider the main screen display where you will do all the work involved in a project.

When you start Microsoft Project, remember, you may be presented with the following screen.



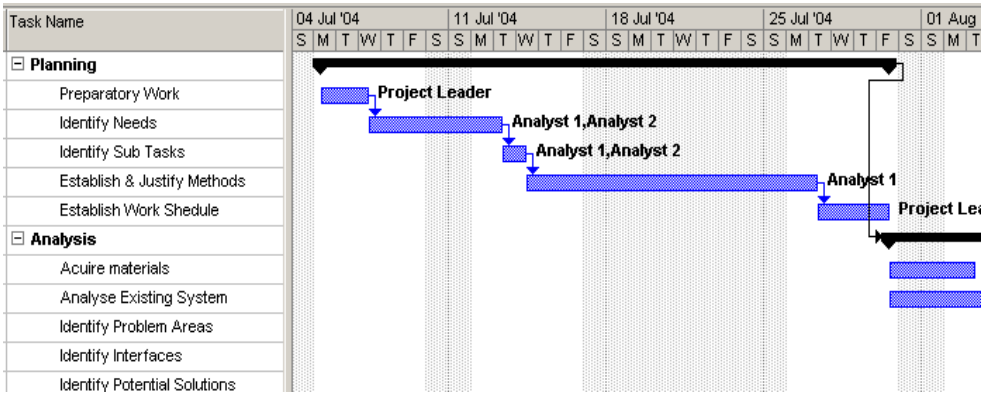
Looking at the part of the screen below the menu and tool bars just described, you may see four parts to the display as above, depending on how your application was configured when first installed. On my display, these are:

1. On the extreme left, you may see a '**Getting Started**' or tutorial guide showing you how to use Microsoft Project with tutorial support.

2. In the second, next, section, you may see a gray or blue vertical bar as shown above, known as the **View Bar**, which lists icon links to the most common views of project data which most project developers, including yourself throughout these notes, will use during a project. If this vertical **View Bar** is not on display, it can be toggled on and off by selecting from the Main Menu: **View -> View Bar**.

3. Next is the '**Table Entry**' area, looking like a data entry form, where you will enter all the detailed information about the project, such as the names of the individual tasks involved in the project, the duration of each task, plus a range of other information such as the order in which the tasks will be executed and also which resources will work on each of the tasks. You will see these as you work through these notes.

4. Finally, on the extreme right of the display is the **Gantt chart** area, where the application will be developed and displayed graphically in the form of a Gantt chart – the scheduled bars graphically representing the tasks in the sequence in which you order them. This depicts the same information you will enter into the 'Table Entry' section in the previous section of the display, but the information will be presented graphically which for most folk is more meaningful and easier to understand. You will be familiar with phrases such as – 'a picture can tell a thousand words'. Similarly with a printout of a big Gantt chart on the wall! See the following diagram which shows what a Gantt chart might look like:



The length of the bars indicates the time each task takes, and the linking arrows between the bars show the sequence of tasks – the order in which they are to be executed. You will also see along the top of this Gantt chart area a 'calendar', or '**Timescale**' which shows you when each task starts and finishes, as well as allowing you to estimate the amount of time each task takes. Unless your application has been pre-configured, the Timescale is usually displayed in gray.

Throughout these notes, you will only need the View Bar, the Table Entry, and the rightmost screen, the Gantt chart area. So if there is any display on the left of your screen, you should close it now by clicking on the small '**X**' icon in the top right corner of the display of each section or pane.

You are now ready to start creating and managing your project!

Setting the Project Environment

When you start any project, it is always a good idea to set the environment parameters for the project. This will include how and where you want to 'save' the project file, as well as how frequently you wish to save the file. This can be set automatically to ensure that you never lose much of your work in the case of a system crash. So please proceed as follows.

Setting the 'save' options and Auto Saving

It is always a good idea when starting a new project to specify right at the beginning where the documents and forms you will create should be stored, and also how frequently you wish MS Project to save your work automatically without prompting, to keep your data safe in case of system crashes. You can specify these preferences using '**Options**' on the '**Tools**' menu.

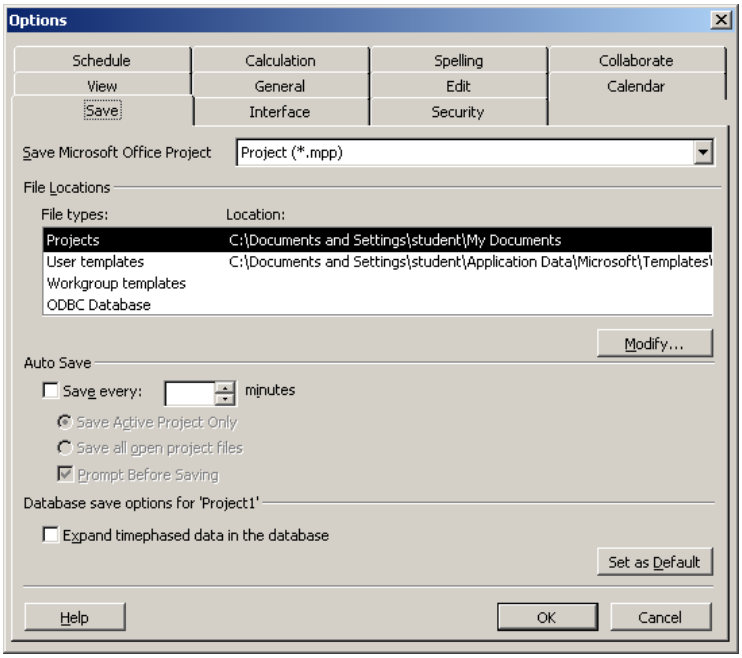
Start with the following:

1 Select **Tools** from the main menu.

2 Select **Options** from the sub-menu.

3 Select the **Save** tab, if not already displayed.

The following will appear on your screen:



1 The first option, '**Save MS Office Project**', specifies the format in which you want to save the project. You can specify here previous versions of MS Project. Leave this at the default of ***.mpp** type.

2 '**File Locations**', specifies where all the project files and related objects will be stored. You should change this to specify your own file storage area, whether a student area on a network or your own removable storage device.

3 For **Auto Save**, check the '**Save every**' box and enter every **10** minutes.

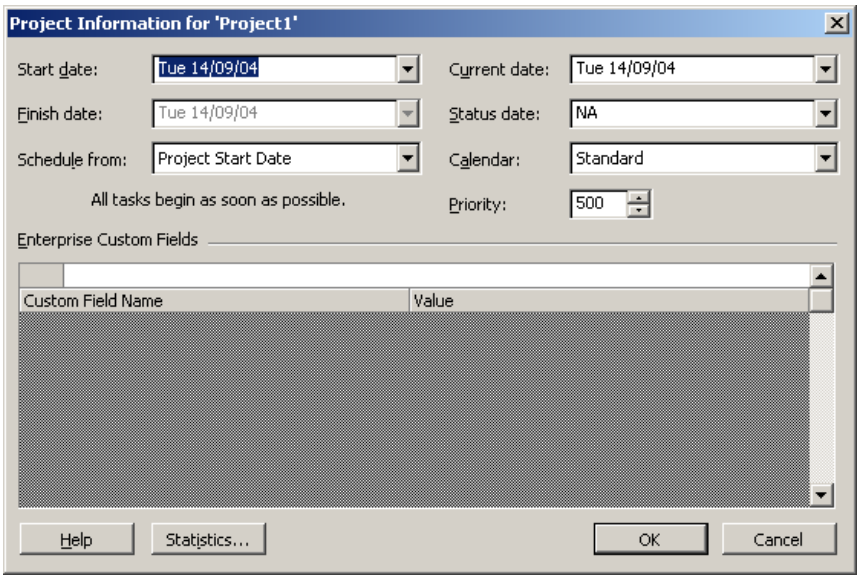
4 Click **OK** to close this window.

Starting a New Project

Before entering any data and tasks into a project you must first open a new project and set up the environment information for that project, for example:

- Setting project start or end date
- Creating a project calendar
- Specifying the length of the working day (start and finish times)
- Specifying non-working days/times (such as holidays).

Open a new project by clicking on **<File>** and then **<New>**. If a 'New Project' pane also appears on the left of the screen, close this pane. Now from the main menu again, select **<Project>** and **<Project Information>** and you will be presented with the following Project Information dialog box (although the dates may be different):



Start by setting the project start date. MS Project will enter the current 'today's date' as the 'start date' by default. Assume the project is scheduled to start about 6 weeks from today's date.

> Enter the Start date as the Monday of the week about 6 weeks from the today's current date (naturally, the project will start sometime in the future!). Use the drop-down arrow to display a calendar.

The project finish date will be automatically adjusted as tasks are entered and subsequently scheduled.

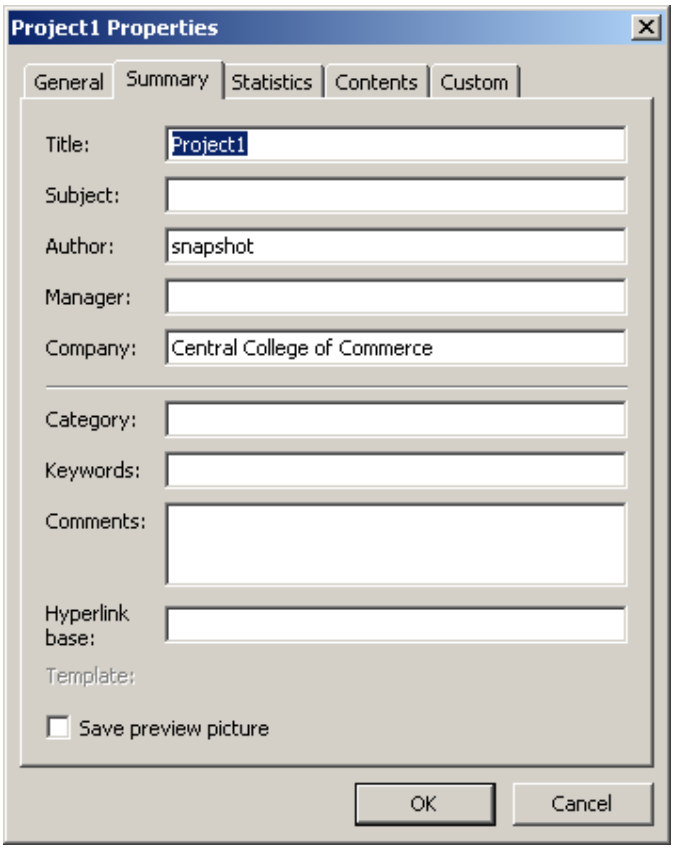
The details on this dialog can be called up at any time during the project for inspection or alteration. This is done by selecting '**Project Information**' from the '**Project**' menu option.

Click on **OK** to close the 'Project Information' dialogue box.

Adding Additional Project Properties information

You should now add some general information about the project, this is done as follows:

1 Select **File**, then **Properties**, and the following will be displayed:



The information in the text boxes may be different from above because of previous users; however, the window and its layout should be the same.

2 In the **Title** box, enter a suitable title for the project, for example: '**New Customer Invoicing System**'.

3 Enter your own name as the Author.

4 In the **Company** box, enter **Invader Clothing Ltd**.

5 In the **Comments** box, enter '**A new system to process Customer invoices**.

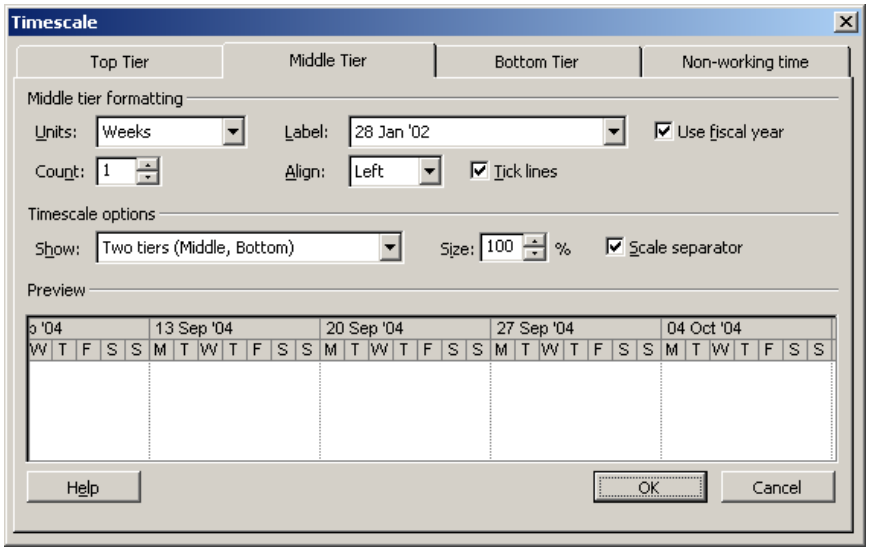
6 Click **OK** then close the Project and save with a suitable file name, e.g. '**Invoicing System**'.

Formatting the Timescale for the Project Chart

You should also set the timescale displayed along the upper margin on the right-hand side of the screen. This is the 'calendar' bar displayed along the top of the chart area of your desktop. The scale can be adjusted to allow you to include more of the chart or less of the chart as required in your current view and also your printouts. On start-up of a new project, the default setting will usually be displayed, although a previous student may have altered it. Let's see how it can be adjusted if required. The scale can be adjusted to show the timescale in months, weeks, days, etc, using up to 3 rows (or tiers) although the default normally consists of two rows showing weeks and days.

To adjust the scale, proceed as follows:

1 Right-click anywhere on the gray timescale bar at the top of the Gantt Chart, and select **Timescale**. The following dialog box will now appear:



2 The three tabs – Top Tier, Middle Tier and Bottom tier, refer to the three rows of scales which you may choose to display in a variety of combinations.

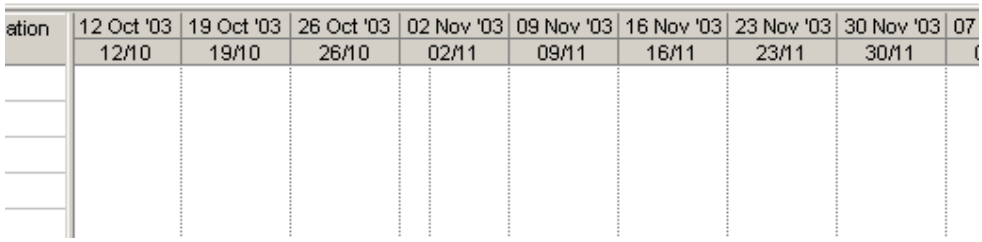
3 In the '**Timescale options**' **->** '**Show**' text box, click on the drop down arrow and select each option in turn to see what each option looks like in the display area of the window.

4 In this particular project, we will use just two tiers, so select '**Two tiers (Middle, Bottom)**'.

5 Then select the '**Middle Tier**' tab, and select '**Weeks**' for the units and set the Count to 1.

6 Next, select the '**Bottom Tier**' tab, and again select '**Weeks**' for the units and set the Count once more to 1.

7 Finally, click on **OK**, and the timescale on the Gantt chart will now be reduced in scale to display more weeks per screen, with a format similar to the following (note - your actual dates may be different!).



Now, repeat this process and change the timescale display back to the default, by again opening the **Timescale** dialogue box and selecting **Weeks** for the Middle Tier and **Days** for the Bottom Tier, setting the Count field for both scales to 1.

Finally close and save your Project to your file storage area ensuring that you use the same file name as suggested before, '**Invoicing System**'.

A 1

Please read the following case study, and then set up a suitable project environment as required.

MedicExpress

MedicExpress is a small distribution company specialising in the storage and distribution of medical supplies to health centres and hospitals throughout Scotland and the northern half of England stretching as far as Manchester.

The company is based in the EuroCentral Industrial Estate off the M8 and employs 78 people.

With changes in the role and budgetary control of local health centres, the demand for drugs and medical supplies delivered direct to local medical centres is rapidly expanding and MedicExpress would like to establish a second distribution depot further south to provide a similar service to the Midlands and the south of England.

A small project team has been set up to research and identify a suitable location and your role will be to plan and co-ordinate the project using MS Project.

The project should be completed within a timescale of 4 months, starting with the third Monday of the month following the current month (if this happens to be a traditional holiday, such as Christmas, then select an appropriate day instead). The project will have a maximum budget of £100,000.

Your remit

Within 4 months, locate a suitable site and adapt the premises to act as a depot serving the Midlands and southern England. The depot must be secure, include office space for 6 people, and be designed to house a sizable refrigeration unit as demanded by the nature of the medical goods and drugs. An overall budget of £100,000 includes approximately £30,000 to cover the expected cost of a 1-year lease of the building.

Now proceed with the steps on the next page to set up the project for MedicExpress.

Setup the project

1 Using **File -> New**, open a new project and specify the 'Save' location for your project to the file storage area you intend to use, with the Auto Save feature suitably activated.

2 Specify the project start date as the third Monday of the month following the current month when you are reading this COLEG Section, ensuring that you do not start the project on a traditional holiday date as mentioned.

3 Give the project the title – '**Southern Depot**'.

4 Insert your own name as the Project Manager and author of the document.

5 Insert the company name as '**MedicExpress**'.

6 Insert suitable comments as per the above remit (in your own words).

7 Format the timescale of the Gantt chart to ensure that only the Middle and Bottom tiers are used with the Middle tier set to Weeks with a count of 1 and the Bottom tier set to Days with a count of 1.

8 Finally close your project, saving it with the filename '**Southern Depot**' to your own file storage area.

Creating Project Calendars

What are Project Calendars?

As one of the world's leading project scheduling software Sections, MS Project is used to schedule projects in a wide range of applications areas, not only the world of IT, but also construction, applied science, engineering, space research, business analysis, people management, etc. As a result of this, no two organisations will have exactly the same work patterns, holidays, starting times and finishing times for the staff involved in the development of the project. Project scheduling software however needs to know this information, in order to schedule the task durations accordingly and correctly.

For example, if experience tells you that a particular task should take one person 40 hours to complete, then if that person works 8 hours per day, the task will take 5 days to complete. If however, the same person only worked 6 hours per day (e.g. 9.00 a.m. until 4.00 p.m. with an hour for lunch), then the task would take 6 days plus 4 hours to complete. The project software needs to know this information so that it can calculate the actual duration of tasks and hence the total duration of the project and the precise finish date for the project.

At the start of a project therefore, it is essential to define these parameters and tell the application when members of the project development team are actually available for work, when they are on holiday, their starting times and finishing times as well as any individual deviations from the organisation's standard base work pattern (calendar).

In this chapter therefore, you will learn:

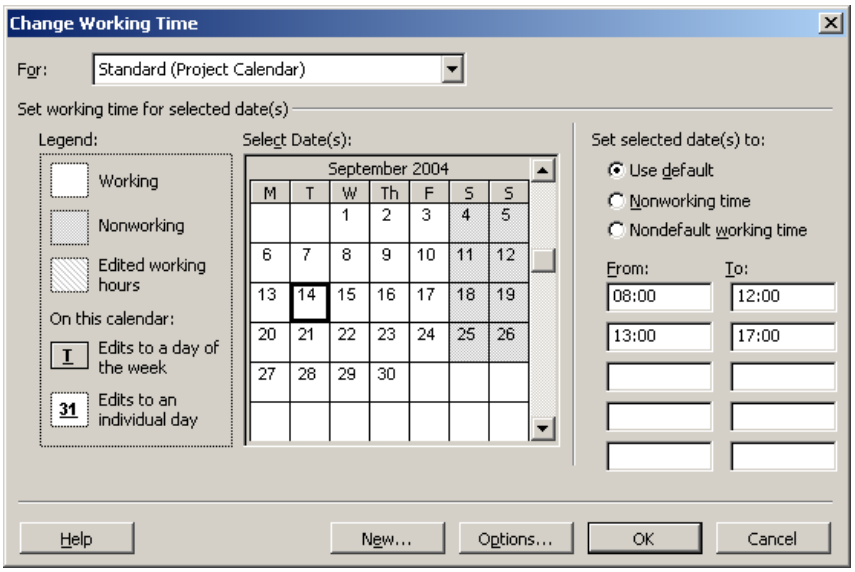
- how to create your own calendars to represent the work patterns of your resources;
- how to specify certain calendar options which MS Project will use to perform scheduling calculations;
- how to take printouts of your calendars;
- and finally how to make sure you have applied your calendars to the specific project so that the correct scheduling calculations are made.

Three calendars are already set up and available within MS Project. These are the ***Standard Calendar*** showing 8 hours per day for a 5 day week: the ***Night Shift Calendar*** showing similar information but a starting time of 11:00 p.m. and a finishing time of 8:00 a.m. the following morning; and finally the ***24-hour Calendar*** offering a round-the-clock 3 shift pattern. The idea is that instead of you having to create calendars from scratch, it might be easier to use one of these default calendars, whichever is closest to your own work patterns, by firstly making a copy of it and then amending the copy to suit your own particular requirements. If none of these calendars is similar to the work pattern you wish to use, then it is certainly easy to create a specific calendar to meet your own needs from scratch. However, most employees have similar work patterns with only minor differences in the details, so often it may be less work to use one of the default calendars as a template and make a copy.

Note: ***You should NEVER edit or change any of the default calendars offered by MS Project, but instead, you should always create a copy of the calendar which is closest to your needs and edit the copy to meet your needs precisely. You will learn how to do this in the following pages. You should always leave the default calendars set as they are for future use.***

To see these default calendars, open the project you have just started, if it is not already on screen, the '**Invoicing System**' project and from the main menu, select **Tools > Change Working Time**.

The following dialogue box will appear on the screen, usually displaying the current month and usually for the default Standard calendar. (Note that the specific details may differ if someone else has used the Pack before you, but if they have not edited any of the default details, it should be similar).



The window shows the name of the calendar in the top text box. The default starting calendar is always the Standard day calendar. In the three panes in the centre, on the left, a legend explains the contents of the calendar displayed in the centre. The centre pane shows the current month's calendar taken from the operating system date and time with the usual slider controls. The right pane shows 3 radio buttons which you will use shortly to make edits to the working day, and also the start and finishing times of the standard working day. On the month pane you can see that Saturdays and Sundays are non-working days and Mondays through Fridays are working days. Use the drop-down arrow in the top text box to see the time schedules for the other two calendars.

You may use any of these Base Calendars if the working times match your own environment. Where they do not however, as is usually the case, you should start by making a copy of one (or more) of these Base calendars, make the appropriate amendments, and then apply that copy to your own project. You should always leave the Base calendars unchanged for you to model future calendars on.

To recap, the process is as follows:

1 Make a copy of the default base calendar closest to the work pattern you wish to use.

2 If required, edit the copy to reflect the correct work patterns and work times, including holidays, etc, of staff in your organisation.

3 Finally apply this new calendar to both your project and to the staff who will be doing the work, so that the software will make the correct calculations.

Creating a New Base Calendar for your Project

If the 'Change Working Time' dialogue box is no longer displayed on screen, then retrieve it again by selecting:

Tools > Change Working Time

With the 'Standard (Project Calendar) displayed,

1 Click on the '**New**' button to reveal the '**Create New Base Calendar**' dialogue box.

2 In the **Name** text box, enter a name for the new calendar. To make it unique to your project, perhaps prefix the calendar with your initials. For example in my case, I would call the calendar '**JS Project Main Calendar**'.

3 You are also creating it as a copy of the standard Base calendar to make use of the pre-set defaults, so make sure the radio button for '***Make a copy of: Standard***' is selected.

4 Click **OK**.

Your new calendar should now be displayed with its new title.

Note that any calendars you create for a particular project will be saved to disk along with the project. The next user, or student, on this workstation, will not see any calendars you create, only the standard three offered by MS.

Now amend this new calendar to meet your own company's needs and your staff's work pattern(s).

How to specify the Non-working days (for example Holidays)

To specify which days are non-working, you simply click on the relevant date (or dates) and click on the '**Nonworking time**' radio button. The selected day(s) will then be shaded as per the legend.

Try this exercise:

1 Click on the second Tuesday in the month currently displayed.

2 Now click on the **Nonworking time** radio button.

3 Click on any other spot on the calendar and you will see that the day you changed is now shaded grey as a non-working day and no 'times' appear in the rightmost pane.

Try some more dates.

1 Using the slider control, move to another month and select a whole week, for example by clicking on a Monday and dragging the mouse along to the following Friday.

2 Click on the **Nonworking time** radio button.

3 Click on any other spot on the calendar and you will be able to see that the week you selected is now shaded grey indicating no work will be allocated on these days.

To specify the same day in every week as a non-working day, for example if you decided that no work should ever take place on a Monday (wouldn't that be wonderful?) then try the following:

1 Click on the '**M**' header for the Monday column. The entire column will now be selected.

2 Click on the **Nonworking time** radio button.

3 Click on any other spot on the calendar and you will be able to see that every Monday is now shaded grey indicating no work will be allocated on Mondays.

Now scroll through the months and see that this last action affects every Monday for ever!

Also, it is customary to see calendars displaying the days from 'Sunday' through 'Saturday'. In the default on-screen it may display 'Monday' to 'Sunday', or any other combination. You can set this to show any order you want, but to display the order in the conventional 'Sunday' to 'Saturday' format, proceed as follows.

1 If not already on-screen, Select **Tools > Change Working Time.**

2 Ensure you have your new calendar displayed. If not, select your new calendar from the drop down box.

3 Click on **Options.**

4 Select the **Calendar** tab, and in the '**Week starts on**' box, select the chosen day from the drop down list. Select 'Sunday'.

5 Click **OK** to return to **Change Working Time** window and notice the change.

Finally, set your calendar back to the default working days, by selecting all of the headers from '**Monday**' through '**Friday**' and click on the '**Use default**' radio button.

How to amend the start and finish times of the working day

This is done by simply overwriting the hours shown on the right pane of the **Change Working Time** dialogue box. The default standard calendar which you have copied shows the standard hours of 8:00 – 12:00 and 13:00 – 17:00, an 8 hour day for 5 days giving a 40 hour week.

What if your staff work 9:00 – 12:00 and 13:00 till 16:00, giving a 6 hour day for 5 days, producing a 30 hour week? Proceed as follows:

1 Click on and select any single day displayed in the calendar. (Make a note of the date you select).

2 Click on the radio button – **Nondefault working time**. If you do not click on this radio button, any amended times will not be set.

3 Overtype the times displayed with the new times, as above.

4 Finally click **OK**.

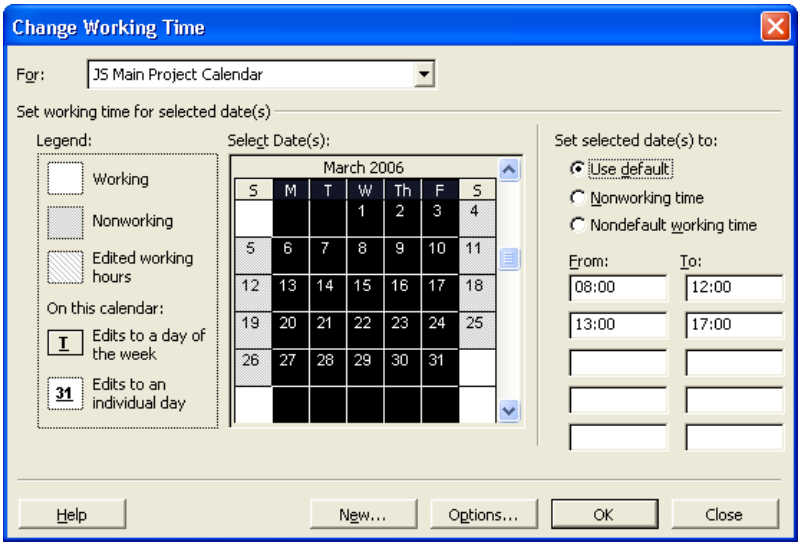
To check that these amended times have been implemented, re-open the **Change Working Time** dialogue box, select your new calendar and click on the same day you previously selected. You will now see the amended times, along with any non-working days you set, and the day(s) will be shaded as 'Edited working hours').

Notice that the times you set will only apply to that particular day which was selected or on which you clicked before you changed the times. All the other days will remain with the original default times. In order to change the working hours on more than one day, all of the days required should be selected before setting the new times, and hence apply these times to the same days every week of the year. To do this, you need to select these days as you did before, by clicking, and selecting, all the day 'headers' along the top of the calendar part of the display. Do this again to change the working times for every day.

1 Select **Tools > Change Working Time**, if not already on-screen.

2 Ensure you have your new calendar displayed. If not, select your new calendar from the drop-down list.

3 Click on the '**Monday**' header and drag the mouse to the '**Friday**' header. All of the required working days should now be selected for the entire month as shown below.

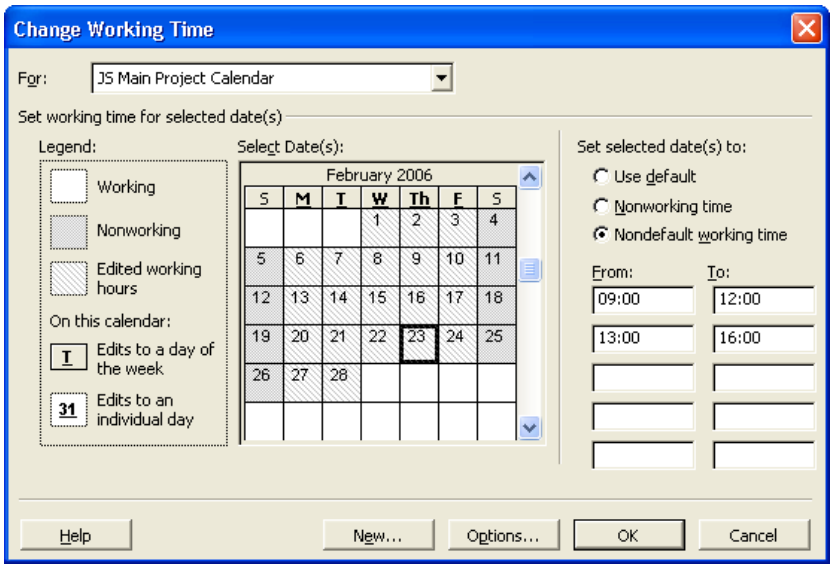


4 Click on the radio button – **Nondefault working time**. If you do not click on this radio button, the amended times will not be accepted.

5 Overtype the times displayed with the new times, as required above, namely 09:00-12:00 and 13:00-16:00.

6 Click anywhere else on the calendar now to see the days shaded as 'Edited working hours'.

Your screen should now appear as follows, with your own calendar name.



7 Finally click **OK**.

Now re-open the calendar again and click on different days in different months to check that all of the working days now have the correct working hours as required.

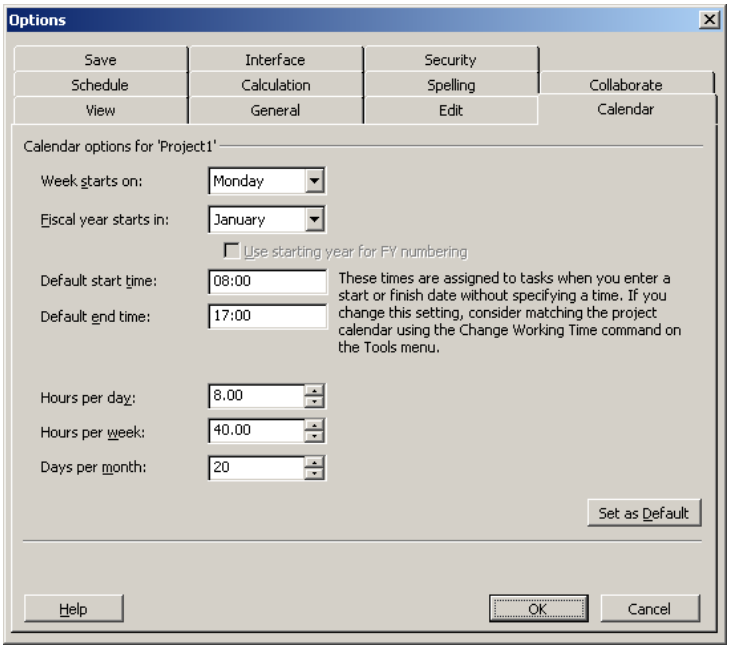
Setting specific Calendar Options

Even though you have created a new base calendar for your project, it is still necessary to specify certain time information to MS Project which it uses as a basis for many of its calculations. For example it needs to know how many working hours there are in a day, as well as how many working days there are in a week. The 'Change Working Time' dialogue box you have just worked with is not used for this more general information. So when you create a new base calendar for a project, you must also specify these calendar options to ensure the accuracy of the scheduling calculations.

Proceed as follows:

From the main menu, select **Tools > Options > Calendar**

A dialogue box similar to the following should be displayed. Notice it still contains the old default values. You need to change these now.



1 The '**Week starts on**' option sets the display you saw in the 'Change Working Time' window. Set this to '**Sunday**' to display a calendar as you normally see it running from Sunday to Saturday.

2 In the '**Fiscal year starts in**' option, set this to **April**, which is the norm for most companies in the UK.

3 Make the '**Default start time**' and the '**Default end time**' the same as you created of **9:00** and **16:00**.

4 This makes an '**Hours per day**' of 6. Enter this accordingly.

5 Make the '**Hours per week**' as 30.

6 Leave the '**Days per month**' as 20. This is the average number of 'working' days per month, excluding Saturdays and Sundays.

7 Finally, click the **OK** button.

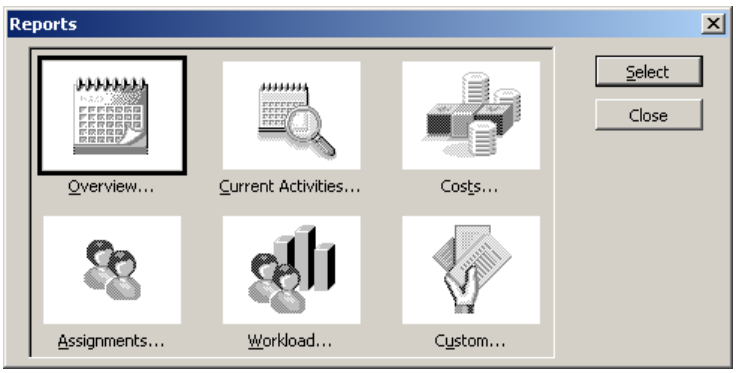
Taking Printouts of your Calendar(s)

In your records, you should keep a printout of all of the calendars you create for each of your projects, as well as any calendars you create specifically for individual resources you have whose work pattern is different from the project base calendar you created.

Printouts of your calendars are easy to produce. Proceed as follows:

1 From the Main Menu, select **View > Reports.**

This produces the following window:



2 Select or double-click **Overview.**

3 Select or double-click **Working Days.**

This will produce a report showing all of the calendars (both default and any you have created) each on a separate page, starting with the default Standard calendar as follows:

Base Calendar as of Mon 13/12/04
Project1

BASE CALENDAR:	Standard
Day	Hours
Monday	08:00 - 12:00, 13:00 - 17:00
Tuesday	08:00 - 12:00, 13:00 - 17:00
Wednesday	08:00 - 12:00, 13:00 - 17:00
Thursday	08:00 - 12:00, 13:00 - 17:00
Friday	08:00 - 12:00, 13:00 - 17:00
Saturday	Nonworking
Sunday	Nonworking
Exceptions:	None

4 Left click on the screen to enlarge the image. The basic Standard MS calendar will be displayed on the first page. As you scroll through the pages using the arrow keys in the top left of the screen, you will see the default MS calendars plus the calendar you have created yourself, each on a page of its own. The new calendar which you created will show the working hours you specified for each day and the non-working days listed in the lower part under 'Exceptions'.

You can take a printout of all of these pages and discard the ones you do not want, or else simply select the pages you do want to print when the Print dialogue box is displayed.

Do that now and print out only the page showing the calendar you just created for your project.

5 Finally close this window, and close the Reports window.

Applying the new Project Calendar to your Project

You must finally apply this new calendar to your project otherwise MS Project will continue to use its own Standard Base Calendar for its calculations.

This involves 3 separate actions.

1 Firstly, apply the calendar to the project.

2 Secondly, apply the calendar to the Gantt chart area so that it displays the non-working days as greyed-out.

3 And thirdly, apply the calendar (or different calendars) to the individual resources. (This will be visited later in these notes).

You may wonder why this all doesn't happen automatically when you created the project calendar. Different resources and operations within the same organisation however can all be working with different time patterns according to the needs of the individual and particular jobs. So MS Project does not assume that any single calendar you create will be used by any or even all of the individual resources. It is necessary therefore to specify which particular calendar(s) should be applied by MS project to which resources and/or operations within the project, so that all the scheduling and costing calculations for the project will be correctly and accurately made.

1 Apply the Calendar to the project in general.

(i) Select **Project > Project Information.**

(ii) In the **Calendar** drop down box, select your new 'Main' calendar from the drop down list (the one I called **JS Project Main Calendar** in these notes).

(iii) Click **OK.**

2 Apply the calendar to the Gantt chart area.

(i) Right click anywhere within the Gantt chart area.

(ii) Select '**Nonworking Time**'.

(iii) If not already displayed, select the '**Non-working Time**' tab.

(iv) In the calendar drop-down list box, select your new 'Main' calendar (the one I called **JS Project Main Calendar** in these notes).

(iv) Click **OK.**

A 2

Continuing with the '**Southern Depot**' project for MedicExpress, you should now proceed to create a suitable calendar for the project team. To remind you of the project requirements again:

Your remit

Within 4 months, locate a suitable site and adapt the premises to act as a depot serving the Midlands and southern England. The depot must be secure, include office space for 6 people, and be designed to house a sizable refrigeration unit as demanded by the nature of the medical goods and drugs. An overall budget of £100,000 includes approximately £30,000 to cover the expected cost of a 1-year lease of the building.

Create a Calendar for the Project

Re-open the '**Southern Depot**' project and using the default 'Standard' calendar as a template, create a new base calendar for your project with the following amendments:

(a) Call it '**Medex Project Calendar**' but prefix it with your own initials. So in my case it would be '**JS Medex Project Calendar**'.

(b) Insert any applicable holidays you are aware of as follows:

- If the project is expected to run over any Christmas, New Year or Easter periods, or summer holidays, then specify these as non-working days, for example running from, and including, Christmas Eve, and returning to work by approximately 5th January, unless this is a non-working day such as Saturday or Sunday, then make it the following Monday. (Note that a holiday split over two months will need to be specified separately for each month, since you can only display 1 month at a time in the 'Change Working Time' dialogue box).
- Also allow a week for Easter (check your diary for dates).
- Don't forget the first and last Mondays in May as well as the last Friday and Monday in September, plus any other public holidays you are aware of.

(c) Modify the working days of Monday through Friday to have the following hours per day:

(i) 08.30 - 12.15
(ii) 13.00 - 17.00

(d) For calculation purposes, make sure these preferences are set in the Calendar Options as follows:

(i)	Week starts on:	Sunday
(ii)	Fiscal year starts in:	April
(iii)	Default Start Time:	08:30
(iv)	Default End Time:	17:00
(v)	Hours Per Day:	7.75 (Allowing for lunch)
(vi)	Hours per week:	38.75
(vii)	Days per month:	20

(e) Ensure that your new calendar is applied to both the Project and also to the Gantt chart display.

Check that the Gantt Chart Timescale shows the standard display of Weeks on the Middle tier and Days on the Bottom tier, both with a count of 1. If not, then amend accordingly.

Take a printout of the new Project calendar.

Finally save the project back to your file storage area.

Developing the Project Schedule

In this chapter you will learn how to create and develop a project schedule by:

Entering the Project Tasks
Organising (or Outlining) the Tasks into Stages or 'Summary Groups'
Setting Task types
Entering Task Durations
Establishing Relationships between the Tasks (Linking Tasks)
Defining Task Deadlines and Task Constraints

Entering the Project Tasks

Entering task names is a relatively straightforward process. Proceed as follows:

Start by opening the '**Invoicing Systems**' project again.

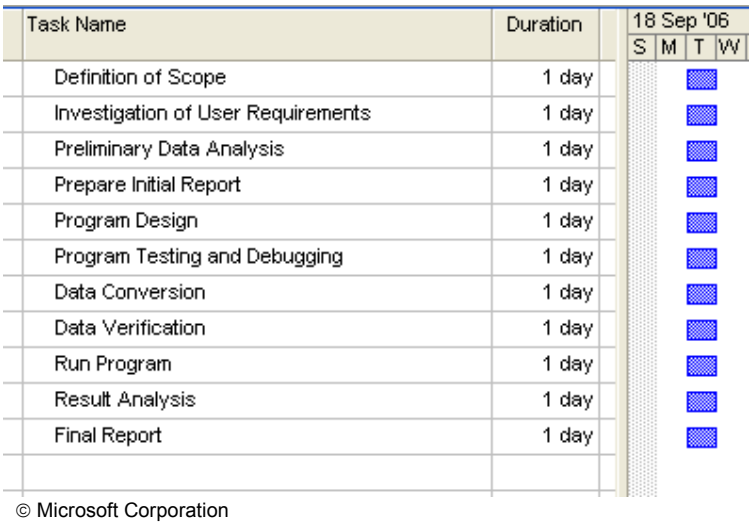
1 In the first cell of the Task Name column, type in the name of the first task - ***Definition of Scope*** - and press the down arrow key or the Enter key.

2 In the second cell (or row) enter the name of the second task - ***Investigation of User Requirements*** - and press the down arrow key or the Enter key.

Then, in the following cells, enter the remaining tasks as shown below.

Preliminary data analysis
Prepare initial report
Program design
Program testing and debugging
Data conversion
Data verification
Run program
Result analysis
Final report

As you do this, you will also notice that a default duration of 1 day per task appears in the Duration column, and a blue bar indicating 1 day duration appears in the Gantt chart area of the screen as follows.



Task Name	Duration
Definition of Scope	1 day
Investigation of User Requirements	1 day
Preliminary Data Analysis	1 day
Prepare Initial Report	1 day
Program Design	1 day
Program Testing and Debugging	1 day
Data Conversion	1 day
Data Verification	1 day
Run Program	1 day
Result Analysis	1 day
Final Report	1 day

Organising (or Outlining) the Tasks into Stages or 'Summary Groups'

In large projects, it will also be helpful to group the tasks into specific stages of development, to help you organise the tasks into more manageable stages. You would then allocate individual names to each of the stages. These names are also known as 'Summary tasks' in MS Project since they summarise a group of tasks into a single task name, in the same way that the Feasibility stage or the Design stage of a development project consists of several sub-tasks. This process is also known as 'Outlining' by MS Project.

The stages into which you will organise the above tasks are as follows:

Initial Study

Definition of Scope
Investigation of User Requirements
Preliminary data analysis
Prepare initial report

Design

Program design
Program testing and debugging

Data Preparation

Data conversion
Data verification
Run program
Result analysis
Final report

The Summary tasks are entered in a similar way to the previous tasks, but since you have already filled up the rows with these tasks, you must first create extra line spaces at the appropriate points where you want the group titles to be. You do this by inserting a row space between a pair of tasks to enable you to enter the Summary task name. This can be done in several ways, and is similar to inserting rows in a spreadsheet.

With MS Project you can do this by clicking on, and selecting the appropriate row where you want the space to appear, then either click on the '**Insert**' key to insert a row space, or select **'Insert'** from the Main menu, then select '**New Task**'.

Try this out now.

1 Click on and select the first task in the first row, i.e. the cell containing the ***Definition of Scope*** task.

2 Either press the '**Insert**' key, or select **Insert > New Task** from the Main menu.

3 In this new blank row, enter ***Initial Study*** and press return.

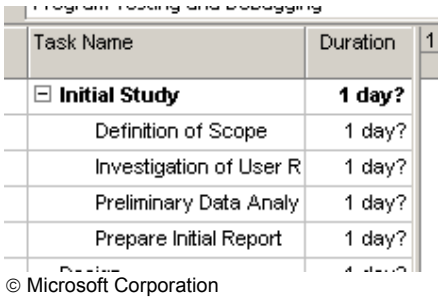
4 Repeat for the ***Design*** and ***Data Preparation*** Summary tasks respectively.

To make ***Initial Study*** the stage heading, or a ***Summary task,*** use point-and-drag to highlight the following tasks of the first stage, starting with ***Definition of Scope*** down to ***Prepare Initial Report***:

Definition of Scope
Investigation of user requirements
Preliminary data analysis
Prepare initial report

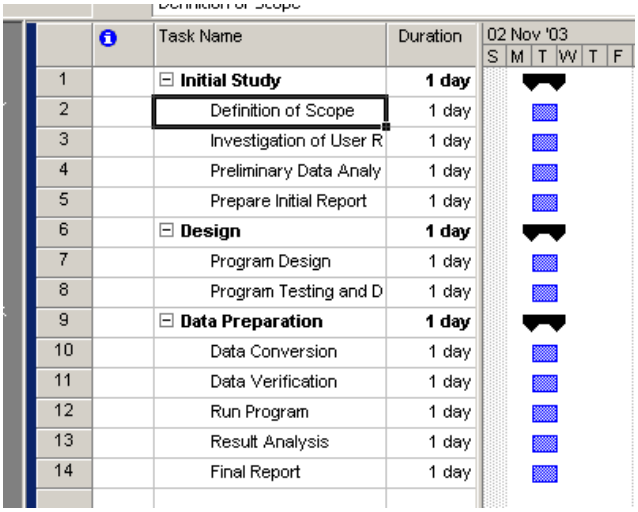
Click on the Indent button – the right-pointing arrow in the tool bar:

This will indent these tasks so that ***Initial Study*** appears as a Summary item in bold, and the four tasks, now known as sub-tasks, appear indented as below:



Task Name	Duration
Initial Study	**1 day?**
Definition of Scope	1 day?
Investigation of User R	1 day?
Preliminary Data Analy	1 day?
Prepare Initial Report	1 day?

Repeat this process for the remaining two stages, as shown below.



	Task Name	Duration
1	**Initial Study**	**1 day**
2	Definition of Scope	1 day
3	Investigation of User R	1 day
4	Preliminary Data Analy	1 day
5	Prepare Initial Report	1 day
6	**Design**	**1 day**
7	Program Design	1 day
8	Program Testing and D	1 day
9	**Data Preparation**	**1 day**
10	Data Conversion	1 day
11	Data Verification	1 day
12	Run Program	1 day
13	Result Analysis	1 day
14	Final Report	1 day

02 Nov '03
S M T W T F

Setting Task Types

'***Setting Task Types***' concerns the amount of hours or days it takes to complete a task and how MS Project recalculates the task durations as you manage and amend the resources assigned to a task.

One of the major decisions you will have to make when preparing a project plan and managing it, is to estimate how long each of the individual tasks takes to complete. For the most part, this will be based on experience. For example, a builder will know that it should take about 1 day to prepare the ground for a new build, then another day to lay the foundations, finally about a week to leave the foundations to settle and the cement to dry before the next task can start. Likewise, your experience tells you that it might take about 8 days to prepare a report, then about a month to design a solution before starting the implementation.

The next part however gets a bit complicated when you add extra resources to a task. For example, if you added an extra two units of labour to 'preparing the foundations' task, you might expect the task to get finished in less time. On the other hand, in the case of the report you are writing, adding an extra unit of labour to assist you might not help in any way, in fact you might find that the task takes more time (after all the distractions of the chats and the cups of coffee!).

'Setting Task Types' is about how you tell MS Project which types of tasks will have their time duration amended if more human resources are added to the task or some are removed, and which, like your report, are not likely to experience any change in duration no matter how many units of resources are added. Knowing this helps MS Project recalculate task durations as you manage and reorganise your resources

MS Project has three different types of tasks, according to how they re-act when resources are added or removed. These are:

1. **Fixed Units**
2. **Fixed Duration**
3. **Fixed Work**

Fixed Units

This is the default type, where you allocate a duration to a task and that duration is 'fixed' or set for that task in terms of one unit of resource effort. For example, if you say a task takes four days to complete, then MS Project assumes that the task will take 4 days with one unit of resource assigned to it, in other words a '4 person-days' task. However, if you add another unit of resource, making two units of effort, then each will work two days together, and the task will be completed. Instead of one unit working for four days, the two units will work for two days each. That task has still taken '4 person-days' of effort to complete, but it will be finished in half the time – only two days. That is, 2 persons will complete a task in half the time it takes 1 person to complete.

Fixed Duration

This is the opposite of the previous type, where the time duration you allocate to a unit is absolutely fixed no matter how many resources you throw at it. It could be for example, a team meeting planned to last four days, or it could be the waiting time while concrete foundations are left to cure and set. No matter how many resources are involved, the overall duration for the task will still remain the same. So MS Project will not do any re-calculations as you add or amend the number of resources attached to the task.

Fixed Work

This type is similar to the Fixed Duration type in that the duration of a task is set at the time you originally entered. Only in this case, if more resources are added then each resource actually does less work on the task. For example, if a task takes one day to complete with one unit of resource, and another unit is added, the task will still take the same time to complete - the same duration - the task is still set as a '1 person-day' task, but each unit will only spend half of the day on that task. You might do this if the resources were required to spend some time on another task. So the task still lasts for one day, and each of the two resources will work half a day each.

For Fixed Duration and Fixed Units Tasks, you can also tell MS Project to modify the percentage of total work that is allocated to each resource, based on the number of assigned resources, if the number of resources changes. In effect, you are concentrating on the effort applied by the resources involved in a task, as opposed to the effect of resources on task durations. In other words, you could class these situations as '***Effort-driven***' tasks. Usually, the total amount of work that's required to complete the task remains the same, but MS Project re-distributes the work equally among all the assigned resources.

You will notice however, that from the definitions above, Fixed-Work Tasks are by default *Effort-driven*. This means that when you specify a task as having 5 days duration, MS Project converts this into hours of work and assumes (using an 8-hour day) that the task using one unit of labour will take 40 hours of work to complete. So if an extra unit of labour is applied, the task will be completed in half the time - 2½ days. The total work required by the task is still fixed at 40 hours, but the more effort which

has been applied, 2 units of labour working 2 ½ days instead of 1 unit working 5 days, means the duration of the task has been reduced.

The default task type is **Fixed Units**.

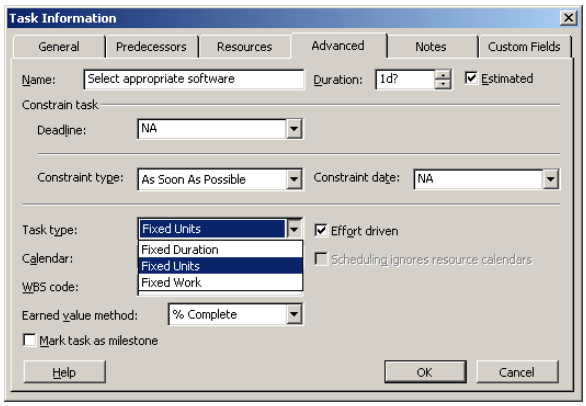
However, to determine which type of task each should be, proceed as follows:

1 Either double-click the task for which you want to specify the task type, or from the main menu select ***Project -> Task Information***.

Do this for any one of the tasks in the list. The **Task Information** dialogue box appears.

2 Click on the **Advanced** tab and click on the drop down arrow for **Task type**.

The following should be on your screen.

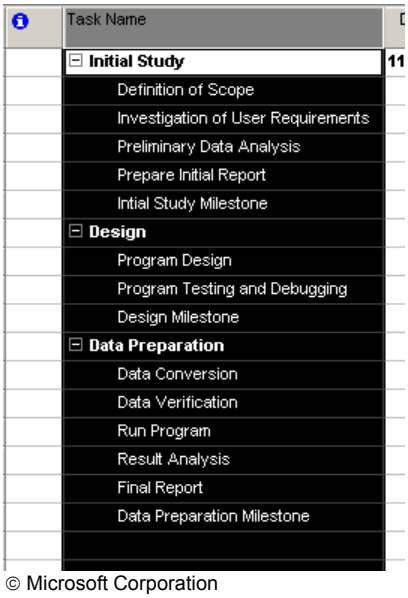


The three task types are listed, and you can select whichever task type you wish to specify for that particular task.

On this occasion, leave all the tasks set at the default type of **Fixed Units**. When starting a new project, however, you should make sure all the tasks are definitely set to this default type. There is an easier way to set all tasks types in one go rather than setting each one individually.

Do this as follows on the next page:

1 Click once on the header title box for the **Task Name** column. This will select all the tasks in the entire column.



2 From the main menu, select **Project -> Task Information**, and proceed as before, selecting the ***Advanced*** tab, and then from the drop down list, selecting the **Fixed Units** task type.

3 Finally close the **Task Information** window by clicking on **OK**.

Entering Task Durations

Now that you have entered all the tasks and set the task types, you also need to assign the task durations – the amount of time it will take one unit of a human resource to complete the task. If the 'Task Duration' column is not visible on screen - it is a column which should be immediately to the right of the 'Task Name' column - then you can reveal it by pointing to the vertical divider bar which separates the columns of information on the left of your screen and the chart area on the right hand side of your screen, and when the pointer changes to a double-arrow, then hold the mouse button and drag the vertical bar to the right, to reveal more columns, including the 'Task Duration' column.

You will have noticed from a previous section, that MS Project will by default assign a duration of 1 day to each task – implying one unit of a human resource will take one day to complete the task. Note also that you only enter the durations for the tasks and not the Summary tasks. The duration of the Summary tasks will be calculated by MS Project as the sum of the durations for the tasks contained within that group. There are several ways by which you can enter the task durations, either using the **Task Information** box as seen above, or by entering the values directly into the **Duration** column. You will use this direct method.

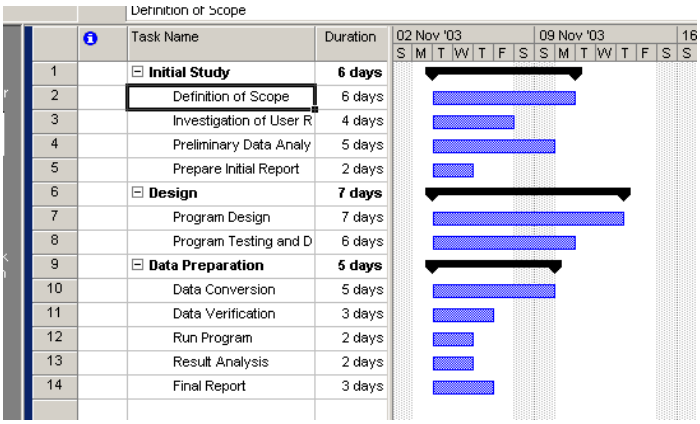
1 You can enter task durations in any time unit (hours, days, weeks), by changing the settings, or by adding the letters 'h', 'd' or 'w' to the number entered. For example, if a task is expected to last only 3 hours, then you could enter this as '3h'. However, to keep it simple, leave the time units at the default of 'days'. This way it is not necessary to add a 'd' to every value.

Click in the Duration cell for the ***Definition of Scope*** task and increase the duration to 6. Do this by either typing in 6 directly, or clicking on the incremental arrow.

2 Enter the respective task durations for all the remaining tasks as below:

Task Name	Duration (days)
Definition of Scope	6
Investigation of User Requirements	4
Preliminary data analysis	5
Prepare initial report	2
Program design	7
Program testing and debugging	6
Data conversion	5
Data verification	3
Run program	2
Result analysis	2
Final report	3

As you enter the task durations, notice that the size of the Gantt chart bars will change as shown below.



Establishing Relationships between the Tasks (Linking Tasks)

Since one of the main reasons for creating a project schedule is to assist in the management of the progress of a project, especially concerning time, then the next important job in preparing a schedule is to link the tasks in the order in which they are to be completed, i.e. enter the task relationships, or dependencies. This refers to the order in which tasks will be completed. For example, the foundations of a building must be prepared and laid before the building itself can be constructed. There are a number of methods which can be used to link tasks.

The table below shows the 'inter-dependencies' of the tasks you entered into the project schedule. This means that any task in the 'Task Name' column cannot start until the task(s) listed in the 'Preceding Activity' column has been completed and is finished. This is the idea of a 'sequence' of tasks. For example, you cannot start to build the brick walls of your home extension until the foundations have been prepared and are completed and set. So the task 'Lay the Foundations' would have to be completed before the task 'Build the Walls' can start. In other words the task 'Build the Walls' ***depends on*** the task 'Lay the Foundations' being completed before it can start, or to put it another way, 'Lay the Foundations' is a ***preceding activity*** to 'Build the Walls'.

In the following table, the task '**Preliminary data analysis**' is ***preceded*** by the task '**Definition of Scope**'. This means, the task '**Preliminary Data Analysis**' cannot start until the task '**Definition of Scope**' has been completed. Note also that since the first two tasks do not have preceding activities, then they will both start together at the same time on day 1.

Task Name	**Preceding Activity – The task on which it depends**
Definition of Scope	-
Investigation of User Requirements	-
Preliminary data analysis	Definition of Scope
Prepare initial report	Investigation of User Requirements and Preliminary data analysis
Program design	Prepare initial report
Program testing and debugging	Program design
Data conversion	Program design
Data verification	Data conversion
Run program	Program testing and debugging and Data verification
Result analysis	Run program
Final report	Result analysis

There are several ways by which you can link tasks together. Here are two methods.

The first method makes use of the '**Link**' icon on the toolbar.

Let's start by linking ***Definition of Scope*** to ***Preliminary data analysis***.

First of all, click on the ***Definition of Scope*** task name - the preceding task.

Now pressing and holding the Control key, click on the ***Preliminary data analysis*** task.

Release the Control key.

Click on the link icon.

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The tasks will now be linked - with '**Preliminary Data Analysis**' following on from '**Definition of Scope**'. Or in other words - the task '**Preliminary Data Analysis**' is dependent on the task '**Definition of Scope**' finishing before it can start.

Remember that when 'linking' tasks, you always start with the ***preceding*** activity and link ***forwards*** to the ***succeeding*** activity. Otherwise MS Project will schedule tasks backwards – building the walls before laying the foundations!

Now try the next one. Click on the ***Investigation of User Requirements*** task.

Pressing and holding the Control key, click on the ***Prepare Initial Report*** task.

Release the Control key.

Click on the link icon.

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The tasks will now be linked - showing '***Prepare Initial Report***' following on from, and dependent on the task '***Investigation of User Requirements***' finishing before it can start.

Another method you can use which may be easier when entering a list of task dependencies at the beginning of a project is as follows.
With the Gantt chart on screen, pull the divider bar to the right sufficiently to reveal the column headed **'Predecessors'**.

You will notice that the task '**Preliminary Data Analysis**' has a '**2**' in the '**Predecessors'** column for this task, indicating that the task '**Preliminary Data Analysis**' (task number 4 in the list) is dependent on the task number '**2**' in the list – '**Definition of Scope**'.

The number of each of the tasks on which each other task depends can be entered manually into this column, to avoid the need to constantly click on each task and clicking on the 'Link' button.

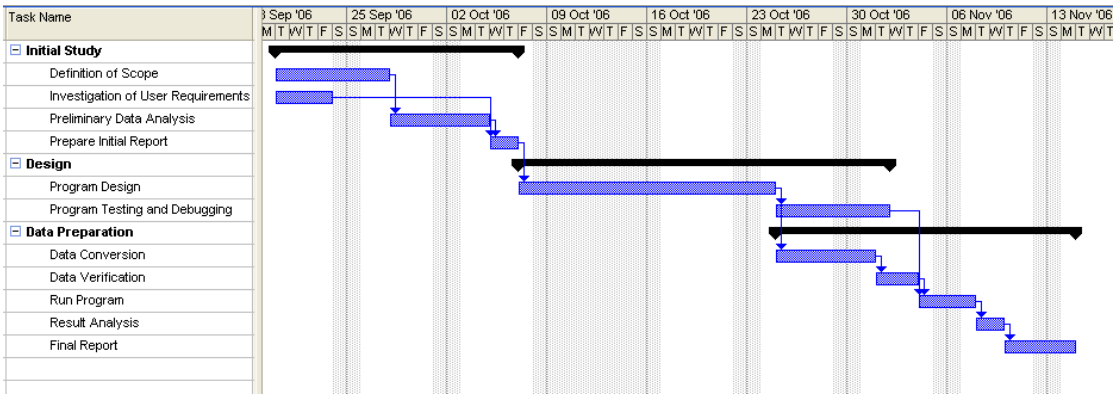
For example, try this now.

The task '**Prepare Initial Report**' is also dependent on the task '**Preliminary Data Analysis**' which is task number '**4**' in my list, as well as task number '**3**' – '**Investigation of User Requirements**'. So in the '**Predecessor**' column for '**Prepare Initial Report**', edit the contents to read '**3,4**', to indicate that the current task depends on these two.

Note: Be careful to check the task numbers on your own screen in case they differ from the numbers in these notes.

Now enter all the Predecessor numbers for each of the tasks remaining in the list at the beginning of this section.

Your Gantt chart should now look similar to that below. Please note that the dates on the Timescale may be different from your chart depending on which date you declared as the Start date for your project. The general layout and links of the tasks should still be the same however.



Defining Task Deadlines and Task Constraints

Task deadlines and constraints are all about specifying how MS Project should schedule the tasks. For example, you may apply start or finish deadlines for certain tasks which cannot start until after a certain date, perhaps because a new member of the development team will not join until then; or a task which must finish by a certain date otherwise the entire project will be thrown off schedule. When scheduling projects, the most common constraint on a task is that it should be able to start as soon as the preceding task(s) on which it depends finish. You can specify deadlines and constraints for tasks in the **Task Information** dialogue box.

Let's apply the constraint to all tasks that each task should start as soon as any preceding task(s) on which it depends has been completed, without any delays. For example, as soon as the first task '**Definition of Scope**' has been completed, you would expect the succeeding task '**Preliminary Data Analysis**' to start without any delay. In other words, you might expect all tasks to start as soon as possible after the relevant preceding task(s) has been completed.

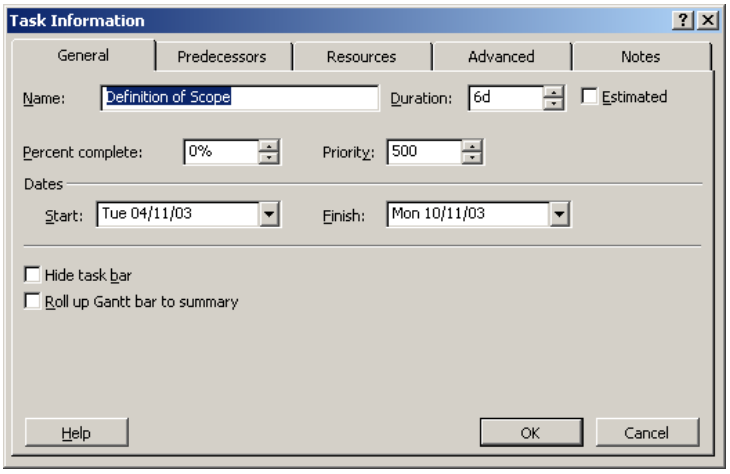
This may not always be the case. It might be for example, that an important member of staff who works on one of the tasks will not be available when the preceding task is completed. S/he may be busy on another project, or on holiday, or at a conference delaying the start of the task for several days. Or it may be that in a Science Research project, more detailed analysis is required and the results will not be available till a later date. In these cases, it is possible to add a constraint to the succeeding task that it cannot start until a certain date, even though the preceding task is well and truly finished.

In our present project however, we wish all tasks to commence as soon as the preceding task is completed. In other words, all tasks should start 'As soon as possible'.

To ensure that all tasks in your project have this constraint applied to them, proceed as follows.

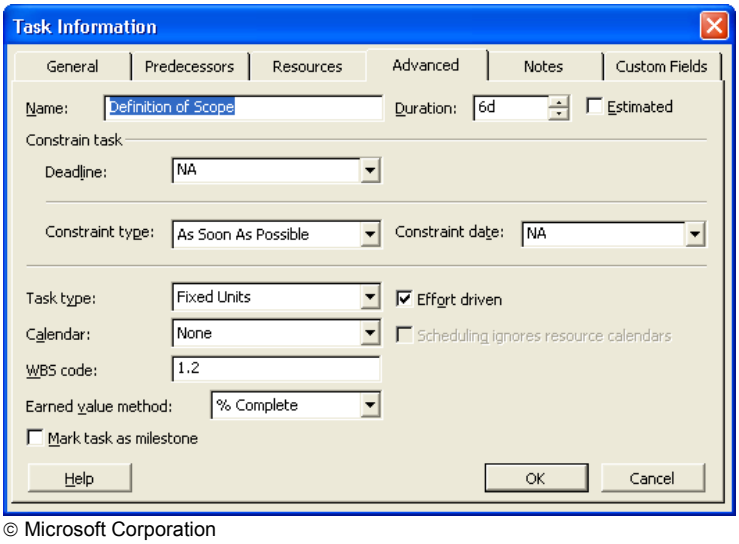
Double click on the first task '**Definition of Scope**'.

You are now presented with the Task Information dialogue box for this task as shown on the next page.



The General tab shows you, most importantly, the name of the task, and its start and finish dates.

To see and set task Deadlines and Constraints, click on the **Advanced** tab. You will now see the following on your screen.



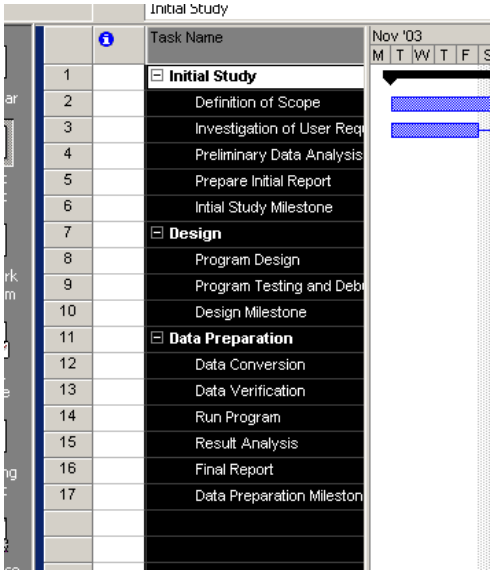
Under the **Constrain task** section you will see the two text boxes for **Deadline** and **Constraint type**.

The **Deadline** box is where you specify the date deadline for any task which must be completed by a certain date. On start-up of a project, this will be set to '**NA**' indicating '**Not Applicable**'. In a real-world project, you would set this as meets your requirements. In this project however, leave the **Deadline** as it is – **NA**.

In the centre of the window you will see the '**Constraint type**' text box. This should show the setting as '**As Soon As Possible**'. If it does not, click on the drop down arrow to reveal the list of possible constraints now. Even if your window displays the correct option, do that now to see the list. Ensure the correct constraint is selected by clicking on the option '**As Soon As Possible**' and click '**OK**'.

You would now do this with every task in the project. But this would be tedious in a long project, so an easier way might be to assign this constraint to all the tasks in one single move. Do this as follows.

Click in the column header of the Task Name column to select the entire column of task names. This appears as follows:



Now pull down the 'Project Menu' and select 'Task Information'. This opens a Multi-task Information box similar to that shown previously, but this time, no specific task is indicated since all have been selected. The '**General**' tab is usually pre-selected, so select the '**Advanced**' tab, and click on the drop down arrow for the 'Constraint type' list, and select '**As Soon As Possible**', then click the '**OK**' button.

The constraint '**As Soon As Possible**' will now be applied to all the tasks in your project.

A **3**

Re-open the MedicExpress Southern Depot project, and enter the following project data.

1 First of all, enter the following tasks and the relevant duration for each.

Task Name	Duration (days)
Visit midlands region	10
Draw up short list of sites	2
Choose site	2
Arrange finance	10
Negotiate price	20
Sign contract	5
Design overall layout	5
Design office	5
Design storage room	10
Order storage units	2
Order office equipment	2
Deliver storage unit	10
Deliver office equipment	5
Physical alterations	20
Establish security	20
Install storage units	10
Recruit staff	5
Grand opening	1

2 Enter the following Summary (or 'group' tasks) into the entry table as follows:

Summary Task	Insert before task
Phase 1: Identify site	Visit midlands region
Phase 2: Legal/Financial	Arrange finance
Phase 3: Building layout	Design overall layout
Phase 4: Setup	Deliver storage unit

3 Ensure that all task types are set to the default of '**Fixed Duration**' and that the task constraint for every task is set to start 'As soon as possible'.

4 Now link the tasks according to the following list of tasks and their predecessors.

Task Name	**Preceding Activity – The task on which it depends**
Start of project milestone	
Visit midlands region	Start of project milestone
Draw up short list of sites	Visit midlands region AND Arrange finance
Choose site	Draw up short list sites
Arrange finance	
Negotiate price	Choose site
Sign contract	Negotiate price
Design overall layout	Choose site
Design office	Design overall layout
Design storage unit	Design overall layout
Order storage unit	Design storage room
Order office equipment	Design office
Deliver storage unit	Physical alterations AND Order storage unit
Deliver office equipment	Physical alterations AND Order office equipment
Physical alterations	Design overall layout AND Sign contract
Establish security	Choose site
Install storage unit	Deliver storage unit
Recruit staff	Deliver office equipment AND Install storage unit AND Establish security
Grand opening	Recruit staff
End of project milestone	Grand opening

Refining your Project Schedule

In this chapter you will learn how to refine your project further by:

Inserting Milestones
Editing Task Links
Inserting Recurring Tasks
Setting and Displaying the Work Breakdown Structure
Working with Lead and Lag times

Inserting Milestones

Milestones are used to identify critical points in the development of a project. It could be the start or end of a stage, or the completion of an important task, or the end of the project itself. Since milestones do not represent actual work being done on the project, they are allocated a duration of zero days.

The procedure for inserting a Milestone is the same as for inserting any new task. Try the following exercise and insert a Milestone at the end of each stage.

1 Point to and click on the second Stage name **'Design**'. Press the '**Insert**' key to insert a new row.

2 Type in the name of the milestone. This is the Milestone for the first stage – Initial Study stage, so call it '**Initial Study Milestone**'.

3 Enter 0 (zero) in the duration column and press enter.

Notice the change to the Gantt chart. Milestone tasks (and any tasks with a 'zero' duration) are shown as black diamonds.

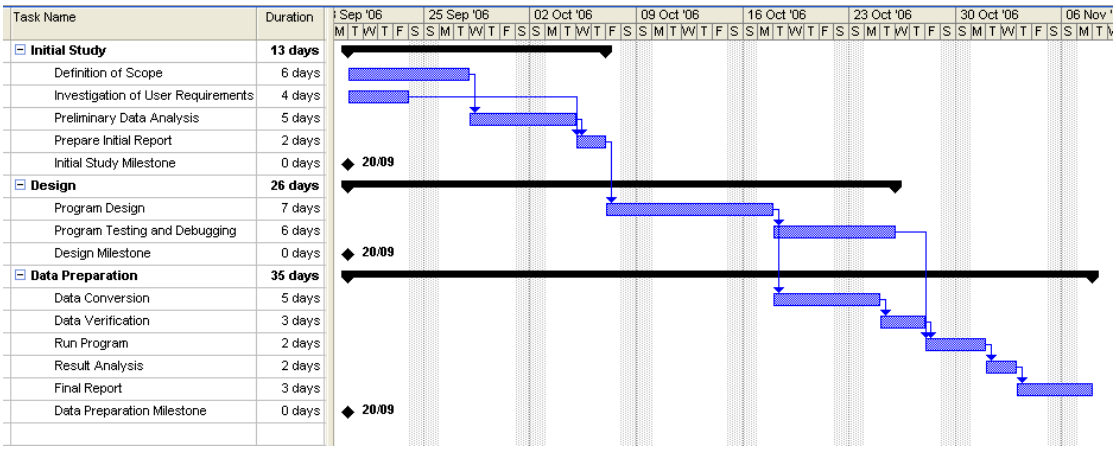
Enter the following milestones for the two remaining stages:

1 ***Design Milestone*** at the end of the Design Stage, and

2 ***Data Preparation Milestone*** at the end of the Data Preparation stage.

As with the Initial Study Milestone, adjust the task duration to 0 (zero) for both of these milestones, and a black diamond will appear in the Gantt chart area for each.

Your screen should now appear as follows.



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Notice the Milestones will appear as black diamonds and also display the date of each milestone. Note also that your dates may be different from those shown above – when I created these notes.

Finally select each of the milestones in turn, and make sure that the constraint of '**As Soon As Possible**' is applied to each milestone.

Editing Task Links

This involves both linking and unlinking tasks. To link two tasks, you clicked on the preceding task, control-clicked on the succeeding task, then clicked on the 'Link' icon. To unlink two tasks, you click on the two tasks in the same way, starting with the preceding task and control-clicking on the succeeding task, but this time click on the 'Unlink' icon (the broken chain link next to the Link icon):

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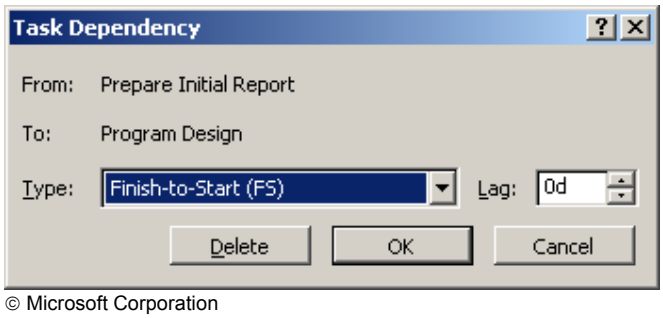
Another way to 'unlink' two tasks is to position the tip of the pointer on the link line, double click with the left button, and a dialogue box appears, listing the two tasks.



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If you wish to delete the link between the two tasks shown, simply click on the 'Delete' button. However, If your Gantt chart is rather 'cluttered' with link lines, it may be easier to use the first method and click on the pair of tasks instead, or another way is simply to reveal the 'Predecessor' column on the left-hand display and edit the task ID numbers in this column to delete an ID referring to a task's predecessor.

To link the Initial study Milestone into the end of the Initial study Stage therefore, proceed as follows.

1. Using either of the methods mentioned, delete the link between the two tasks '**Prepare Initial Report**' and '**Program Design**'. Notice that since the task 'Program Design' no longer depends on any preceding task, it jumps back to the start date of the project.

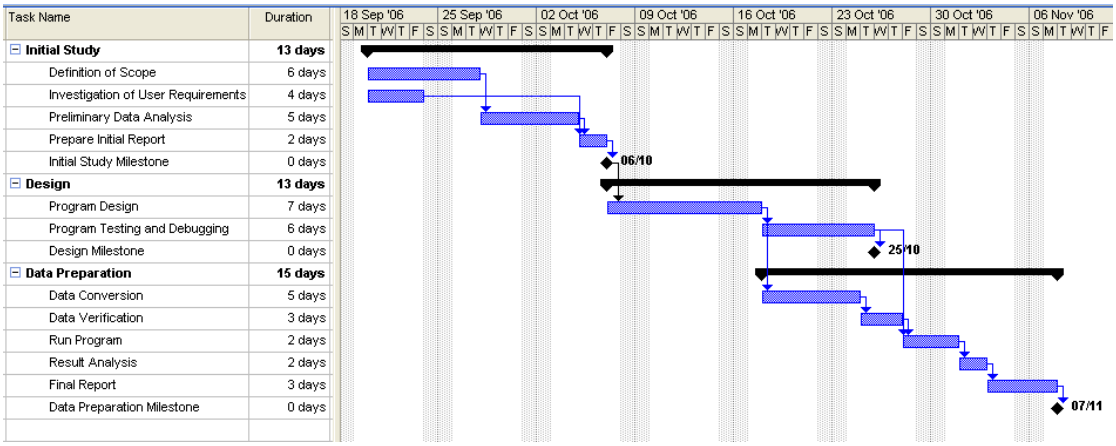
2. Now link the two tasks '**Prepare Initial Report**' succeeded by '**Initial Study Milestone**'. And secondly, link the **milestone** into the first task '**Program Design**' of the next stage.

3. For the '**Design Milestone**', delete the link between the '**Program Testing and Debugging**', and the '**Run Program**' tasks, and link the '**Design Milestone**' task between the two.

Notice that the task 'Data Conversion' still follows on from 'Program Design'. This is acceptable. It is not necessary that all the tasks in a stage are completed before the next stage can begin. Your own experience in project development will tell you what is possible and can be done, even before milestones have been achieved. In this case, as soon as the program has been designed, there is no reason why data operators cannot start converting the data and verifying the process.

Don't forget to link the final milestone – '**Data Preparation Milestone**' following on from the task '**Final Report**'.

Your Gantt chart should now look like the following.



Inserting Recurring Tasks

'Recurring Tasks' refers to tasks which repeat regularly throughout the project. The most obvious example of a recurring task might be the need to have a project team meeting every week. For example, the Project Leader might decide to call the development team together for a regular meeting, either weekly or monthly, on the first Monday of each week for the first four weeks of the Initial Study Stage. Perhaps the meeting might last only 1 hour or 2 hours, but every member of the team will be expected to be there. This will have implications therefore for the scheduling of the other tasks in the project, since the team members will not be available for productive work on any other tasks while they are attending the team meeting.

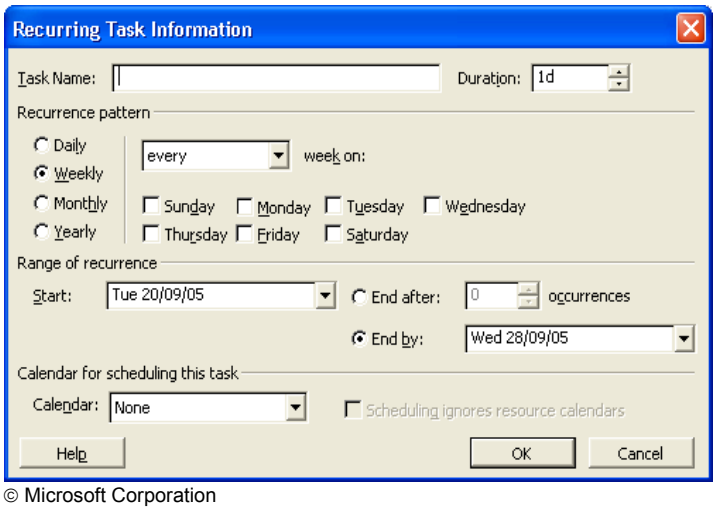
MS Project provides a simple technique for inserting a Recurring Task. You simply describe the task and MS Project will insert it for you.

Let's insert a Recurring Task as described above for 4 meetings on the first four Mondays of the project. Each meeting will last a maximum of 2 hours.

1 With the current project Gantt chart on screen, start by clicking on and selecting the first task, the Summary Task name - **Initial Study**.

2 From the main menu select **Insert -> Recurring Task**.

3 The following '**Recurring Task Information**' box should appear. (The dates may be different).



4 Type a name for the Recurring Task > **Monday Meetings.**

5 For the duration, enter **2h.**

6 Select **Weekly** for the Recurrence pattern.

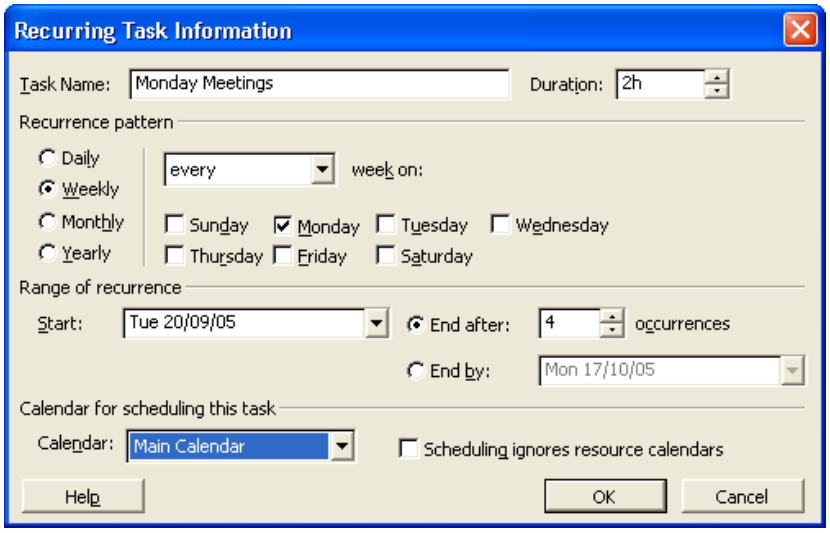
7 In the right-hand side of this recurrence pattern, select **every** and check **Monday**.

8 For the Start date, enter the date of the first Monday of the start of your project. See this from your Gantt chart or use the drop-down arrow to display a calendar.

9 Select the '**End after**' button and enter **4** occurrences.

10 Check that the correct calendar is being used - the calendar you created for this project. This will allow for holidays, when there will be no meetings. Edit this if it is not.

11 Your screen should appear similar to the following:



12 Finally click on **OK**.

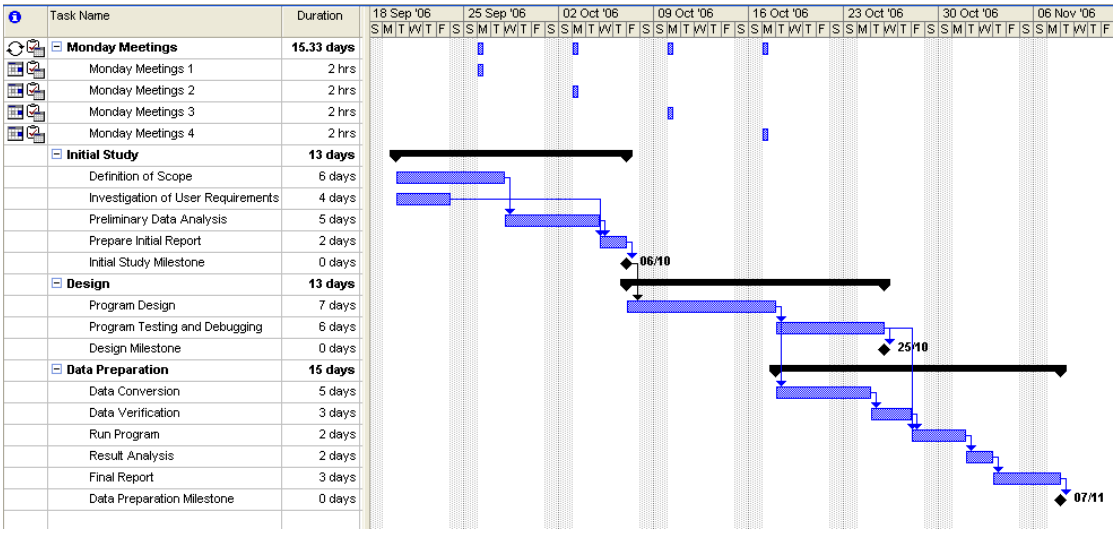
At this point, if you have scheduled meetings to take place at times or on days when no work is taking place, for example on holidays, then you will see a warning dialogue box appear offering you the options of:

(i) Allow MS Project to reschedule the meetings which occur on non-working days;
(ii) To cancel those meetings occurring on non-working days;
(iii) Cancel the whole process.

When that happens, you should select accordingly at your discretion.

If all goes well however, MS Project creates the appropriate number of tasks and displays them as sub-tasks under a summary task with the name you supplied. Note the Recurring Task symbol appears in the Indicators column of the Gantt chart.

Your Gantt chart should be similar to the following, allowing for different dates.



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Notice also that since a recurring task, such as a series of meetings, will take place at a specified date and time regardless of what is happening to the other tasks, the recurring tasks are not 'linked' into the rest of the project schedule.

Their presence however will impact on the rest of the schedule by delaying the other tasks as well as the final project finish date, since the human resources assigned to these other tasks will be at the meeting and not working on these productive tasks, and allowances for this will be automatically 'added in' by the application itself.

Displaying the Work Breakdown Structure

A 'Work Breakdown Structure' is all about organising the list of tasks in your project into a more meaningful, hierarchical order. This may not seem very important. However, when dealing with any kind of business information, it is critical to the success and survival of the business that the information it uses is maintained in some sort of 'organised' manner. Whether it is simply maintaining all records of information in a filing cabinet in date order or customer order, or a very complex database of government statistics on taxation issues, it must be organised.

Maintaining all information in an organised manner will not only speed up data retrieval, but also make the decision-making processes more efficient and effective, resulting in better decisions being made.

The same goes for project information, where Project Managers are frequently making decisions on tasks, progress, resource allocation, time-scheduling, etc. All of these decisions take time and cost money. Any inefficiencies in the process may add to the total cost of a project if inaccurate decisions are made.

One area where an element of organisation can be introduced into projects is to maintain the tasks in a specific order.

In MS Project, there are three ways by which the list of tasks can be given an element of organisation.

These are:

1 **The Task ID**

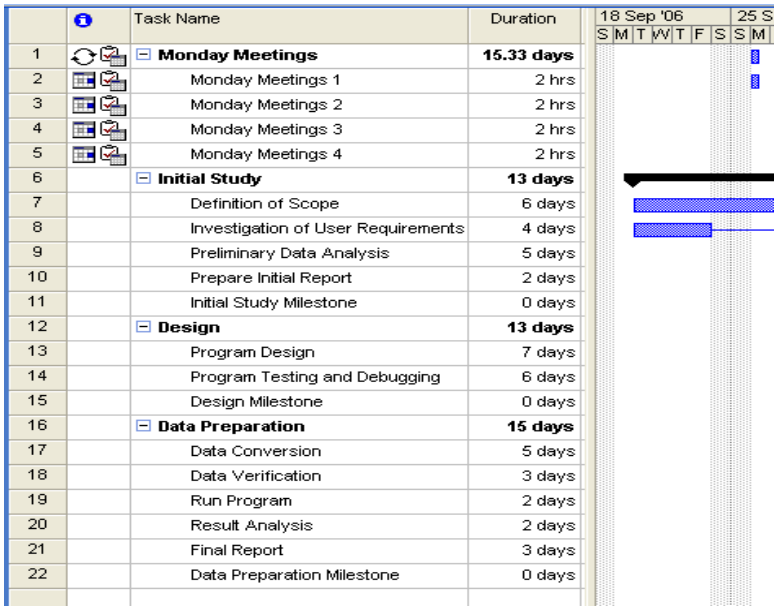
2 **The Unique ID**

3 **The Work Breakdown Structure**

1 Task ID

The first of these, the Task ID, you have already seen and are currently using. It is the simple numerical list, in order, of the task numbers you see in the column to the left of the Task Name list.

If you look at your Gantt chart screen, it should resemble something like the following with the ID numbers down the left-hand side:



	Task Name	Duration
1	**Monday Meetings**	**15.33 days**
2	Monday Meetings 1	2 hrs
3	Monday Meetings 2	2 hrs
4	Monday Meetings 3	2 hrs
5	Monday Meetings 4	2 hrs
6	**Initial Study**	**13 days**
7	Definition of Scope	6 days
8	Investigation of User Requirements	4 days
9	Preliminary Data Analysis	5 days
10	Prepare Initial Report	2 days
11	Initial Study Milestone	0 days
12	**Design**	**13 days**
13	Program Design	7 days
14	Program Testing and Debugging	6 days
15	Design Milestone	0 days
16	**Data Preparation**	**15 days**
17	Data Conversion	5 days
18	Data Verification	3 days
19	Run Program	2 days
20	Result Analysis	2 days
21	Final Report	3 days
22	Data Preparation Milestone	0 days

This shows a list of numbers, starting at 1, simply listing the total number of tasks and summary tasks making up the entire project. The numbering is a simple list in sequence of all the items in the project and makes no difference between summary or group items, individual tasks and the series of meetings. Every item is numbered and treated equally. Unfortunately you cannot use these numbers as a means of identifying a task within a project because every time you make a change to the list of tasks, for example by inserting or deleting a task, or moving them around, these numbers remain in place and do not move with, or get attached to, any specific task name. You cannot therefore use these Task IDs as a means of identifying specific tasks. The Task ID is in effect simply a counter.

Try the following:

1. Click on the task '**Prepare Initial Report**', which is task no. **10** in the above display. Press the Insert key to open a space and type in the new task '**Summarise Data Analysis**'.

2. Now look at the Task ID numbering. This new task has become task no. 10, and all the remaining tasks have been re-numbered. So this Task ID is just a simple listing of tasks in sequence, nothing more.

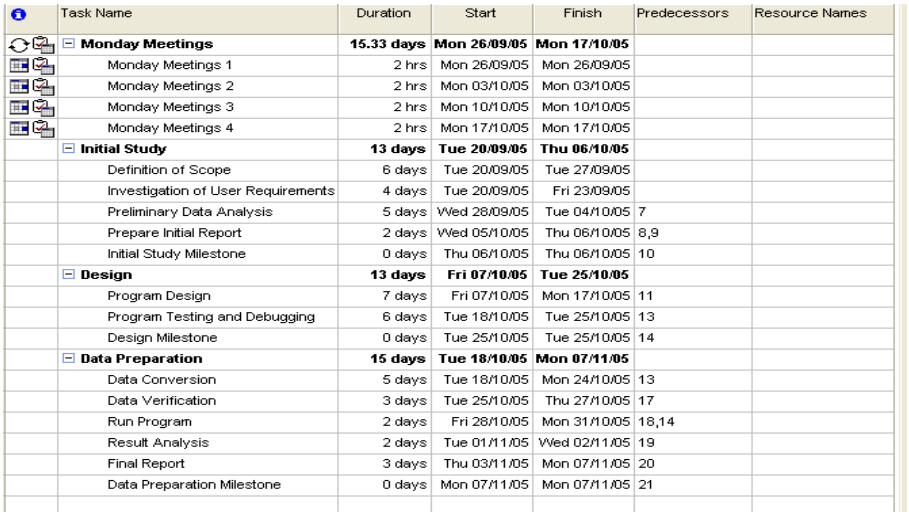
3. Finally click on this new task and delete it from the list and you will see the task list returning to its original state with its original numbers.

2 Unique ID

If, however, you would like to attach a specific and unique ID number to individual tasks, and 'lock' it to that task, so that you can refer to any task by its unique ID number, no matter what you do to the project, then you can use the '**Unique ID**'.

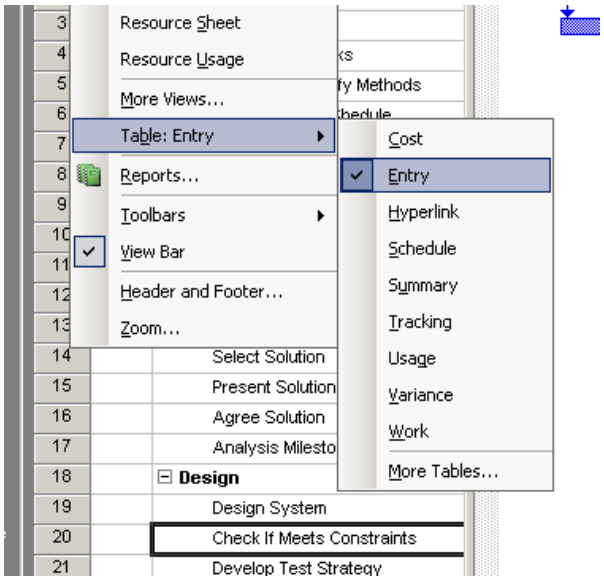
To see this you need to add a new column to the data display. Proceed as follows.

1 Firstly drag the vertical divider bar between the Gantt chart area and the data display to the right to reveal the data information columns, as follows.

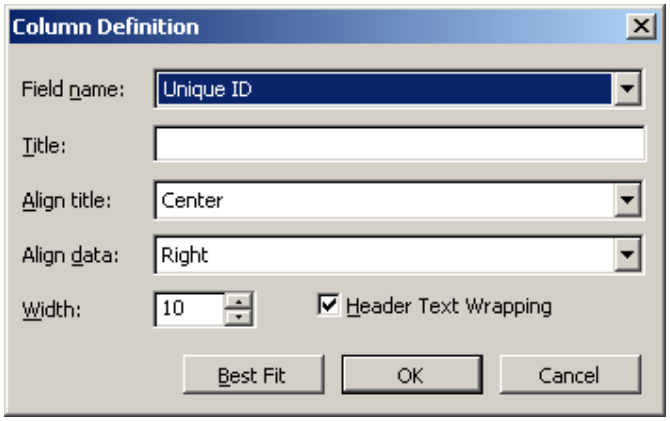


Task Name	Duration	Start	Finish	Predecessors	Resource Names
Monday Meetings	**15.33 days**	**Mon 26/09/05**	**Mon 17/10/05**		
Monday Meetings 1	2 hrs	Mon 26/09/05	Mon 26/09/05		
Monday Meetings 2	2 hrs	Mon 03/10/05	Mon 03/10/05		
Monday Meetings 3	2 hrs	Mon 10/10/05	Mon 10/10/05		
Monday Meetings 4	2 hrs	Mon 17/10/05	Mon 17/10/05		
Initial Study	**13 days**	**Tue 20/09/05**	**Thu 06/10/05**		
Definition of Scope	6 days	Tue 20/09/05	Tue 27/09/05		
Investigation of User Requirements	4 days	Tue 20/09/05	Fri 23/09/05		
Preliminary Data Analysis	5 days	Wed 28/09/05	Tue 04/10/05	7	
Prepare Initial Report	2 days	Wed 05/10/05	Thu 06/10/05	8,9	
Initial Study Milestone	0 days	Thu 06/10/05	Thu 06/10/05	10	
Design	**13 days**	**Fri 07/10/05**	**Tue 25/10/05**		
Program Design	7 days	Fri 07/10/05	Mon 17/10/05	11	
Program Testing and Debugging	6 days	Tue 18/10/05	Tue 25/10/05	13	
Design Milestone	0 days	Tue 25/10/05	Tue 25/10/05	14	
Data Preparation	**15 days**	**Tue 18/10/05**	**Mon 07/11/05**		
Data Conversion	5 days	Tue 18/10/05	Mon 24/10/05	13	
Data Verification	3 days	Tue 25/10/05	Thu 27/10/05	17	
Run Program	2 days	Fri 28/10/05	Mon 31/10/05	18,14	
Result Analysis	2 days	Tue 01/11/05	Wed 02/11/05	19	
Final Report	3 days	Thu 03/11/05	Mon 07/11/05	20	
Data Preparation Milestone	0 days	Mon 07/11/05	Mon 07/11/05	21	

If your screen does not show the columns as above, then change the data display by selecting the **View** menu, then **Table ->**, and finally **Entry** from the sub-menu.



2 Now click on the **Task Name** column header to select this column, and from the **Insert** menu, select **Column**, and in the **Column Definition** box, in the drop down **Field Name** box, select **Unique ID**.



Your screen should now appear similar to the following with the **Unique ID** column inserted to the left of the Task Name column:

	Unique ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
	62	**Monday Meetings**	**15.33 days**	**Mon 26/09/05**	**Mon 17/10/05**		
	63	Monday Meetings 1	2 hrs	Mon 26/09/05	Mon 26/09/05		
	64	Monday Meetings 2	2 hrs	Mon 03/10/05	Mon 03/10/05		
	65	Monday Meetings 3	2 hrs	Mon 10/10/05	Mon 10/10/05		
	66	Monday Meetings 4	2 hrs	Mon 17/10/05	Mon 17/10/05		
	43	**Initial Study**	**13 days**	**Tue 20/09/05**	**Thu 06/10/05**		
	1	Definition of Scope	6 days	Tue 20/09/05	Tue 27/09/05		
	2	Investigation of User Requirements	4 days	Tue 20/09/05	Fri 23/09/05		
	3	Preliminary Data Analysis	5 days	Wed 28/09/05	Tue 04/10/05	7	
	4	Prepare Initial Report	2 days	Wed 05/10/05	Thu 06/10/05	8,9	
	46	Initial Study Milestone	0 days	Thu 06/10/05	Thu 06/10/05	10	
	44	**Design**	**13 days**	**Fri 07/10/05**	**Tue 25/10/05**		
	5	Program Design	7 days	Fri 07/10/05	Mon 17/10/05	11	
	6	Program Testing and Debugging	6 days	Tue 18/10/05	Tue 25/10/05	13	
	47	Design Milestone	0 days	Tue 25/10/05	Tue 25/10/05	14	
	45	**Data Preparation**	**15 days**	**Tue 18/10/05**	**Mon 07/11/05**		
	7	Data Conversion	5 days	Tue 18/10/05	Mon 24/10/05	13	
	8	Data Verification	3 days	Tue 25/10/05	Thu 27/10/05	17	
	9	Run Program	2 days	Fri 28/10/05	Mon 31/10/05	18,14	
	10	Result Analysis	2 days	Tue 01/11/05	Wed 02/11/05	19	
	11	Final Report	3 days	Thu 03/11/05	Mon 07/11/05	20	
	48	Data Preparation Milestone	0 days	Mon 07/11/05	Mon 07/11/05	21	

If your screen does not appear exactly the same as above, the important thing to notice is the **Unique ID** column. This appears to be in random order, because it lists the tasks in the order ***in which they were entered***. And more importantly, the number allocated to each task remains with the task, so each task can be uniquely identified and referred to by that ID number.

Now let's try the same exercise you did with the **Task ID**, to see how this works for the **Unique ID**.

In my screen display the task **Prepare Initial Report** has a Unique ID of **4** and the task **Initial Study Milestone** has the Unique ID of **46**. If these are different on your screen, make a note of the Unique ID numbers here:

Prepare Initial Report Unique ID: _____

Initial Study Milestone Unique ID: _____

Click on the task '**Prepare Initial Report**', and press the Insert key to open a space and type in the new task '**Summarise Data Analysis**'.

Now look at the Unique Task ID numbering. This new task in my screen shown below has been allocated the unique task ID number **67**: This means that it is the 67th task I have entered into this project, and the task will retain this number no matter what I do in future with this project. But the Unique ID numbers for all the other tasks have not changed. **Prepare Initial Report** is still **4**, and **Initial Study Milestone** is still **46**.

Unique ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
62	**Monday Meetings**	**15.33 days**	**Mon 26/09/05**	**Mon 17/10/05**		
63	Monday Meetings 1	2 hrs	Mon 26/09/05	Mon 26/09/05		
64	Monday Meetings 2	2 hrs	Mon 03/10/05	Mon 03/10/05		
65	Monday Meetings 3	2 hrs	Mon 10/10/05	Mon 10/10/05		
66	Monday Meetings 4	2 hrs	Mon 17/10/05	Mon 17/10/05		
43	**Initial Study**	**14 days?**	**Tue 20/09/05**	**Fri 07/10/05**		
1	Definition of Scope	6 days	Tue 20/09/05	Tue 27/09/05		
2	Investigation of User Requirements	4 days	Tue 20/09/05	Fri 23/09/05		
3	Preliminary Data Analysis	5 days	Wed 28/09/05	Tue 04/10/05	7	
67	Summarise Data Analysis	1 day?	Wed 05/10/05	Wed 05/10/05	9	
4	Prepare Initial Report	2 days	Thu 06/10/05	Fri 07/10/05	8,10	
46	Initial Study Milestone	0 days	Fri 07/10/05	Fri 07/10/05	11	
44	**Design**	**13 days**	**Mon 10/10/05**	**Wed 26/10/05**		
5	Program Design	7 days	Mon 10/10/05	Tue 18/10/05	12	
6	Program Testing and Debugging	6 days	Wed 19/10/05	Wed 26/10/05	14	
47	Design Milestone	0 days	Wed 26/10/05	Wed 26/10/05	15	
45	**Data Preparation**	**15 days**	**Wed 19/10/05**	**Tue 08/11/05**		
7	Data Conversion	5 days	Wed 19/10/05	Tue 25/10/05	14	
8	Data Verification	3 days	Wed 26/10/05	Fri 28/10/05	18	
9	Run Program	2 days	Mon 31/10/05	Tue 01/11/05	19,15	
10	Result Analysis	2 days	Wed 02/11/05	Thu 03/11/05	20	
11	Final Report	3 days	Fri 04/11/05	Tue 08/11/05	21	
48	Data Preparation Milestone	0 days	Tue 08/11/05	Tue 08/11/05	22	

Finally click on this new task and delete it from the list and you will see the task list returning to its original state with the Unique ID numbers again unchanged.

3 Work Breakdown Structure

Unique ID numbers allocated to each of the tasks in your project are useful when referencing specific tasks, but one more thing would be very useful and more meaningful in organising the list of tasks. That would be to be able to organise the tasks in a hierarchical format to be able to see which tasks belong to which summary group, rather than just the order in which they were entered.

This is similar to paragraph numbering in a text document as follows:

1 First main paragraph

1.1 First part
1.2 Second part
1.3 Third part

2 Second main paragraph

2.1 First part
2.1.1 First sub-part
2.1.2 Second sub-part

2.2 Second part
2.2.1 First sub-part
2.2.2 Second sub-part
2.2.3 Third sub-part

etc.

In your project, this would mean numbering the tasks in the order of the main summary items then the sub-tasks as follows:

1 Initial Study

1.1 Monday Meetings
1.2 Definition of Scope
1.3 Investigation of User Requirements

etc.

2 Design
2.1 Acquire Physical Resources
2.2 Program Design

etc.

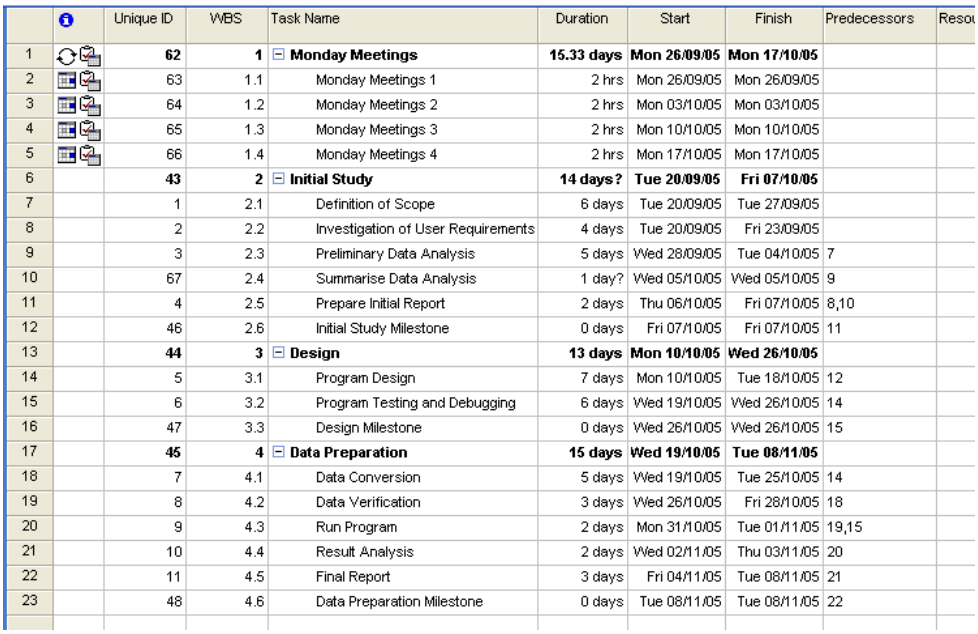
Using the **Work Breakdown Structure** feature, these numbers can be automatically allocated to tasks, but unlike Unique ID numbers, they will be amended as you move tasks around, insert or delete tasks, if these edits affect the task hierarchy of the project.

1. To display these, proceed as before and insert another column to the left of the Task Name column as follows.

2. Click on the Task Name column heading again to select this column.

   Then from the **Insert** menu, select **Column** and from the **Column Definition** window, for **Field Name**, select **WBS**. Finally click **OK**.

   Your screen should now appear as follows:



		Unique ID	WBS	Task Name	Duration	Start	Finish	Predecessors	Resou
1		**62**	**1**	**Monday Meetings**	**15.33 days**	**Mon 26/09/05**	**Mon 17/10/05**		
2		63	1.1	Monday Meetings 1	2 hrs	Mon 26/09/05	Mon 26/09/05		
3		64	1.2	Monday Meetings 2	2 hrs	Mon 03/10/05	Mon 03/10/05		
4		65	1.3	Monday Meetings 3	2 hrs	Mon 10/10/05	Mon 10/10/05		
5		66	1.4	Monday Meetings 4	2 hrs	Mon 17/10/05	Mon 17/10/05		
6		**43**	**2**	**Initial Study**	**14 days?**	**Tue 20/09/05**	**Fri 07/10/05**		
7		1	2.1	Definition of Scope	6 days	Tue 20/09/05	Tue 27/09/05		
8		2	2.2	Investigation of User Requirements	4 days	Tue 20/09/05	Fri 23/09/05		
9		3	2.3	Preliminary Data Analysis	5 days	Wed 28/09/05	Tue 04/10/05	7	
10		67	2.4	Summarise Data Analysis	1 day?	Wed 05/10/05	Wed 05/10/05	9	
11		4	2.5	Prepare Initial Report	2 days	Thu 06/10/05	Fri 07/10/05	8,10	
12		46	2.6	Initial Study Milestone	0 days	Fri 07/10/05	Fri 07/10/05	11	
13		**44**	**3**	**Design**	**13 days**	**Mon 10/10/05**	**Wed 26/10/05**		
14		5	3.1	Program Design	7 days	Mon 10/10/05	Tue 18/10/05	12	
15		6	3.2	Program Testing and Debugging	6 days	Wed 19/10/05	Wed 26/10/05	14	
16		47	3.3	Design Milestone	0 days	Wed 26/10/05	Wed 26/10/05	15	
17		**45**	**4**	**Data Preparation**	**15 days**	**Wed 19/10/05**	**Tue 08/11/05**		
18		7	4.1	Data Conversion	5 days	Wed 19/10/05	Tue 25/10/05	14	
19		8	4.2	Data Verification	3 days	Wed 26/10/05	Fri 28/10/05	18	
20		9	4.3	Run Program	2 days	Mon 31/10/05	Tue 01/11/05	19,15	
21		10	4.4	Result Analysis	2 days	Wed 02/11/05	Thu 03/11/05	20	
22		11	4.5	Final Report	3 days	Fri 04/11/05	Tue 08/11/05	21	
23		48	4.6	Data Preparation Milestone	0 days	Tue 08/11/05	Tue 08/11/05	22	

   Your screen should now show all three numbering systems, the **Task ID**, the **Unique ID**, and the **Work Breakdown Structure**.

3. Finally take a printout of this information table selecting only page 1 to print.

4. Do this by selecting the **Print** option from the **File** menu, and select the **Print range** - **Pages from 1 to 1**.

Working with Lead and Lag Times

All of the tasks you have entered and used to date have been linked on a '**finish-to-start**' basis. This means that a 'preceding' task must finish, or be finished, before the following task can start. You have also set constraints on all of the tasks that they should start '**as soon as possible**'. In other words, as soon as the preceding task is finished, the 'succeeding' or 'following' task can and should start immediately.

In most cases this will be true, but in the real world it is also possible that a 'following' task can start before the preceding task has actually finished. Similarly, when a task is finished, it may be that the following task cannot start immediately, only after some delay. MS Project has a means of identifying such situations and refers to them as '**Lead time**' and '**Lag time**'

Lead time is where a following task can start before the preceding task on which it depends has actually finished. This means that since the following task is able to start earlier, this will result in a '**lead**' on the project duration, or a reduction of the total time taken for the project.

An example of this could be during the construction of a building. Naturally you would have the task 'Build the walls' before the task 'Plaster the walls', and the plastering task dependent upon the walls being built first. However, if there are a lot of walls to be built, then the plastering could possibly get started on the first walls finished even before the remaining walls have been constructed. In other words, the plastering could possibly start when the wall building task is about 50% completed, or even sooner.

Lag time is the opposite of '**Lead**' time, where a following task cannot start immediately the preceding task is finished. In other words, there is a delay between the two tasks, which will result in the total project time increasing, taking longer, or 'lagging' behind. An example of this could be when the foundations of a new building have been laid, particularly the cement, then no work can be done until the cement has set, cured and hardened. So any 'succeeding' task has to wait for a week or more before it can start.

(i) Lead Time

To indicate Lead time between two tasks, you simply say by how much a following or succeeding task has a 'lead' on its preceding task. This is done in the task information window by showing a reduction in time - remember 'Lead' time means a saving in time - a reduction - and is indicated by a 'minus percentage' (e.g. -30%) of the preceding task's duration, or a 'minus days' (if you know exactly how many days you can start a task early).

Try this exercise.

In your project it is possible to start the '**Program Testing and Debugging**' task before the preceding task '**Program Design**' has been fully completed. In other words, you can test bits of the design as they are being completed instead of having to wait till the very end of the Design task before you can start the testing. Let's assume that the testing can start when the '**Program Design**' task is about 30% underway. In other words, you can gain a **Lead** of about 70% on the Design task – or a 'saving' of about 70% of the time taken to Design the program.

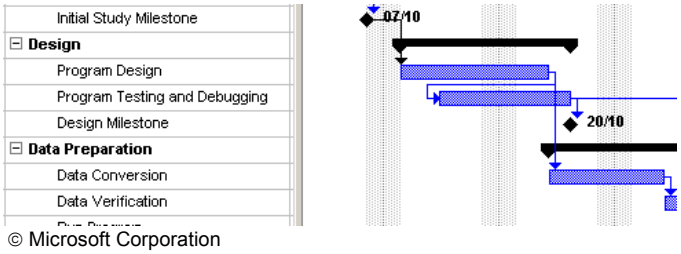
1 With these two tasks on display, double click on the successor task name '**Program Testing and Debugging**'.

2 In the Task Information window, select the **Predecessors** tab. This shows the task on which **Program Testing and Debugging** depends.

3 In the **Lag** column, showing **0d** (zero days) insert **-70%**. This means that you can save 70% of the preceding task's time (or 'cut' or 'reduce' the time of the preceding task by about 70%, by starting this 'successor' task about 30% of the way through the preceding Design task).

4 Click **OK**

Your project should now appear as follows:



The link between the two tasks still shows a finish-to-start relationship, but the follow-on task is starting well before the Program Design task has finished.

(ii) Lag Time

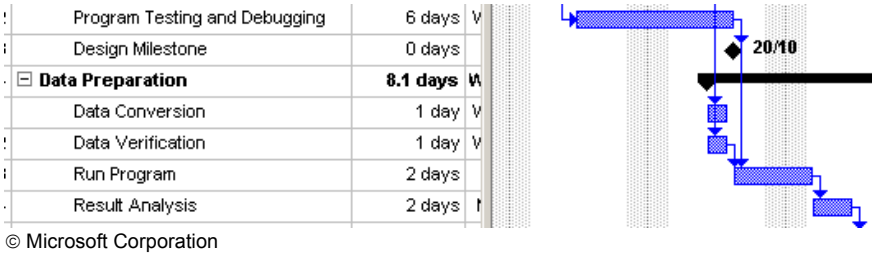
Introducing **Lag time** is the opposite of **Lead Time**, as shown on the previous page. Let's assume that the two tasks '**Data Conversion**' and '**Data Verification**' will be done by an external IT contractor. The entire process will take 10 working days for them to complete but will only involve your own staff for only one day while the data requirements are explained to the contractor. Then for the following 10 days, nothing can be done on the 'Invoicing System' project until the data is returned, converted and verified. From a business efficiency point of view, it would be more appropriate to show the two tasks '**Data Conversion**' and '**Data Verification**' as taking 1 day duration, then introduce a '**Lag**' time before the following task can start –'**Run Program**'. That way, no costs will be charged for your own staff when they are not actually working on these two tasks. You will see this point in the following chapters when dealing with staff resources and staff costs.

Proceed as follows:

1 Firstly change the duration of the tasks '**Data Conversion**' and '**Data Verification**' to a duration of **1 day** each.

2 Now remove the link between '**Data Conversion**' and '**Data Verification**' and re-link '**Data Verification**' so that it succeeds (or depends on) the task '**Program Design**' in the same way that '**Data Conversion**' does. Both of these tasks will now start at the same time at the beginning of the '**Data Preparation**' stage.

3 Now also remove the resources you have applied to these two tasks, Data Conversion and Data Verification since the work will be done by an outside contractor. At this stage, your chart should appear as follows:



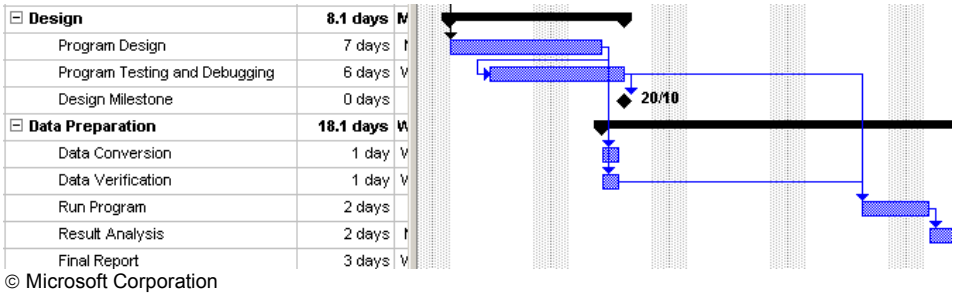
4 Now double-click on the task '**Run Program**' to open the **Task Information** window.

5 Click on the **Predecessors** tab to show the predecessor(s) of '**Run Program**'. Two predecessors are listed – Data Conversion and Data Verification.

6 This time you want to introduce a time delay, so in the **Lag** column, type **10d** for both of these predecessor tasks. It is not necessary to type the ***plus*** sign (+10d). The positive value is the default.

7 Finally click **OK.**

Your project should now appear as follows:



This now shows a gap of 10 days between the two tasks '**Data Conversion**' and '**Data Verification**' and the following task '**Run Program**'.

This is a better and more financially realistic way of organising the task relationships and links, because any staff resources working on the tasks 'Data Conversion' and Data Verification' will now only be charged for 1 day rather than 10 days, while no work was being done, and the staff can perhaps be allocated to other tasks in another project in the meantime.

A 4

Re-open the MedicExpress Southern Depot project, and refine your project further by adding the following data and features.

1 Enter two milestones as follows. Place first one at the start of the project before the task ‘Phase 1: Identify site’ and call it ‘Start of project’, and the second one at the end of the project after the task ‘Grand opening’, calling it ‘End of project’.

2 Now insert a recurring task for a series of team meetings to review process. The first meeting should take place on the first day of the project with 9 follow up meetings taking place on the same day every week and lasting for about 2 hours, making a total of 10 meetings.

3 There will also be some delay in the build process. The task of ‘Install storage unit’ cannot take place until the refrigeration equipment has settled for 2 weeks after delivery. So there will be a lag of 2 weeks between the tasks ‘Deliver storage unit’ and ‘Install storage unit’. Edit your links to show this accordingly.

4 Finally take a printout of your Gantt chart which should include the columns ‘Task name’, ‘Duration’ and ‘Start and Finish’ dates, and the ‘Predecessor tasks’ on display along with the complete Gantt chart.

Managing Resources

Managing a project involves managing two key elements. Firstly the project tasks involving which jobs are to be done, when, and in which order. Secondly, managing the resources, both human and physical which will contribute the effort required in order to complete the tasks - in other words - do the actual work.

Before you can use any resources in a project schedule, it is necessary to prepare a list of the available resources within the project, so that they can subsequently be assigned to the appropriate tasks. For example, you would assign programmers to the programming parts of a software development project, and assign network designers and engineers to the networking parts of the project - not the other way around.

Firstly, you need to create a pool of 'resources'. Resources for your project include the people who manage the project and do the work, as well as the facilities, equipment, materials, and supplies they use to complete the tasks. The set of resources available for working on your project is called the **Resource Pool**.

You can create a pool of resources directly linked to your project, or you can use a pool of resources created in another project and import them across. In the following exercise you will create a resource pool in the current project, to be used exclusively by your project.

Creating a Resource Pool

Start by creating a Resource Pool for the project 'Invoicing System'. Let's assume that we need four human resources to undertake our project - a Systems Analyst, a Programmer, a Data Analyst, and a Systems Designer.

If not already open, then open the project you are creating in this tutorial, the '**Invoicing System**' project. With your project open and the table columns of Task names and task details on view on the left of the screen and the Gantt chart bars on the right side of the screen, start by making sure that the **View Bar** is on display to help you navigate the different views of MS Project. This is a narrow pane which appears down the left side of the screen listing the most common views available to you in MS Project, and making it easier to jump between views. If it is not on display, you can display it by selecting **View -> View Bar** from the main menu. Now from this **View Bar** click on **Resource Sheet**.

The Resource Sheet is displayed on the desktop. The main columns you will use here are the '**Resource Name**' column - used in a similar way to the 'Task Name' column you used previously, and also the columns headed '**Std rate**' and '**Ovt rate**' for entering the standard hourly rates of pay and the overtime rates of pay for the resources. The pay rates columns will be used later in this tutorial to calculate the resource costs of the project.

Proceed as follows:

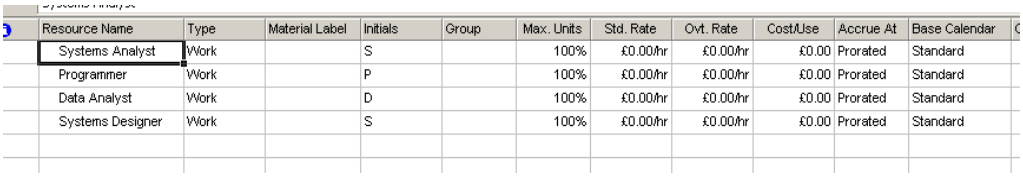
1 In the first cell in the Resource Name column, enter **Systems Analyst.**

2 In the second cell enter **Programmer.**

3 In the third cell enter **Data Analyst.**

4 In the fourth Cell enter **Systems Designer.**

Your screen should appear as follows.



Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
Systems Analyst	Work		S		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
Programmer	Work		P		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
Data Analyst	Work		D		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard
Systems Designer	Work		S		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Standard

Assigning Calendars to the Resources

Previously in the tutorial, you created a calendar to show the work patterns for your staff and to allow the Project software to calculate durations and costs of the project. Before you leave the Resource Pool, you must ensure that the correct calendar and its work patterns are being used by MS Project for each and all of the Resources, not one of the MS Project default calendars.

Do this as follows:

Start by clicking on the first cell in the '**Base Calendar**' column, click on the drop-down arrow, and select the correct calendar for each resource. Use the calendar you created for this project.

Do this for each of the resources.

The Resource sheet should now appear as follows:

Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
Systems Analyst	Work		S		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar
Programmer	Work		P		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar
Data Analyst	Work		D		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar
Systems Designer	Work		S		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar

In this display I have called the project calendar '**Main Calendar**' - your display will show the calendar you created.

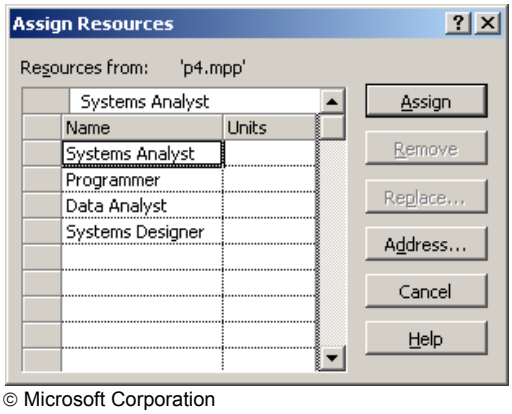
Assigning Resources to Tasks

Now that you have created a pool of resources, you can allocate these resources to the individual tasks in the project schedule.

Return to the Gantt chart by clicking on the Gantt chart icon in the View Bar on the left side of the desktop.

When the Gantt chart is on screen, open the 'Assign Resources' dialogue box by clicking on the 'Assign Resources' icon in the tool bar (the wee heads):

The Assign Resources dialogue box will open, and display all the resources you have created in the Resource Pool.



The process of assigning resources is quite simple. While the dialogue box is on screen, click on and select, each task in turn, then click on and select the resource you wish to assign to this task, and finally click on the '**Assign**' button. You can assign as many resources as you wish to each task. While the **Assign Resources** dialogue box is on display, click on each task in turn select the resource(s) you wish to allocate to that task. You would repeat this process until you have assigned all the required resources to all of the tasks.

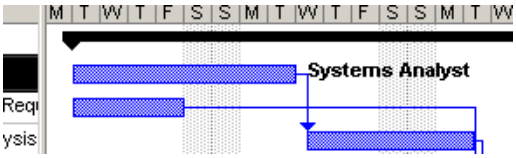
Keep in mind that MS Project, like all project scheduling software, uses by default an '**effort-driven**' approach to task durations. This means that the more resources you assign to a task, the shorter time the task will take to complete. In other words, two men digging a hole will take less time to dig it, than one man. The arithmetic is simple in that when two resources are assigned to a task, you will find that the task duration will reduce by half. If you add a third, or even more, the task duration will diminish accordingly.

Let's proceed and assign some resources to the tasks.

1 Click on and select the first task ***Definition of Scope***.

2 Open the Assign Resources dialogue box, and click on **Systems Analyst**.

3 Click the Assign button. If you look up at the schedule, you will notice that this resource name has been appended to the ***Definition of Scope*** bar on the Gantt chart.



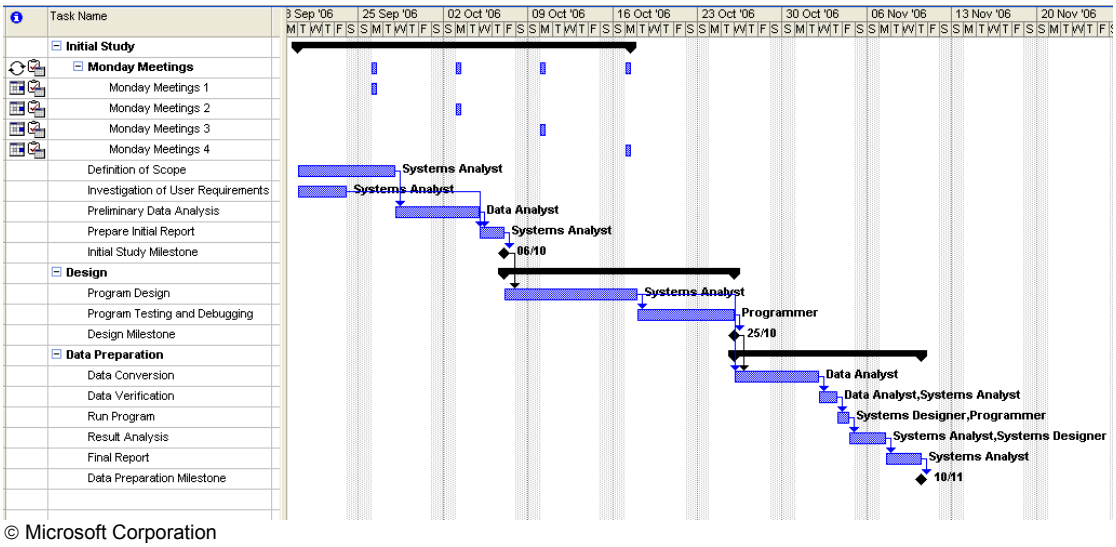
4 Also the figure of 100% appears in the Units column of the 'Assign Resources' box, indicating that this resource has been allocated to work 100% of their available time on this task.

5 Now repeat the process, clicking on each task in turn, and then assigning the following resources to the remaining tasks as below. Note that some tasks have more than one resource assigned to them:

Task Name	**Resources**
Investigation of user requirements	Systems Analyst
Preliminary data analysis	Data Analyst
Prepare initial report	Systems Analyst
Program design	Systems Designer
Program testing and debugging	Programmer
Data conversion	Data Analyst
Data verification	Data Analyst Systems Analyst
Run program	Systems Designer Programmer
Result analysis	Systems Designer Systems Analyst
Final report	Systems Analyst

6 When you have finished, click on the '**Close**' button to close the '**Assign Resources**' dialogue box.

Your Gantt chart should now appear similar to the following.



Now close this project and save it to your file storage area.

A 5

1 Re-open the '**Southern Depot**' project for MedicExpress again, and in the Resource Sheet, enter the following resources. The first 4 of them are individuals who work for MedicExpress, and the last 3 are contractors. The details under 'Group' refer to area of work and this information will be used later in these notes for sorting and filtering processes. Enter this detail in the column headed '**Group**'.

Name	**Group**
Arthur Shutt	Internal
Caroline Spenser	Internal
Harry Dunn	Internal
Wendy Clarke	Consultant

Name	**Group**
Acme Builders	Contractors
Russell Transport	Contractors
Total Security	Contractors

2 Ensure that the correct project calendar which you created for the 'Southern Depot' project has been assigned to each of the resources.

3 Take a printout of the Resource Sheet to show all of the above details in your resource pool, and scale the display to include all of the columns on 1 page.

4 Now using the following box, assign the resources as follows:

Task Name	Resource(s)
Visit midlands region	Arthur Shutt Harry Dunn Wendy Clarke
Draw up short list of sites	Arthur Shutt Caroline Spenser Harry Dunn Wendy Clarke
Choose site	Arthur Shutt
Arrange finance	Caroline Spenser
Negotiate price	Arthur Shutt Caroline Spenser
Sign contract	Arthur Shutt
Design overall layout	Arthur Shutt Harry Dunn Wendy Clarke
Design office	Wendy Clarke
Design storage unit	Wendy Clarke
Order storage unit	Caroline Spenser
Order office equipment	Caroline Spenser
Deliver storage unit	Russell Transport
Deliver office equipment	Russell Transport
Physical alterations	Acme Builders
Establish security	Total Security
Install storage unit	Arthur Shutt Acme Builders
Recruit staff	Caroline Spenser
Grand opening	Arthur Shutt Harry Dunn Wendy Clarke

5 Now take a printout of the Gantt chart again to show all of the tasks with the resources allocated against each of the task bars.

6 Finally close the ‘Southern Depot’ project and save it to your file storage area.

Allocating Costs to Resources and Tasks

Another important duty of the Project Manager is to be able to estimate the costs of a project, such as the individual resource costs, or the cost of any single task, as well as the total project costs. This is the information that would form the foundation for the quote when going to tender. In order to calculate the development costs of a project, it is necessary to enter the cost details for the resources used in the project. In this chapter, you will see how to enter a resource's standard hourly rate, its overtime rate and also how to allocate a set, or 'fixed' cost to a specific task.

Start by re-opening your original project '**Invoicing System**' again.

Displaying project costs

First of all, let's look at a report called a '**Project Summary**' which shows a range of information about the project, but most importantly, the project **start** and **finish** dates and also the **project costs**. This report is available from the **View** menu as follows.

1 With the Gantt chart on display, select **View -> Reports -> Overview -> Project Summary**. The following should be displayed on screen. You can zoom in on the report by left clicking on the view and also print out the report by clicking on the 'Print' button.

New Customer Invoicing System
Home

as of Sun 21/08/05

Dates			
Start:	Tue 20/09/05	Finish:	Thu 10/11/05
Baseline Start:	NA	Baseline Finish:	NA
Actual Start:	NA	Actual Finish:	NA
Start Variance:	0 days	Finish Variance:	0 days

Duration			
Scheduled:	37.5 days	Remaining:	37.5 days
Baseline:	0 days?	Actual:	0 days
Variance:	37.5 days	Percent Complete:	0%

Work			
Scheduled:	270 hrs	Remaining:	270 hrs
Baseline:	0 hrs	Actual:	0 hrs
Variance:	270 hrs	Percent Complete:	0%

Costs			
Scheduled:	£0.00	Remaining:	£0.00
Baseline:	£0.00	Actual:	£0.00
Variance:	£0.00		

Task Status		Resource Status	
Tasks not yet started:	22	Work Resources:	3
Tasks in progress:	0	Overallocated Work Resources:	1
Tasks completed:	0	Material Resources:	0
Total Tasks:	22	Total Resources:	4

At the top of the report you will see the **Start** date as declared by you previously, and also the **Finish** date as calculated by MS Project using the linked task durations.

Notice also that the **Costs** fields are currently blank.

Click on the **Print** icon to take a printout of this report.

Entering Hourly Rates for human resources

There are a number of possible views/dialog boxes that can be used to enter wage rates, but perhaps the easiest method is to use the **Resource Sheet** view:

1 Open the original project you were developing in these notes. You have already created the pool of resources in the Resource Sheet, so . . .

2 Select **Resource Sheet** from the view bar. This should appear as follows:

Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
Systems Analyst	**Work**		**S**		**100%**	**£0.00/hr**	**£0.00/hr**	**£0.00**	**Prorated**	**Main Calendar**
Programmer	Work		P		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar
Data Analyst	Work		D		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar
Systems Designer	Work		S		100%	£0.00/hr	£0.00/hr	£0.00	Prorated	Main Calendar

Note: On your screen you will see that the Systems Analyst appears in red. This is a warning alert to the fact that you have over-allocated this resource to too many tasks at the same time. In a later chapter you will see how to deal with such over-allocated resources.

3 To enter the standard rate for the first resource, **Systems Analyst**, click on the cell at the intersection of **Systems Analyst** and **Std. Rate** and type in the amount (£35 - without the '£' sign), the same procedure is used to enter overtime rates, this time typing in the cells below **Ovt. Rate**.

4 Using the figures in the table below enter the **standard** and **overtime rates** for all four resources:

Resource Name	Std. Rate	Ovt. Rate
Systems Analyst	£35	£45
Programmer	£30	£40
Data Analyst	£20	£27
Systems Designer	£35	£45

Your Resource Sheet display should now appear as follows:

Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
Systems Analyst	**Work**		**S**		**100%**	**£35.00/hr**	**£45.00/hr**	**£0.00**	**Prorated**	**Main Calendar**
Programmer	Work		P		100%	£30.00/hr	£40.00/hr	£0.00	Prorated	Main Calendar
Data Analyst	Work		D		100%	£20.00/hr	£27.00/hr	£0.00	Prorated	Main Calendar
Systems Designer	Work		S		100%	£35.00/hr	£45.00/hr	£0.00	Prorated	Main Calendar

5 Now display the Project summary report again to see the impact of these wage rates on the project costs. To remind you, you will find this under **View -> Reports ->Overview -> Project summary**. Left click once on the display to enlarge the image.

Your Project Summary report should now appear as follows. See the difference in the project total costs figure. It should now display a total project cost of £8,205.

New Customer Invoicing System
Home

as of Sun 21/08/05

Dates			
Start:	Tue 20/09/05	Finish:	Thu 10/11/05
Baseline Start:	NA	Baseline Finish:	NA
Actual Start:	NA	Actual Finish:	NA
Start Variance:	0 days	Finish Variance:	0 days

Duration			
Scheduled:	37.5 days	Remaining:	37.5 days
Baseline:	0 days?	Actual:	0 days
Variance:	37.5 days	Percent Complete:	0%

Work			
Scheduled:	270 hrs	Remaining:	270 hrs
Baseline:	0 hrs	Actual:	0 hrs
Variance:	270 hrs	Percent Complete:	0%

Costs			
Scheduled:	£8,205.00	Remaining:	£8,205.00
Baseline:	£0.00	Actual:	£0.00
Variance:	£8,205.00		

Task Status	
Tasks not yet started:	22
Tasks in progress:	0
Tasks completed:	0
Total Tasks:	22

Resource Status	
Work Resources:	3
Overallocated Work Resources:	1
Material Resources:	0
Total Resources:	4

6 Finally, take a further printout of the report and retain this.

Viewing Task Costs

Now assume that you would like to see what each task is costing, after having allocated hourly rates to each of the resources involved in the project. To do this you need to display two separate views in the one window, by 'splitting' the screen display into two panes.

1 Ensure that the **Gantt chart** is on display. If not, select it from the **View Bar**, or from the **View** menu.

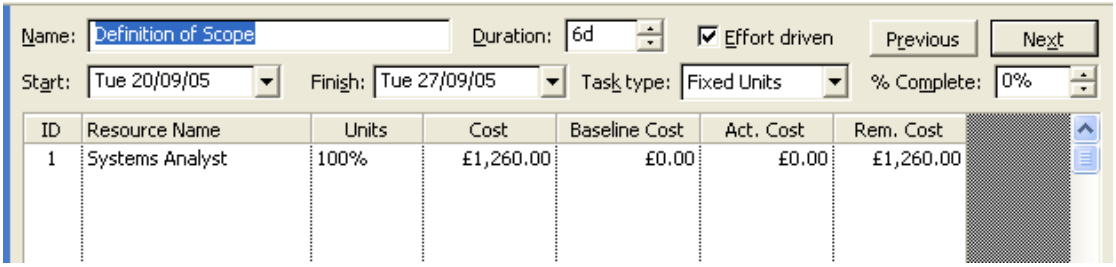
2 From the main menu select **Window**, then select **Split**. When you split the Gantt chart view, a Task form is automatically displayed in the lower pane, which shows more specific details about each of the tasks in the above pane, which is still showing the Gantt chart.

3 In the Gantt chart view in the upper pane, click on the first task, **Definition of Scope**.

4 Activate the bottom pane with the **F6** key which toggles between the two (or click anywhere in the bottom pane - it works just the same).

5 From the menu bar, select **Format, Details** to display the Details menu.

6 From the **Details** menu, choose **Resource Cost** and the details in the lower pane should change and appear similar to the following:



7 You can see the cost for the Definition of Scope task is £1,260. This consists of the Systems Analyst working 6 hours per day @ £35 each day for 6 days:

6 * £35 * 6 = £1,260

8 Click on the **Investigation of User Requirements** task. This task costs £840, made up of the Systems Analyst working for 4 days of 6 hours per day at £35 per hour.

9 It's also just as easy to display the costs of tasks as part of the Gantt chart.

Return to the Gantt chart in the upper pane (click anywhere in the chart or press the toggle key - **F6**), and remove the split by Selecting **Windows -> Remove Split**.

The table of information you have seen to date consisting of columns such as Task Name, Task Duration, Start Date, etc, make up what is called the **Table: Entry** view. You should now switch to the **Table: Cost** view to see cost details. Do this as follows.

10 Select **View** from the main menu.

11 Select the **Table:** option and select **Cost**. Your display should be similar to the following showing a selection of the many columns of **Cost** information available to you in MS Project:

Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline
Initial Study	**£0.00**	**Prorated**	**£3,120.00**	**£0.00**
Monday Meetings	**£0.00**	**Prorated**	**£0.00**	**£0.00**
Monday Meetings	£0.00	Prorated	£0.00	£0.00
Monday Meetings	£0.00	Prorated	£0.00	£0.00
Monday Meetings	£0.00	Prorated	£0.00	£0.00
Monday Meetings	£0.00	Prorated	£0.00	£0.00
Definition of Scope	£0.00	Prorated	£1,260.00	£0.00
Investigation of User R	£0.00	Prorated	£840.00	£0.00
Preliminary Data Analy	£0.00	Prorated	£600.00	£0.00
Prepare Initial Report	£0.00	Prorated	£420.00	£0.00
Initial Study Milestone	£0.00	Prorated	£0.00	£0.00
Design	**£0.00**	**Prorated**	**£2,550.00**	**£0.00**
Program Design	£0.00	Prorated	£1,470.00	£0.00
Program Testing and D	£0.00	Prorated	£1,080.00	£0.00
Design Milestone	£0.00	Prorated	£0.00	£0.00
Data Preparation	**£0.00**	**Prorated**	**£2,535.00**	**£0.00**
Data Conversion	£0.00	Prorated	£600.00	£0.00
Data Verification	£0.00	Prorated	£495.00	£0.00
Run Program	£0.00	Prorated	£390.00	£0.00
Result Analysis	£0.00	Prorated	£420.00	£0.00
Final Report	£0.00	Prorated	£630.00	£0.00
Data Preparation Miles	£0.00	Prorated	£0.00	£0.00

12 In this view, you are mainly concerned just now with the **Total Cost** column showing the total cost for each task.

13 Finally take a printout of the current display showing the various Cost columns.

Click on the Print Preview icon first to ensure that all of the columns will be printed. If they are not, then move the vertical divider bar to the right. Only columns which are fully visible on screen will be included in any printout. This way, by moving the divider bar left or right, you can determine which and how many columns to include in the printout.

The most important column to you just now is the **Total** Cost column which shows the total cost of each task in the project.

14 Before proceeding to the next chapter, switch the table view back to the **Data Entry** view by selecting from the main menu **View -> Table:** and select **Entry**.

Allocating Fixed Costs

Physical Resources vs. Human Resources

Physical resources are all the other non-human resources used during the development of a project. In the example of the extension being built onto a house, the physical resources would include things like bricks, cement, wood, glass for the windows, etc. They are the physical objects which are used up, or 'transformed' during the development of a project, becoming the final goods themselves.

Human resources, on the other hand provide the actual work and 'process' or 'convert' these physical resources into the goods required by the project. The human resources provide the work effort so are paid by the hour, or month, or whatever, and will continue in existence after the project is completed. The physical resources will be 'used up' during the project and normally incur a one-off cost.

For example, you will pay a building merchant for the stack of bricks you require, also for several bags of cement, and for the hire of excavation vehicles to remove the soil and clear the ground, etc. All of these items will usually incur a one-off fixed charge, which must still be accounted for within the project schedule to enable it to calculate the true total cost of the project. On the other hand, the actual builders you hire to do the work for you will probably charge you at an hourly or daily rate.

In the case of a computing oriented project, you may require physical resources such as workstations, office equipment, office furniture or cars for development staff to travel between the office and remote sites.

Charging for Physical Resources

You can account for physical resources in various ways, but perhaps the easiest way is to create a task in the schedule which records the act of ordering, purchasing, acquiring, or simply making use of the physical resources at an appropriate stage in the project, and allocating a fixed cost to that task as the cost for the materials. Keep in mind, human resources may also charge a fixed rate for their services. For example, hiring a consultant may incur a fixed charge of £8000 regardless of how many hours are spent on the job (within reason of course), or the fixed fee you pay a lawyer to sell your home regardless of how long it takes to sell.

In this exercise, you realise that you will require a few extra resources to help your team undertake the project. For example, you will need a few PCs, and the lease of an office for about 6 months. All of this will cost another £6,000. At the beginning of the Design Stage, therefore, you will need to account for the acquisition of these resources and also include the cost of £6,000 so that it will be included in the total cost of the project.

Click on the first cell in the Design stage, that is, the **Program Design** task, and insert a space for a new task. Into this cell enter the task name: **Acquire Physical Resources**. Acquiring these resources will also take 5 days for delivery, so allocate a task duration of 5 days.

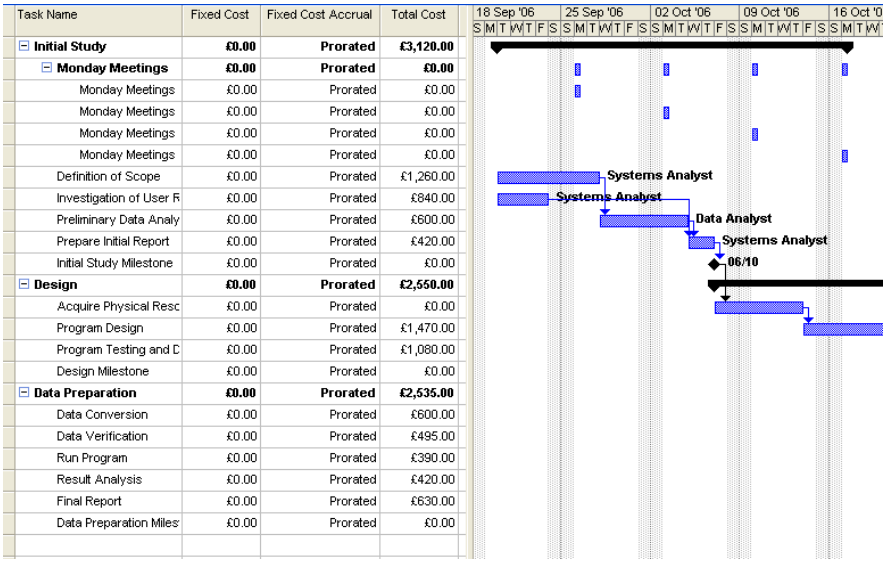
If necessary, adjust the links so that this new task is linked between the **Design Milestone** and the **Program Design** tasks.

Ensure that the table view Table: Cost is still on display. If not change it as follows:

Select **View** from the main menu.

Select **Cost** from the **Table** option on the menu.

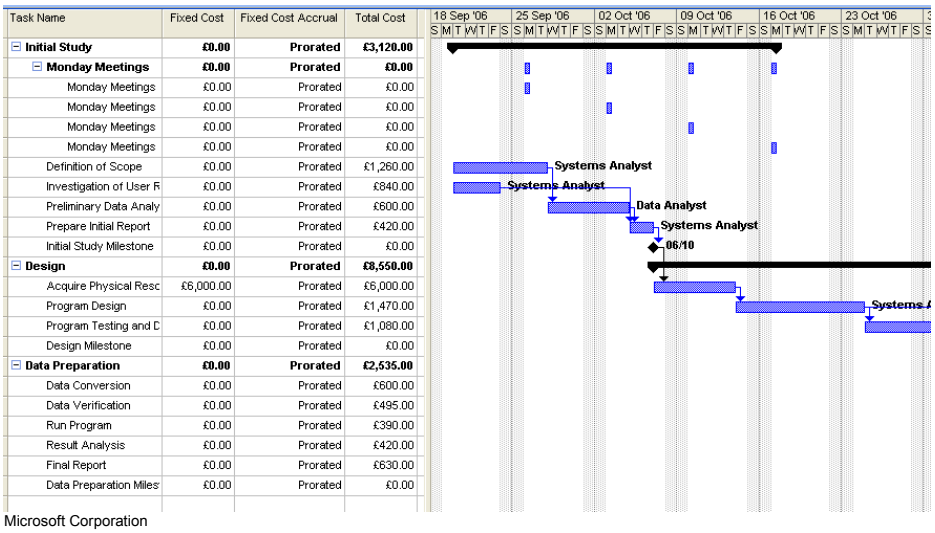
Your screen should appear as follows. Notice that the total cost for the Design Stage is £2,550.



Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost
Initial Study	**£0.00**	**Prorated**	**£3,120.00**
Monday Meetings	**£0.00**	**Prorated**	**£0.00**
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Definition of Scope	£0.00	Prorated	£1,260.00
Investigation of User R	£0.00	Prorated	£840.00
Preliminary Data Analy	£0.00	Prorated	£600.00
Prepare Initial Report	£0.00	Prorated	£420.00
Initial Study Milestone	£0.00	Prorated	£0.00
Design	**£0.00**	**Prorated**	**£2,550.00**
Acquire Physical Resc	£0.00	Prorated	£0.00
Program Design	£0.00	Prorated	£1,470.00
Program Testing and D	£0.00	Prorated	£1,080.00
Design Milestone	£0.00	Prorated	£0.00
Data Preparation	**£0.00**	**Prorated**	**£2,535.00**
Data Conversion	£0.00	Prorated	£600.00
Data Verification	£0.00	Prorated	£495.00
Run Program	£0.00	Prorated	£390.00
Result Analysis	£0.00	Prorated	£420.00
Final Report	£0.00	Prorated	£630.00
Data Preparation Miles	£0.00	Prorated	£0.00

You can also see that the first column after the Task Name column is '**Fixed Cost**', where you simply enter the fixed cost of a particular resource or task.

For the new task – **Acquiring Physical Resources** – enter a fixed cost of **£6,000**.



Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost
Initial Study	**£0.00**	**Prorated**	**£3,120.00**
Monday Meetings	**£0.00**	**Prorated**	**£0.00**
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Monday Meetings	£0.00	Prorated	£0.00
Definition of Scope	£0.00	Prorated	£1,260.00
Investigation of User R	£0.00	Prorated	£840.00
Preliminary Data Analy	£0.00	Prorated	£600.00
Prepare Initial Report	£0.00	Prorated	£420.00
Initial Study Milestone	£0.00	Prorated	£0.00
Design	**£0.00**	**Prorated**	**£8,550.00**
Acquire Physical Resc	£6,000.00	Prorated	£6,000.00
Program Design	£0.00	Prorated	£1,470.00
Program Testing and D	£0.00	Prorated	£1,080.00
Design Milestone	£0.00	Prorated	£0.00
Data Preparation	**£0.00**	**Prorated**	**£2,535.00**
Data Conversion	£0.00	Prorated	£600.00
Data Verification	£0.00	Prorated	£495.00
Run Program	£0.00	Prorated	£390.00
Result Analysis	£0.00	Prorated	£420.00
Final Report	£0.00	Prorated	£630.00
Data Preparation Miles	£0.00	Prorated	£0.00

You will now notice that the total cost for the Design Stage has risen to **£8,550**.

At this stage, you should look at the **Project Summary** report again and see the difference this has made to the total project costs.

New Customer Invoicing System
Home

as of Sun 21/08/05

Dates

Start:	Tue 20/09/05	Finish:	Thu 17/11/05
Baseline Start:	NA	Baseline Finish:	NA
Actual Start:	NA	Actual Finish:	NA
Start Variance:	0 days	Finish Variance:	0 days

Duration

Scheduled:	42.5 days	Remaining:	42.5 days
Baseline:	0 days?	Actual:	0 days
Variance:	42.5 days	Percent Complete:	0%

Work

Scheduled:	270 hrs	Remaining:	270 hrs
Baseline:	0 hrs	Actual:	0 hrs
Variance:	270 hrs	Percent Complete:	0%

Costs

Scheduled:	£14,205.00	Remaining:	£14,205.00
Baseline:	£0.00	Actual:	£0.00
Variance:	£14,205.00		

Task Status

Tasks not yet started:	23
Tasks in progress:	0
Tasks completed:	0
Total Tasks:	23

Resource Status

Work Resources:	3
Overallocated Work Resources:	1
Material Resources:	0
Total Resources:	4

The total project costs have now risen to **£14,205**. Compare this with your previous printouts of total project costs.

Finally, close the '**Invoicing System**' project and save it to your file storage area.

A 6

1 Re-open the '**Southern Depot**' project for MedicExpress again, and in the **Resource Sheet**, enter the Standard and Overtime Hourly Rates for each of the resources as follows.

Name	Std. Rate	Ovt. Rate
Arthur Shutt	£28/h	£40/h
Caroline Spenser	£20/h	£28/h
Harry Dunn	£20/h	£28/h
Wendy Clarke	£50/h	£50/h

2 For the following contractors, there will be a 'Cost per Use' fee as follows:

Name	Cost/Use
Russell Transport	£ 1,000
Acme Builders	£40,000
Total Security	£ 8,000

This is the fee that will be charged for each and every time the contractors are used. Enter the values into the Cost/Use column in the Resource Sheet.

3 Take a printout of the revised Resource Sheet showing the rates for each of the resources, adjusting the scale of the sheet to printout on a single sheet.

4 Now take a printout of the Project Summary to see the total project costs to date.

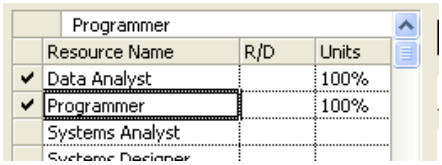
5 Finally close the project and save it to your file storage area.

Dealing with Resource Overallocations

What is meant by resource overallocation?

When you are allocating resources to tasks in a very large project, you will naturally allocate the same resource to many tasks, and sometimes you may allocate resources to tasks taking place at the same time without realising you are doing so. This results in the **overallocation** of a resource. That is, where a resource is allocated to do more work than the resource is available to do at that moment in time.

For example, you may have noticed that as each resource was allocated, it was allocated on the basis of 100% effort. Remember the following diagram when you were allocating resources using the 'Assign Resources' dialogue box which has a column indicating 100% Units of effort being applied by a resource? This means that a resource's entire day will be allocated to that task.



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The resource will be fully occupied with that task for 100% of the resource's time for the duration of that task. If you allocate the same resource to another task scheduled to take place at the same time on the same day, again at 100%, then you are expecting this resource to contribute 200% effort, in other words, working double the available hours in every single day.

This is not possible, and all project management software recognises this fact, and will somehow warn you that you have **overallocated** that resource during this time period.

Resources are ***'overallocated'*** when they are scheduled to do more work than is physically possible within a specified time period.

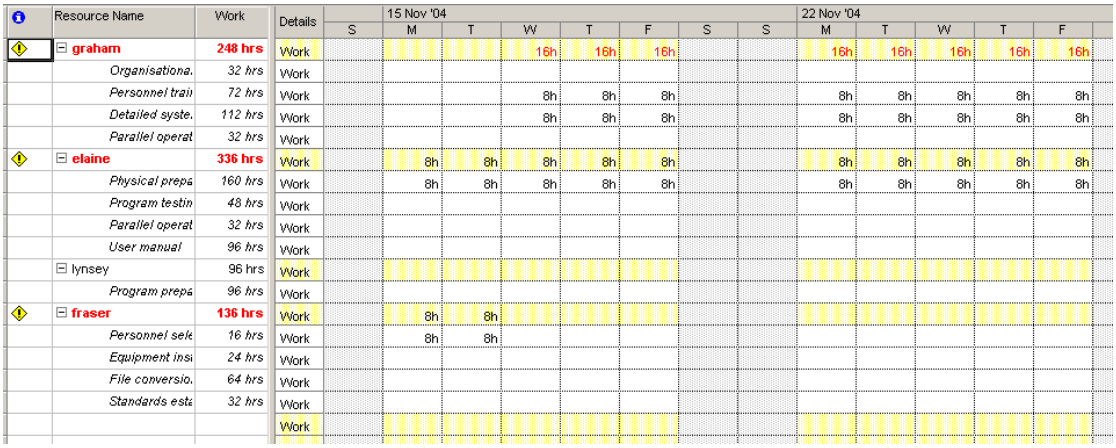
Most examples of project management software have ways of indicating when resources are overallocated. To see how MS Project indicates resources which are overallocated, copy the following project **overallocation.mpp** to your own file storage area, and open the file on your workstation. Your tutor will advise you where to locate this project file. Study the Gantt chart and you will see that some of the resources have been deliberately allocated to several tasks at the same time.

To specifically see any resource overallocation, there are a number of views/reports that can be used.

Firstly, look at the Resource Usage View.

On the View menu, click and select **Resource Usage**, or click on the **Resource Usage** icon in the **View Bar** on the left of the screen.

The following display should appear.



Resource Name	Work	Details	15 Nov '04 S	M	T	W	T	F	S	S	22 Nov '04 M	T	W	T	F
graham	248 hrs	Work				16h	16h	16h			16h	16h	16h	16h	16h
Organisationa.	32 hrs	Work													
Personnel trai	72 hrs	Work				8h	8h	8h			8h	8h	8h	8h	8h
Detailed syste.	112 hrs	Work				8h	8h	8h			8h	8h	8h	8h	8h
Parallel operat	32 hrs	Work													
elaine	336 hrs	Work		8h	8h	8h	8h	8h			8h	8h	8h	8h	8h
Physical prepa	160 hrs	Work		8h	8h	8h	8h	8h			8h	8h	8h	8h	8h
Program testin	48 hrs	Work													
Parallel operat	32 hrs	Work													
User manual	96 hrs	Work													
lynsey	96 hrs	Work													
Program prepa	96 hrs	Work													
fraser	136 hrs	Work		8h	8h										
Personnel sele	16 hrs	Work		8h	8h										
Equipment insi	24 hrs	Work													
File conversio.	64 hrs	Work													
Standards esta	32 hrs	Work													
		Work													

This lists for each resource the tasks to which the resource has been assigned and the total amount of work (in hours) that the resource is scheduled to perform on each task. If necessary, scroll the screen to the appropriate dates to reveal the display.

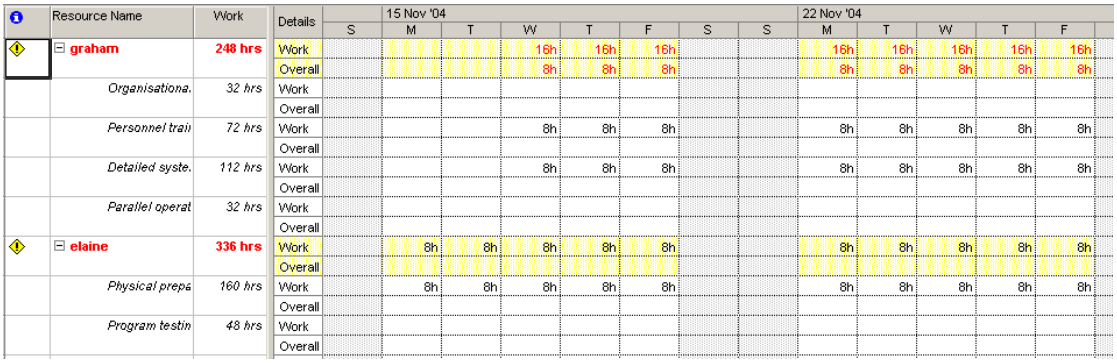
It also indicates if any of the resources are overallocated by displaying the resource name in ***red*** and also by placing an ***information marker*** beside the overallocated resource:

If you place the mouse pointer on the marker MS Project recommends what action should be taken to resolve the overallocation.

Use the horizontal scroll bar to locate dates when a resource is overallocated to see the amount of hours a resource is scheduled to undertake on these days – more than the resource has available. This will also be shown in red. In the display above, you can see that Graham is scheduled to work on two tasks each day from the 17th November – making a total of effort for each day of 16 hours! However, he is only available to work for 8 hours on each of these days. So he has been overallocated on these dates.

To display even more details about the actual amount of overallocations over and above Graham's normal working hours, select the **Format** menu, and click **Detail Styles**.

In the **Available fields** list, click **Overallocation**, then click on **Show**, and finally click **OK**.



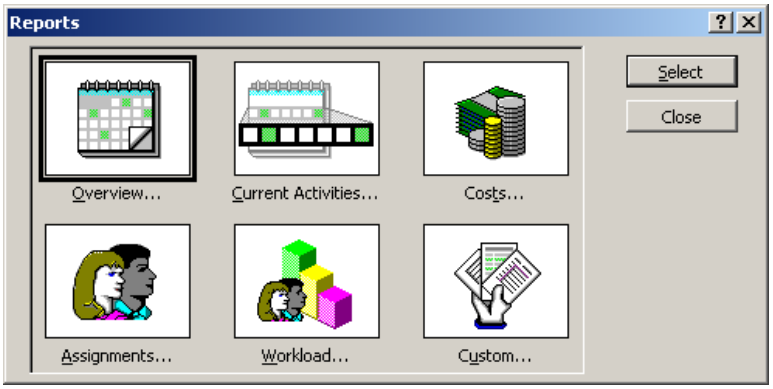
Resource Name	Work	Details	15 Nov '04 S	M	T	W	T	F	S	S	22 Nov '04 M	T	W	T	F
graham	248 hrs	Work				16h	16h	16h			16h	16h	16h	16h	16h
		Overall				8h	8h	8h			8h	8h	8h	8h	8h
Organisationa.	32 hrs	Work													
		Overall													
Personnel trail	72 hrs	Work				8h	8h	8h			8h	8h	8h	8h	8h
		Overall													
Detailed syste.	112 hrs	Work				8h	8h	8h			8h	8h	8h	8h	8h
		Overall													
Parallel operat	32 hrs	Work													
		Overall													
elaine	336 hrs	Work		8h	8h	8h	8h	8h			8h	8h	8h	8h	8h
		Overall													
Physical prepa	160 hrs	Work		8h	8h	8h	8h	8h			8h	8h	8h	8h	8h
		Overall													
Program testin	48 hrs	Work													
		Overall													

You will see an extra row has been added to the display for each Resource and task to which they have been assigned, to highlight on which days that resource has been overallocated.

With Graham still on display in November, you will see that there is an overallocation on certain days of 8 hours. That is, Graham is assigned to do 16 hours per day instead of the 8 hours per day he has available. In other words, he is overallocated.

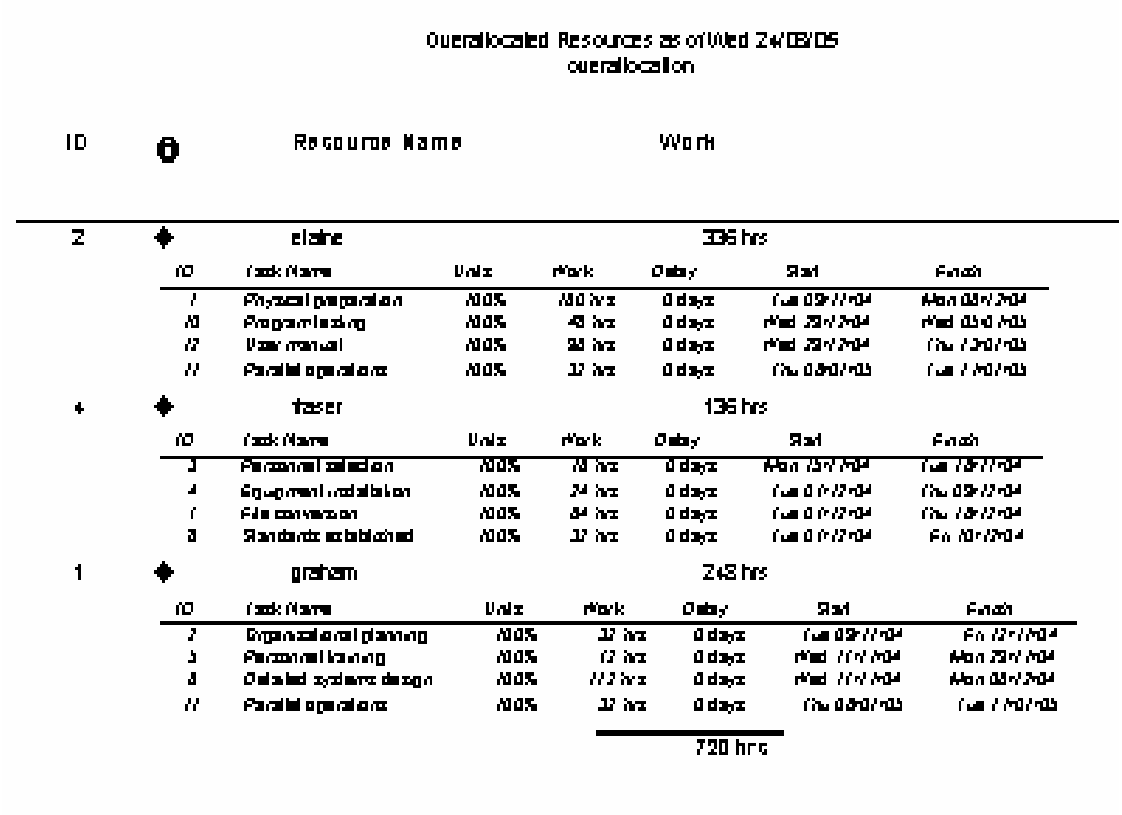
Now take a look at the 'Overallocated Resources Report'

1 From the **View** menu, select **Reports**, and the following Reports dialogue box should be displayed:



2 Double-click on **Assignments**, and from the next dialogue box select **Overallocated Resources**.

The following report should be displayed:


Overallocated Resources as of Wed 24/03/04
overallocation

ID	Resource Name	Work
2	elaine	336 hrs
	ID / Task Name / Units / Work / Delay / Start / Finish	
	7 Physical preparation 100% 80 hrs 0 days Tue 09/12/03 Mon 05/01/04	
	10 Programming 100% 48 hrs 0 days Wed 28/01/04 Wed 03/03/04	
	12 User manual 100% 96 hrs 0 days Wed 28/01/04 Thu 12/02/04	
	11 Parallel operations 100% 32 hrs 0 days Thu 04/03/04 Tue 09/03/04	
4	fraser	136 hrs
	ID / Task Name / Units / Work / Delay / Start / Finish	
	3 Personnel selection 100% 40 hrs 0 days Mon 15/12/03 Tue 13/01/04	
	4 Equipment installation 100% 24 hrs 0 days Tue 06/01/04 Thu 08/01/04	
	6 File conversion 100% 64 hrs 0 days Tue 06/01/04 Thu 15/01/04	
	8 Standards established 100% 32 hrs 0 days Tue 06/01/04 Fri 16/01/04	
1	graham	248 hrs
	ID / Task Name / Units / Work / Delay / Start / Finish	
	2 Organizational planning 100% 32 hrs 0 days Tue 09/12/03 Fri 02/01/04	
	5 Personnel training 100% 72 hrs 0 days Wed 31/12/03 Mon 26/01/04	
	9 Detailed systems design 100% 112 hrs 0 days Wed 31/12/03 Mon 09/02/04	
	11 Parallel operations 100% 32 hrs 0 days Thu 04/03/04 Tue 09/03/04	
		720 hrs

3 Left click on the Report to enlarge it.

4 This report displays resources that have been overallocated, along with the relevant tasks and dates when overallocated.

5 Notice that this lists those resources that are overallocated along with all the tasks to which they are assigned. This information will help the Project Manager to re-assign, or re-allocate these and other resources to help remedy the overallocation.

6 Click on the **Print** button to take a printout of this report.

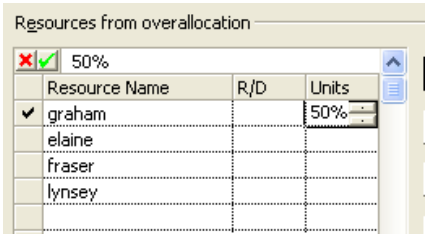
To resolve such cases of overallocations, you have several options. Some of the easiest solutions include:

1 You can reduce the *effort* (the amount of 'work') applied by a resource per day to a task.

When you allocate a resource to a task, it is allocated by default at 100% of effort per day to that task. That means every hour of the working day is spent on that task and nothing else. You can reduce this to a lower value, for example 50%. This means that a resource will only spend 50% of their working day on that task, for example working only mornings on one task and afternoons on another task. This also means that the tasks concerned will take longer to finish, for example a task with a duration of 5 days will, naturally take 5 full days to complete (1 working week), whereas the same task being worked only in the mornings will require 10 mornings - the same total hours of effort, but two weeks to complete instead of 1 week to complete. This will also push the project finish date further away, but will of course eliminate the problem of overallocation. Try the following:

Before you start, take a look at the **Project Summary** report again (you will find this in **View -> Reports -> Project Summary**), and make a note of the Finish date for the Project: _____

Going back to the Gantt chart display for the overallocations.mpp project, select the task '**Detailed systems design**' which has **Graham** allocated to it at the same time he is allocated to '**Personnel training'**. Now open the '**Assign Resources**' dialogue box. Look at the resource ***Graham*** allocated to this task and in the '**Units**' column which shows the amount of effort being contributed by Graham to the task per day, it should read **100%**. Change this to **50%**, and as you do this a ***cross*** and a ***tick*** should appear alongside the text box above the list of resources as follows:



Click on the green '**Tick**' to confirm this action and see the impact of this on the blue Gantt bar for this task – it should have increased in length (almost doubled) to indicate the task taking longer to complete on account of the resource only applying 50% of effort per day instead of 100%.

Now look at the latest version of the Project Summary report again and see the impact this has made on the project's finish date. The project is now taking longer to complete.

Now change the resource effort you just amended back to 100%.

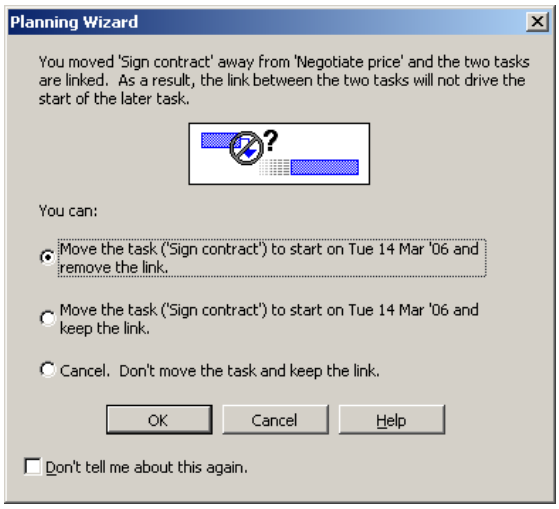
2 You can change (or 'swap') the overallocated resource for another.

A very easy way to remove the problem of overallocation is to simply remove the overallocated resource from the task and allocate a different resource(s) to the task, as long as the new resource is similarly skilled and can do the job.

3 You can re-schedule the task.

Another easy method is to re-schedule a task to be completed at another time when the resource is not assigned to something else. This might have serious implications for the project however, if you have already linked the task with others and these other tasks depend on it.

To re-schedule a task however, is quite easy. You simply point to the task in question, click and hold the mouse button, and drag the task bar to the right as far as is required, then release the button. This may however have implications for the task links you have created, and if so, you will see a Planning Wizard dialogue box similar to the following:

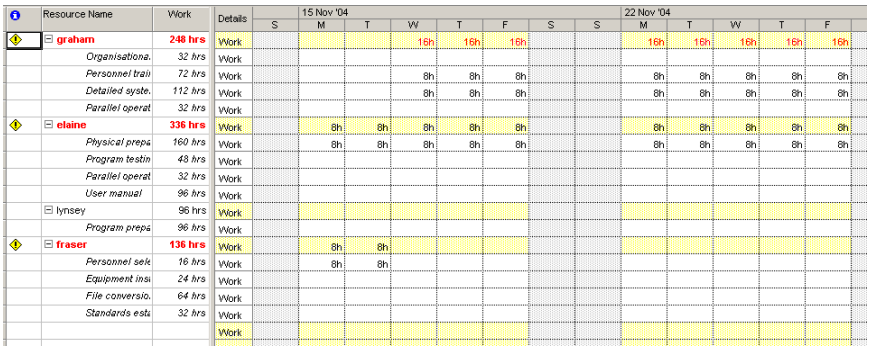


This will warn you of any difficulties and ask whether you want to move the task and delete the link, or move the task and retain the link, or simply cancel the action. In most cases you will probably want to move the task and retain the link - the second radio button.

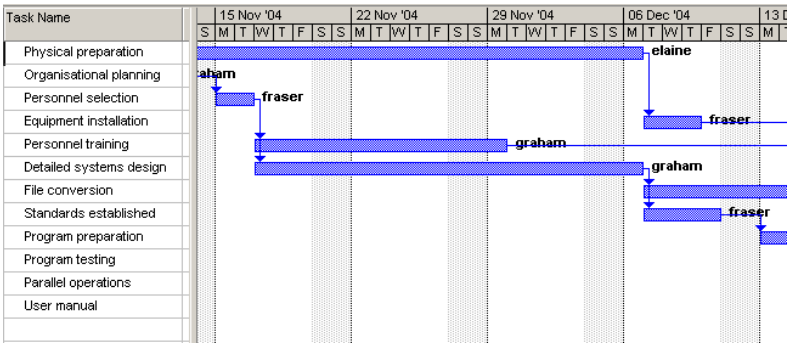
4 You can 'split' the tasks where there is overallocation of resources.

This is similar to reducing a resource's effort, except that in this case, you simply delay a task or interrupt its progress to allow the resource to work on another task instead. Naturally this results in the task(s) concerned taking more days to complete and the total duration of the project taking longer. You deliberately 'spread' a task out over a longer period by 'dragging' the blue task bar to the right to stretch it out and leave 'gaps' in the middle. Try this.

Ensure the project '**overallocation.mpp**' is still on display, and also showing the '**Resource Usage**' view. Here you will see that Graham is overalllocated on certain days from 17th November as follows:

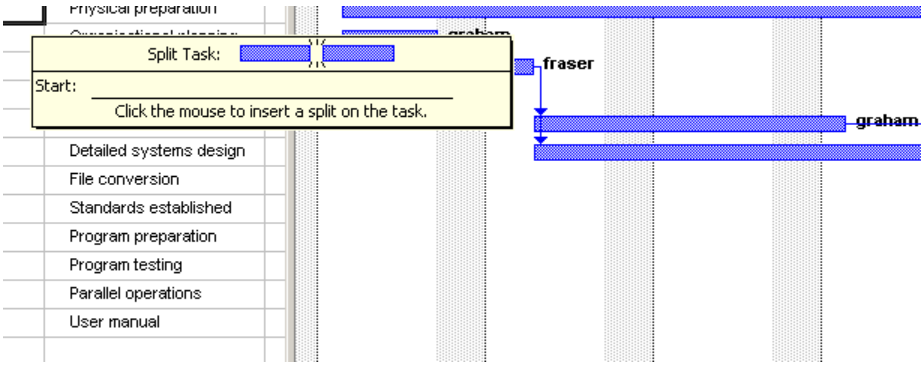


Now switch to the Gantt chart view. You should have something on screen similar to the following.



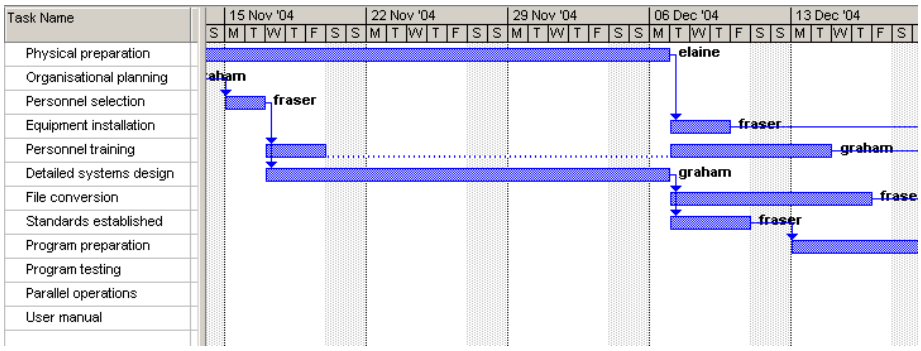
You will see that two of the tasks '**Personnel training**' and '**Detailed systems design**' are both resourced by Graham. Graham however cannot complete both of these tasks at the same time – in other words, he has been overallocated. Both of these tasks depend on 'Personnel selection' so you would prefer not to alter the links affecting task dependencies. You decide however that the task '**Personnel training**' can be 'split' or 'staggered' over a longer period giving Graham more time to complete both of them.

So firstly, point to the blue task bar for '**Personnel training**' and right-click. From the sub-menu which appears, select '**Split Task**'. The following should appear on screen:



This window invites you to use the mouse to point to the appropriate part in the blue bar for this task, 'Personnel training' where you want to split the task, and holding the left button down, drag the blue bar to the right till it is clear of the following task '**Detailed systems design**'.

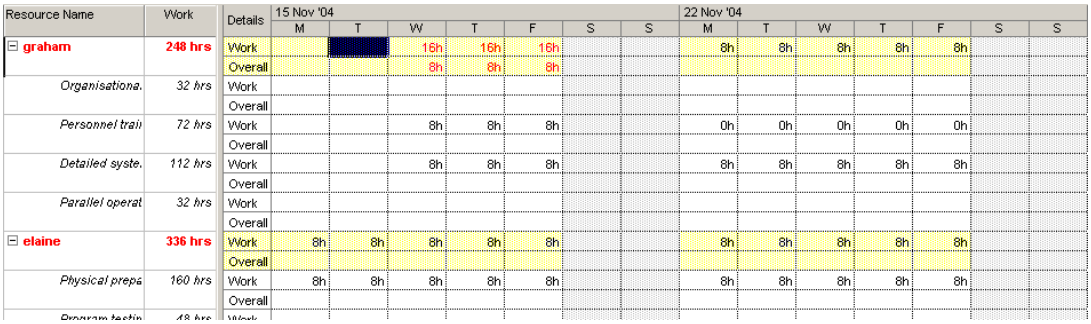
Do this now – point to the bar on Monday 22nd November, hold the left button down and drag the bar till it is clear of the following task, then release the left button. Naturally this leaves the first three days of this task – the Wednesday, Thursday and Friday of the previous week as overallocated days for Graham, but at least he has the tasks started. Your chart should now appear as follows.



You can see that this will naturally eliminate the problem of overallocation for Graham, but since the task is now taking longer to complete, this will also increase the duration for the entire project.

Look at the **Project Summary** report again and compare the project finish date with that at the beginning of this exercise.

Switch back once more to the '**Resource Usage**' view to see that Graham is no longer overallocated on these days where you have split the '**Personnel training**' task starting on the Monday.



Resource Name	Work	Details	15 Nov '04 M	T	W	T	F	S	S	22 Nov '04 M	T	W	T	F	S	S
graham	248 hrs	Work			16h	16h	16h			8h	8h	8h	8h	8h		
		Overall			8h	8h	8h									
Organisationa.	32 hrs	Work														
		Overall														
Personnel trai	72 hrs	Work			8h	8h	8h			0h	0h	0h	0h	0h		
		Overall														
Detailed syste.	112 hrs	Work			8h	8h	8h			8h	8h	8h	8h	8h		
		Overall														
Parallel operat	32 hrs	Work														
		Overall														
elaine	336 hrs	Work	8h	8h	8h	8h	8h			8h	8h	8h	8h	8h		
		Overall														
Physical prepa	160 hrs	Work	8h	8h	8h	8h	8h			8h	8h	8h	8h	8h		
		Overall														

Before you leave this exercise, point again to the blue bar you just split, hold the left button down and drag the bar back to the left to re-join the two parts.

All of these options would be explored by the Project Manager in an attempt to deal with overallocated resources. It may well be possible to resolve the overallocation by using one (or more) of the techniques mentioned.

5 Finally, you can let MS Project do all the work for you automatically.

There is an in-built tool in MS Project which enables you to resolve the problem of overallocation of resource(s) automatically. The Pack uses a combination of the techniques mentioned. The tool is known as '**Resource Levelling'.**

'**Resource Levelling**' is where MS Project resolves resource conflicts or overallocations often by ***delaying*** or ***splitting*** certain tasks where resources are overallocated, to allow the resource sufficient time to finish them. The consequence of this however is, as always, that the project will now take longer to complete than was originally planned. If this creates a serious problem, then this is when a Project Manager might consider the possibility of allowing overtime to be worked to try to keep a project on schedule, or if that is not enough, then perhaps to hire more resources temporarily (contract workers) to cope with the workload. Either way, the cost of the project will start to increase.

When MS Project levels a resource, the tasks to which that resource is assigned are re-distributed and re-scheduled according to the resource's working capacity, assignment units, and calendar, as well as the task's duration and constraints.

In plain English, this means the tasks will be 'stretched', taking longer to complete and the resource will spend perhaps one day on task 1, the next day on task 2, the next day back on task 1, etc. MS Project examines a task's predecessor dependencies, slack time, dates, priority, and constraints to determine whether it could be delayed or has to be split.

To demonstrate the options available to resolve resource overallocation, ensure that the '**overallocation.mpp**' is still on display, or open it again if it is not.

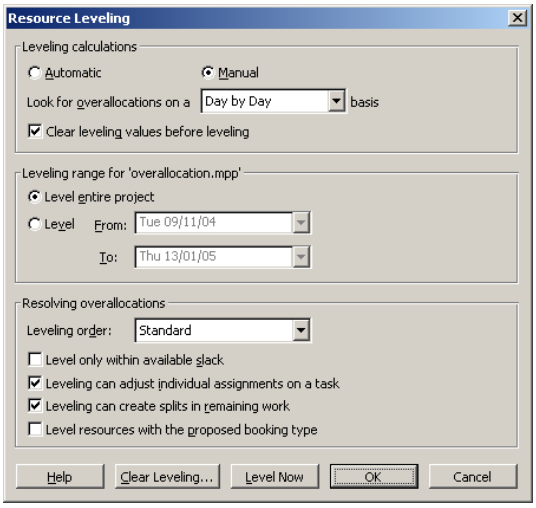
Before you apply levelling, take a note of the start date and the expected finish date once more for the project you are building in these notes. Do this by re-displaying the selecting '**Project Summary**' report once more. Make a note of these two dates below.

Project start date: _____

Project finish date: _____

When you have made a note of the two dates, close the report display and return to the 'overallocations' project.

1 From the Tools menu, select **Level Resources**. The following should appear on screen.



2 MS Project wants some indication from you as to how you would like the overallocated resources levelled. But first of all, ensure that the radio button **Manual** is checked to level resources only when you want to – not automatically.

In the '**Look for overallocations on a . . . basis'** box, you select a time period to determine the sensitivity with which levelling will recognise overallocations.

In the Resource Usage view the advice to resolve the overallocation was 'levelling on a 'day-by-day' basis'.

3 Select **Day-by-Day**.

4 Leave the '**Clear levelling values before levelling**' box checked.

5 Under '**Levelling range for**', select whether you want the entire project levelled or only those tasks falling within a specific time range. You might select only part of the project if it was already underway and only wanted to level the remaining part.

In this case, select **Entire project**.

6 In the Levelling order box, there is a choice of levelling orders:

Click **ID Only** to have MS Project check those tasks in the ascending order of their ID numbers before considering other levelling criteria to determine which tasks to level.

Click **Standard** to have MS Project check tasks in the order of their predecessor dependencies, slack, dates, priority, and then task constraints.

Click **Priority, Standard** to have MS Project check tasks' priorities to be levelled before considering predecessor dependencies, slack, dates, and then task constraints.

Select **Standard**.

7 The remaining check boxes ask for some more guidance on how you would like the resources levelled, which can influence by how much the project finish date might be extended. In the meantime, proceed as follows:

Uncheck the '**Level Only within available slack box**'.

Check the next two boxes – '**Levelling can adjust . .**' and '**Levelling can create .'.**

Uncheck the last box '**Level resources with the . .'.**

8 If you wanted to prevent the finish date of your project from being moved out, you should select the '**Level only within available slack**' check box. This will attempt to remove as much of the overallocation as possible without extending the project end-date.

9 If you are satisfied with your selections, click **Level Now** to start levelling your project.

10 Finally, look at the Project Summary report again to see the new project finish date and compare this with the finish date you noted previously. Also look at the **Resource Usage** view, to check that no resources are overallocated any longer.

Now close all projects you have been working on and save them to your file storage area.

A 7

Start this exercise by re-opening the '**Southern Depot**' project again for MedicExpress.

Open the Resource Sheet view to see that 3 of the resources are overallocated, Caroline Spenser, Russell Transport and Wendy Clarke. You will see these highlighted in red, indicating they are overallocated. Take a printout of this view scaling the view to fit into a single page.

Now take a printout of the Overallocated Resources report to list these three overallocated resources and all the tasks to which each of them is assigned.

Proceed as follows to resolve the overallocation.

1 In the case of Caroline Spenser, you will notice that she is overallocated on the tasks 'Negotiate price', 'Order storage unit', and 'Order office equipment'. There is also a *long* time gap after these tasks, so any delay will have no impact on the finished ate of the project. So . . .

   (a) reschedule the task 'Order storage unit' so that it takes place ***after*** 'Negotiate price' (or as soon as it has finished) while retaining the link;

   (b) reschedule 'Order office equipment' so that it takes place as soon as possible after 'Order storage unit', and again retain the link.

2 Now look at Wendy Clarke's record on the Overallocation Report again. She is assigned to two tasks at the same time – 'Design office' and 'Design storage room'. She is the only member of the team allocated to these tasks so it would be possible to reduce the effort applied to each and she can continue to work on both at the same time. Similar to Caroline, you will notice from the Gantt chart that any delay on these tasks will not have any impact on the finished date of the project. So . .

   (a) Firstly, for each of these tasks, change the Task type to '**Fixed units**' so that any change in resource effort will be reflected in the duration of a task (in other words, if a resource is only applying 50% effort, you would not expect the task to be completed in the same time – it will naturally take twice as long).

   (b) Now change the resource effort for Wendy on both of these tasks to 50% to eliminate the overallocation.

3 In the case of Russell Transport, since this is a contractor, they will be expected to solve this problem by using extra trucks or working overtime. So you can ignore this problem meantime.

4 Finally, take a printout of both the Resource Sheet view (scaled to fit onto one page) and also the Overallocations Report to show that only Russell Transport is over allocated now.

Now close the '**Southern Depot**' project and save it to your file storage area.

Making Use of Overtime

Often when a project is under pressure to be completed earlier than planned, one of the options is to allow your resources to work overtime. This means allowing your resources to work more hours in the day and possibly also working weekends. It does not mean that a task will take any fewer hours to complete or that the resources will work any faster, but if the resources are working more hours in any one day, then the task will by definition get finished earlier than was planned for it.

In this chapter, you will learn how to allow your resources to work overtime on any task and finish it earlier. There is a down-side to this however. When any resource is working overtime hours or at weekends therefore, then the resource would expect to be paid extra – in other words, at overtime rates. So the task, and consequently, the project, might get finished sooner, but the project will naturally cost more. This is something which you would need to discuss with the client, before they agree to pay extra to have the project finished sooner.

Overtime is the amount of work done on a task beyond a resource's regular working hours, and is charged at the resource's overtime rate. **Overtime work is not additional work on an assignment**. **Rather, it indicates the amount of work which is done in hours over and above the normal working day** – often referred to as 'unsocial hours' – or your own personal time.

Overtime will often be required when a project is either falling behind schedule or if the client requires the project to be finished earlier than was planned for. In other words, staff will be required to work more hours per day, and sometimes more days per week (such as weekends) in order to complete the project earlier, or even just to complete it on time.

Overtime can be used to enable a task to be completed earlier than it would normally be. This would result because the overtime hours will be taking place at a time when the resource would not normally be working, such as in the evenings, or at the weekends. For example if a task normally takes 40 hours and a resource works 8 hours per day, then the task will take 5 working days to complete. If however, there is a rush on for that task to be completed earlier, then the resource could work 12 hours of overtime as follows - 8 hours normal on day 1 plus 4 hours overtime in the evening, the same on day 2 and the same on day 3. That means 36 hours of work have been completed to date and it is only the third day, the remaining 4 hours of work would be completed on the morning of the fourth day finishing at lunch time. In other words, the task would now be competed in 3½ days, instead of 5 days – ***but it is still taking 40 hours of work or effort to complete***.

The task has certainly been completed and finished sooner, but it has been completed in fewer days. The total number of hours however has remained the same - just more hours ***per day*** were worked on each of the days. So the overall finish date of the project will likewise be sooner but there are other consequences for the project. The main one being that the project will cost more to complete. This is because, although the task still needs 40 hours of work, instead of being costed at 40 hours x a resource's standard hourly rate, it is now being costed at 28 hours during normal hours and charged at the standard rate, while the remaining 12 hours were worked in the evenings and will be charged at the overtime rate.

By default, MS Project uses the standard regular wage rates when calculating the costs of resources for any work required to complete a task. It does not assume any overtime is being worked, unless instructed, so does not automatically calculate any hours at overtime rates unless you specifically assign certain hours as overtime work. To set up and allow any work to be done over and above the normal hours in any one day, proceed as follows:

1 Re-open your original project - '**Invoicing System**' - and ensure that you are in the Gantt chart view.

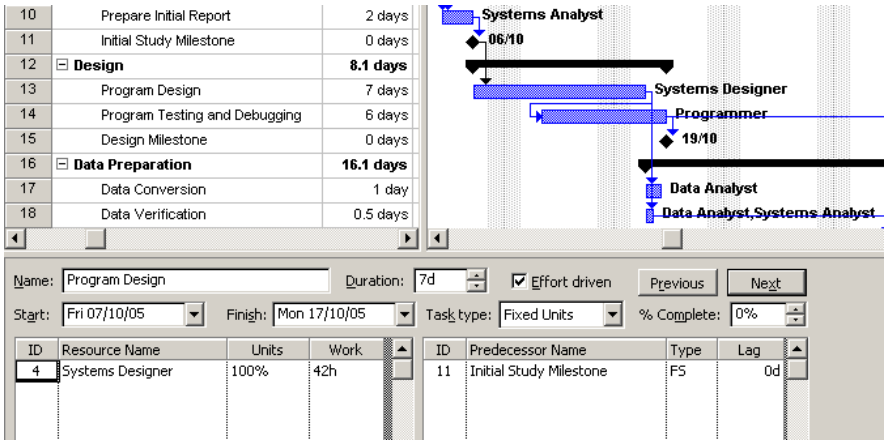
Start by viewing the ***Project Summary*** report once more and make a note here of the finish date of the project and the current total cost of the project:
Finish Date:_____ Total cost of project:_____

Or better still, just take another printout of the report. If you can't remember, the **Project Summary** can be found by selecting ***View -> Reports -> Overview -> Project Summary.***

2 Return to the Gantt chart view. Also ensure that you can see the task '**Program Design**' on view with the resource '**Systems Designer**' assigned to it.

Now from the **Window** menu, select **Split**.

This will split the screen horizontally into two windows with the Gantt chart in the upper pane and the **Task Form** view in the lower window. The **Task Form** simply displays more information on each of the tasks as you click on each task in the upper pane. Your screen should appear similar to the following:



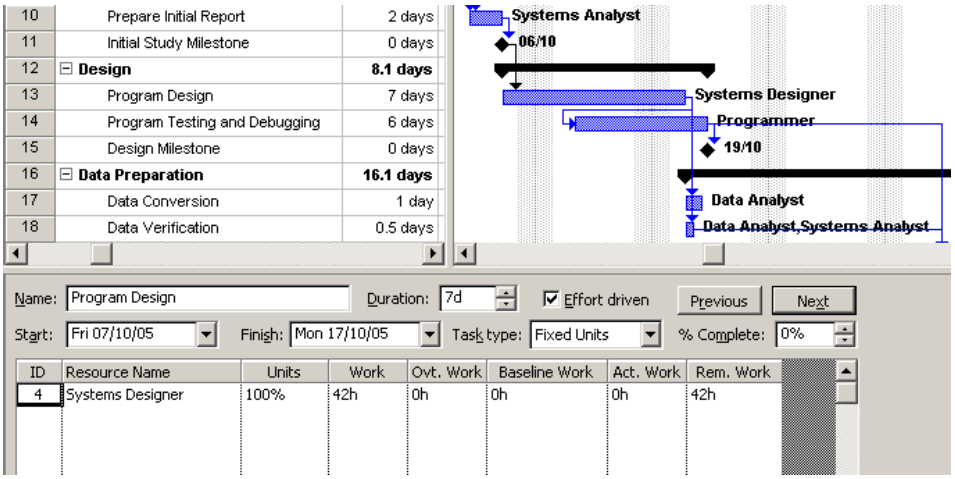
Notice that the task '**Program Design**' takes 7 days of work effort to complete. Let's assume that there is a rush on this project, so with a bit of overtime, the Systems Designer can perhaps get this task finished earlier.

Firstly, you need to alter the **Task Form** view to show overtime details which you can then edit, so

3 Click anywhere on the **Task Form** view in the lower pane to activate it or press **F6** to toggle between the two windows.

4 From the **Format** menu, point to **Details**, and then click on **Resource Work**, or right-click anywhere on the lower window and the same sub-menu will appear ready for you to select **Resource Work**.

5 The following should be displayed on screen: (note your dates and specific details may be different – but the same layout).



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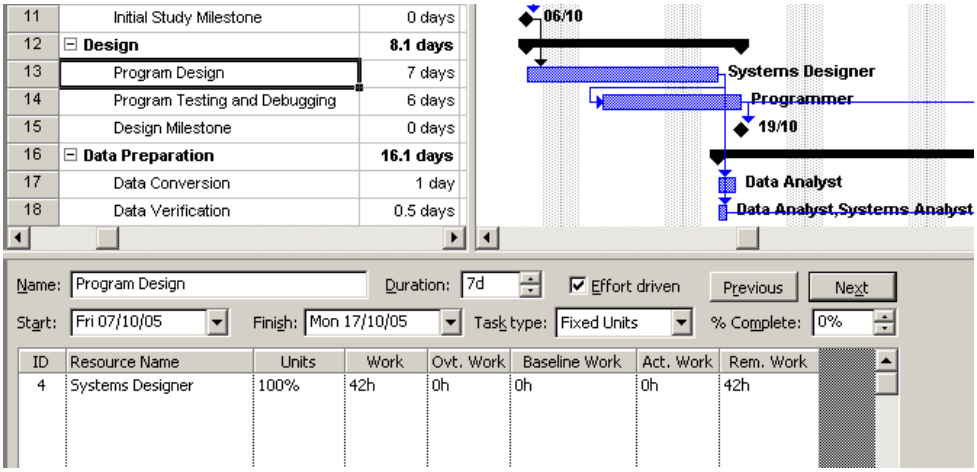
6 In the top pane, select the task for which you want to assign overtime work and shorten the total task duration.

Click on **Program Design**.

Your screen display should appear similar to the following, allowing for a different start date for your project:



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7 Before you make any amendments, you should make a note of the Start and Finish dates for the task. You will see these on the lower window. On the display above, the start and finish dates for '**Program Design**' are showing as **07/10/05** and **17/10/05** with 7 working days duration. If your dates are different, make a note of them here:

Start date: _____ Finish date: _____

In the bottom pane, you can see that the task is taking 42 hours of work or effort. That is, 7 days at 6 hours per day making a total of 42 hours of resource effort.

The Systems Designer is the only resource for this task, and you want to allow him/her to work 16 of these hours in the evening at overtime rates, so enter **16hr** in the **Ovt. Work** column. The task '**Program Design**' will still take 42 hours of work. But 26 will be done during the normal working hours and paid at the standard hourly rate, while the remaining 16 hours will be worked, perhaps in the evenings, and paid at the overtime rate, so the task should get finished sooner, although still taking up the same number of hours of work effort.

8 Either click on **OK** or click in the top window. This will now show a reduction in the Duration field to **4.33** days and the blue bar will also shorten.

Now check the task finish date for the task and compare it with that you noted above.

Note: The amount of overtime work you specify does not get added to the amount of work for the task. Duration hours always represents the total amount of work effort required by a task and does not change. Overtime work merely represents the portion of the total amount of work that is to be worked outwith the normal working day and paid at overtime rates.

You should notice the following differences after entering overtime hours are as follows:

(i) The Finish date for the task should be earlier than before.
(ii) The duration of the task has been reduced.
(iii) The Finish date for the project should also be earlier than before.

9 To get a report of the project Start and Finish dates, the project duration, and the costs, produce a **Project Summary** again as follows:

Select **View -> Reports -> Overview -> Project Summary**

This displays the report in Print Preview mode

Clicking on the image will enlarge the view, and to get a printout, click on the **Print** icon.

10 Finally, remove the split window and return the screen to show the Gantt chart only by selecting **Remove Split** from the **Window** main menu, then close and save your project to your file storage area again.

Overtime and the Critical Path

In Project Management, there is a very important concept known as the '**Critical Path**'.

The Critical Path consists of the series of tasks on which the finish date of the project depends. If there are any delays on any of these tasks then the entire project will be delayed. Likewise, if any time was saved on one of the tasks on the path, then that amount of time would also be saved on the entire project. Tasks in the Critical Path are known as **Critical Tasks**. Non-critical tasks are the opposite. If there is any delay with a non-critical task, then the project finish date may not be affected, likewise any time saved on a non-critical task will not have any impact on the project finish date either. This has serious implications for the use of overtime in that you would only want to allocate and pay for extra overtime on tasks which will have an impact on the project finish date. Any other expense on overtime on non-critical tasks would be a complete waste of money. It is easy to display the critical tasks in the Gantt chart area. Let me explain this with the following example.

Displaying the Critical Path

You should copy the project file **overtime.mpp** onto your file file storage area. Your tutor will advise you where to locate this file.

Open the 'overtime' project and, using the **Gantt chart Wizard**, alter the display to show all those tasks which are deemed to be 'critical' in ***red***.

Do this as follows:

- Right-click anywhere on the chart area
- Select **Gantt Chart Wizard**
- Click on **Next**
- Select the **Critical path** radio button
- Click **Next** – 3 times
- Click on **Format It**
- Click on **Exit Wizard**

Also at this point, take a printout of the **Project Summary** again so that you can see **Finish date** and the **Start date** of the project as well as the **current total cost** of the project. The Project Summary report shows a Start date of 02/10/06 and a Finish date of 05/03/07, with a total project cost of £73,560.

If your dates are different, you should make a note of the project Start and Finish dates as per your summary report, and also the total cost of the project.

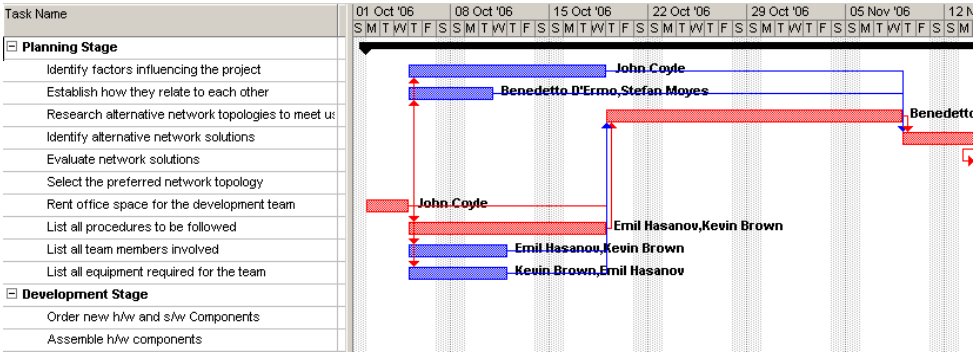
Start date:_____ Finish date:_____

Total project cost:_____

Let's assume that we would like the project to be completed ***about 2 weeks earlier*** if possible, finishing about 24th April, 2007, and the only alternative available to you is to allow some of the resources to work overtime, assuming there are no other resources which can be hired at such short notice. This will also have the effect of increasing the cost of the project, but the client has indicated that s/he is wiling to pay this extra cost if time can be saved.

Study the Gantt chart display on your screen, or if you have taken a printout of the chart, then you will notice that, if you have used a black-and-white printer, the ***red*** critical tasks are displayed with a diagonal pattern to indicate they are 'critical'.

Look at the first few tasks in the project:



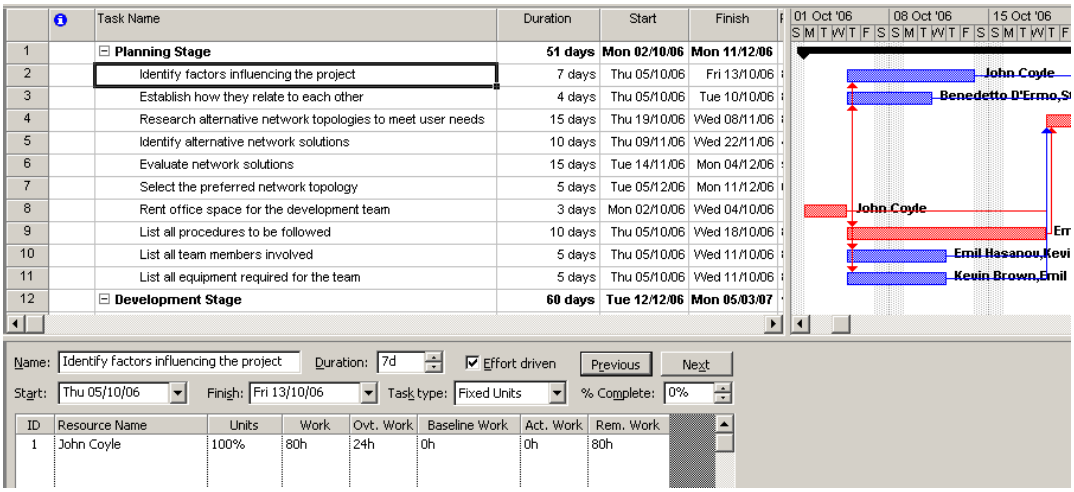
Unfortunately, you will not be able to see the blue and red bars on this page, since it is printed and photocopied in black and white, but please use it in conjunction with the project displayed on your screen.

Look at the two tasks starting near the beginning of the project '**Identify factors influencing the project**' and '**List all procedures to be followed**'. Both are 10 days long, but the first task is shown as non-critical while the second 'List all factors etc' is shown as critical.

Let's start by allocating some overtime to the first task – '**Identify factors influencing the project**', which is non-critical.

In the project, with the Gantt char on display, split the window, and in the lower pane change the format to show **Format -> Details -> Resource Work**. Returning to the top pane, ensure that the columns Task Name, Duration, Start Date and Finish Date are on display. If not, pull the divider bar to the right to reveal these columns.

In the upper pane of the Gantt chart, select the task '**Identify factors influencing the project**'. In the lower pane, against the resource, John Coyle, who will spend 80 hours of work on this task, allocate an overtime allowance of **24** hours, which should reduce the task duration by about 3 days. Do that now and click on **<OK>**. You will see the task duration reduce to 7 days and the blue bar also reduce in length. Your screen should be similar to the following.



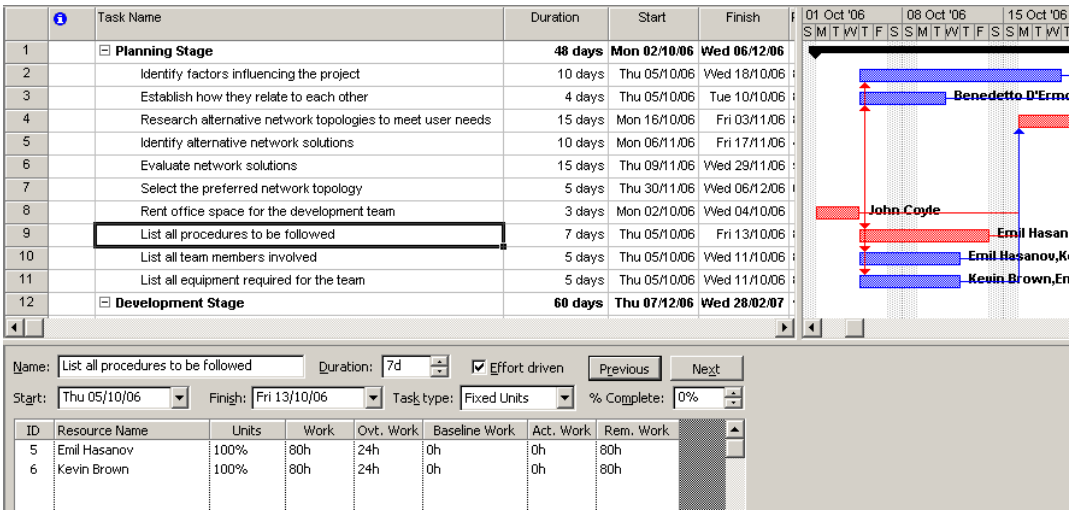
Scroll down the upper pane to show the finish date of the project – i.e. the finish date of the last task and you will see that the project finish date has not altered at all. Now look at the **Project Summary** report once more.

You will see that the project finish date is still at 5th March 2007, but the total cost of the project has increased by £360 to £73,920. Obviously a complete waste of money!

Next, let's try this with a task which is on the Critical Path.

Firstly, remove the overtime hours from John for the above task 'Identify factors etc', and return him to the normal 80 hours standard rate. To prove this has been done, display the Project Summary again to show that the total project cost has returned to £73,560.

Now for the second task, the task on the Critical Path, '**List all procedures to be followed**', there are two resources, Emil and Kevin, each contributing **80** hours of work effort to the task, lasting **10** days. For each of them, allow **24** hours of overtime and finally click on **<OK>**. This should again reduce the task duration by about **3** days. Do this now. You will see the task duration and the length of the red bar both reduce. Your display should appear similar to the following:



You will see the task duration reducing by 3 days such that the task now takes only 7 days to complete, and if you display the Project Summary report once more, this time you will see that not only has the total project cost increased, as was expected, by £408, but the finish date for the project has been brought forward by 7 days to 28th February 2007. The client may well be satisfied with this time saving for such a modest outlay!

You would continue allowing overtime to appropriate resources working on tasks on the critical path in order to reduce the project duration and bring forward the project finish date to achieve the desired effect. But you must be careful not to allocate overtime to resources working on non-critical tasks – which will just be a waste of money with no impact at all on the project duration.

So to make use of overtime, you proceed as follows:

1 Have the appropriate Gantt chart on view

2 Alter the display to show the Critical Path and the tasks on this path displayed in red.

3 Split the window

4 In the bottom pane, change the display to show the relevant task form details by selecting - **Format -> Detail -> Work Resource**

5 From the Gantt chart, select appropriate task(s), from those on the Critical Path and on which you intend to allow overtime working.

5 Insert the amount of overtime hours to be worked in the **Ovt. Work** column

6 Then click **OK**

Remember, you would not allocate more hours of overtime than is already allocated to a task, although it is possible to allocate all of a task's hours to be done on overtime. This could be the case where there is a rush to complete a project and certain tasks can be undertaken, for example, over a weekend, which would involve overtime rates being paid to the staff resources.

A 8

The Directors of MedicExpress have just become aware of an excellent one-off marketing opportunity for their new venture in the southern part of England to draw national media attention to their presence there. Approximately 3 weeks before the new MedicExpress centre is due to be completed, Her Majesty the Queen is due to open a new Museum in Wolverhampton. Unfortunately the museum has just been partially destroyed in a fire accident. So to save Her Majesty hanging about the centre of Wolverhampton, if we could finish our project 3 weeks earlier, then she would be available to open our new centre instead.

Start by re-opening your '**Southern Depot**' project for MedicExpress, and take a printout of:

1 The Project Summary to see the current start and finish dates for the project, as well as the current total cost of the project.

2 The Gantt chart using the **Table: Costs** view to see the costs of each of the tasks in the project. (Print out only the first page of the Gantt chart showing **all** the columns of the table information).

Now amend the Gantt chart view to highlight in red the critical tasks which impact directly on the finish date of the project.

At the start of this project, you established the task type of '**Fixed Duration**' for all of the tasks. You should now change the task type for all of the tasks to '**Fixed Units**' so that any change in the resource effort (including any overtime hours worked) will be reflected in a reduction in the day's duration of a task).

Using a selection of these critical tasks, allocate overtime to the resources assigned to these tasks, in order to reduce the duration of them.

Continue to do this to several tasks, continually checking the finish date of the project until it finishes 3 weeks earlier than previously.

When you have completed this exercise, take a printout once more of the Project Summary to show the new finish date of the project and also the increased total cost of the project.

Also take a printout of the Gantt chart in the **Table: Costs** view (to include a range of 'cost' columns) to indicate the individual tasks to which you allocated overtime, and which are now costing more than they did before.

Finally close the 'Southern Depot' project and save it again to your file storage area.

Formatting Views and Printing Reports

The Gantt chart displays project information as a table of text columns and a horizontal bar chart. The Gantt chart view is the most widely used view for managing projects and certainly the best view to use when reviewing a project plan. MS Project also offers a number of possibilities to format the Gantt chart to suit individual information requirements. Here are some of these possibilities for you to try out.

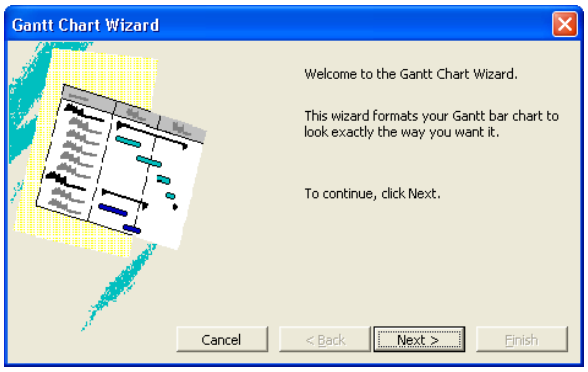
Formatting the Gantt Chart

The quickest and easiest way to format the Gantt Chart is to use the Gantt Chart Wizard. This guides you through several formatting options. Start by re-opening your '**Invoicing System**' project again.

To format the Gantt chart using the Wizard, follow these steps:

1 Ensure that the Gantt chart for the 'Invoicing System' project is on display.

2 Choose **Format -> Gantt Chart Wizard** from the menu. The Gantt Chart Wizard window opens as follows:



Click **Next** to continue.

(The Gantt Chart Wizard can also be opened by right-clicking anywhere on the background of the chart and selecting the Gantt Chart Wizard from the sub-menu).

3 The next screen requires a choice to be made about how project tasks should be displayed in the Gantt Chart. There are five possibilities:

Standard Displays the taskbars in the default format, which you have been using to date.

Critical This view will display critical tasks in a different colour, the default colour is red (though this can be changed). Critical tasks are those tasks on which the finish date of the project depends. Some tasks have an element of 'float' in them which means that if the task is delayed, it will not effect the project date. These are non-critical tasks. Critical tasks are those which will affect this finish date if they are in any way delayed.

Baseline The 'Baseline' refers to the original plan you first created for a project. This is fixed and stored in the database and allows you, at any time in the future, to display on screen this 'baseline' chart alongside your current project plan. This allows a comparison to be made between the current status of a project, and what and where the original plan says it should be.

Other This offers variations of the standard, critical and baseline formats.

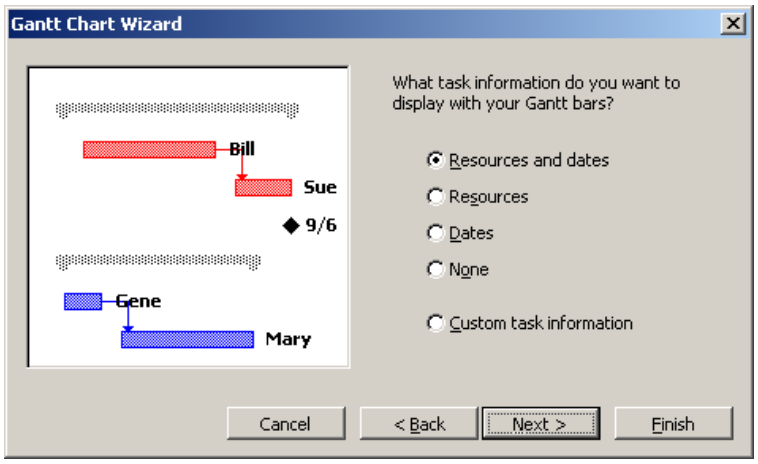
Custom Gantt Chart This allows changes to be made to colours, patterns and shapes for Critical, Normal, Summary and Milestone tasks.

Click on each radio button option in turn to see how each affects the display in the preview window. Now try the following.

4 In this case, select the **Critical Path** option, to display in red those tasks on which the project end date directly depends. The non-critical tasks will remain in the default blue.

Click on **Next**.

5 In the next window, you are asked to select what information you wish displayed with the Gantt chart bars, see the window display on the next page:



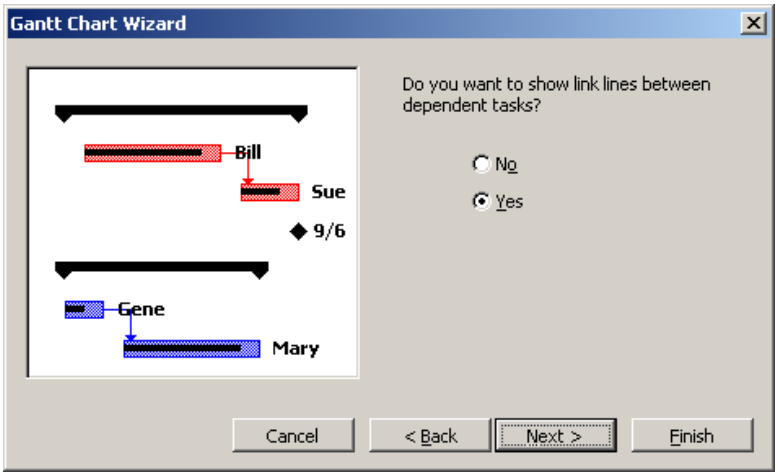
Select the default of **Resources and dates**.

Then Click **Next**.

6 In the next screen, you have to decide whether to show the link lines between dependent tasks.

Check out each radio button to see how it appears. The link lines are very important to show the relationships between the tasks, so

Select **Yes, please**.

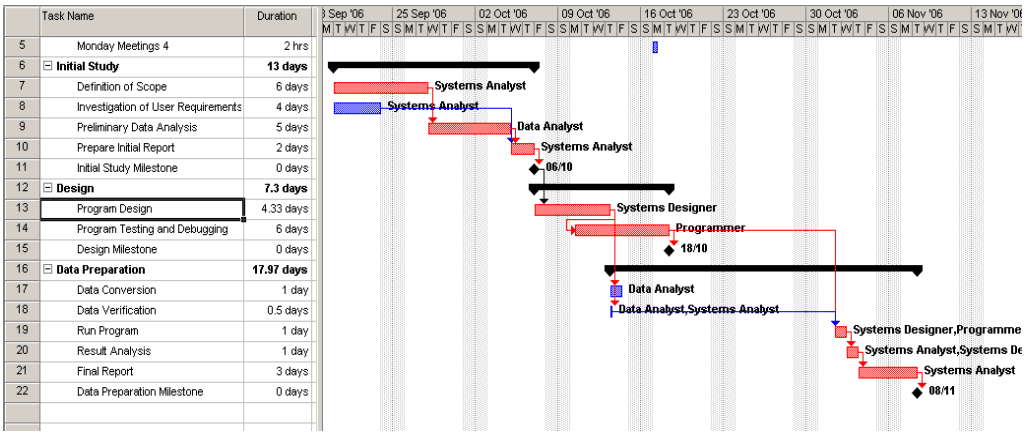


Click on **Next**.

7 Now click the **Format It** button, your Gantt chart will be formatted according to the choices selected.

8 Finally, click the **Exit Wizard** button.

Below is how the Gantt chart for the project should appear. (Your display may be different if your dates differ or if you have more or less tasks than I have). Compare it with yours:

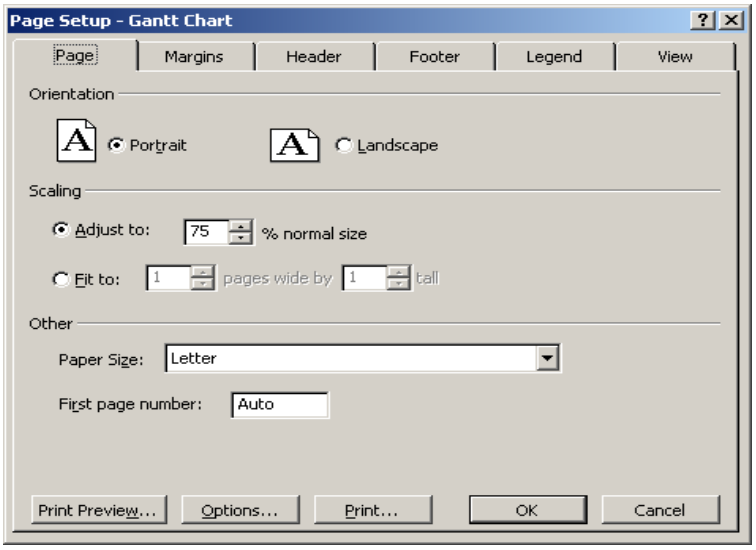


Working with the Page Setup Options

As in all Microsoft applications, the Page Setup option allows you to set such features as page orientation, scaling of page size, margins, headers and footers, etc. in order to produce more meaningful reports. Try the following.

Still using the same project as above, '**Invoicing System**', make sure the Gantt chart view is still on display, then choose **File** -> **Page Setup**.

There are six tabs in the Page Setup dialog box, as shown below:



1 Select the **Page** tab (as displayed above). Here you can define the page orientation, adjust the scale of the page, and also select the target paper size.

Ensure the following options are selected:

(i) For **Orientation**, select **Landscape**.

(ii) For **Scaling**, select **Adjust to 75%**, to ensure the printout fits the page and takes fewer pages.

(iii) For **Other -> Paper Size**, ensure you have selected **A4** (The paper in your printer!).

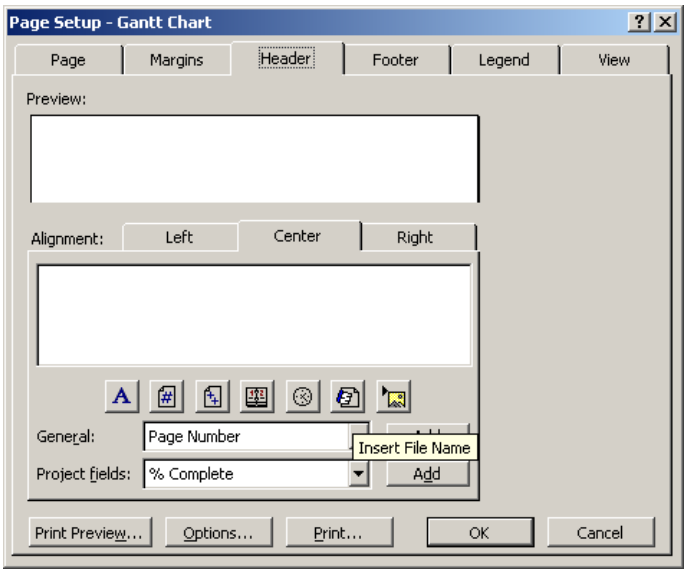
2 In the **Margins** tab, ensure the following options are set.

(i) Ensure the margins are set to a default of 1.27 cms all round.

(ii) Set the Borders to **Every** page.

3 Now select the **Header** tab to enter a Header.

The lower pane is where you enter the data and text you want to appear as Headers and Footers. The upper pane previews what this looks like. Notice the extra tabs on the lower pane to justify your entries - left, centre or right. There is also a range of icons for inserting the most common options directly without having to type them, such as page number, date, time, etc. Hold the mouse over each in turn to see what is inserted when you click on it. Below these are drop down boxes which take the text from the Project Information screens you completed at the beginning of this project, which can also be inserted without you having to type them all out again.



Try this out! Ensure the **Header** tab is selected.

(i) Choose the Centre alignment tab.

(ii) Now enter the information you wish to be displayed in the header. You are going to use the codes for the information you entered earlier on the Project Information screen, using the drop-down boxes.

In the **General** drop down box, click on the drop-down list, and choose **Project Title**, then click on **Add**.

(iii) See over . . /

(iii) See over . . /You now want the company's name to be displayed on the line below the Project Title field.

You first need to move the cursor to the line below where the **&[Project Title]** variable name appears. Do this by pressing the **Enter** key once. The cursor should now be positioned in the middle of the line below the variable name.

From the **General** drop down list, select **Company Name** and click **Add**.

(iv) Finally click on the Print Preview button to see how this looks on the actual Gantt chart.

4 Entering a **Footer**

If the Page Setup screen is not on the screen, open it again by clicking on the **Page Setup** button or by selecting **Page Setup** from the **File** Menu.

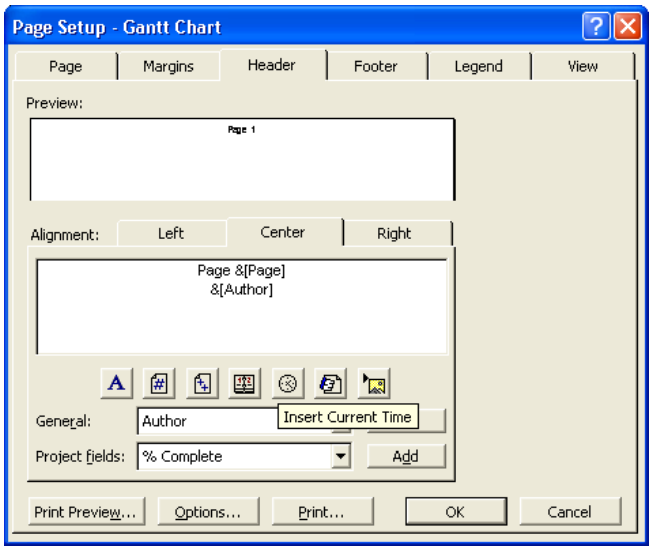
(i) This time, select the **Footer** tab.

The procedure for creating a footer is the same as for a header.

(ii) Again selecting the **Center** alignment tab, type in the word **Page**, followed by a space, then add the following details from the **General** drop down text box, by selecting the item '**Page Number**'.

(iii) Press the <Enter> key or click on the next line to enter the next item of text in the Footer, and add the name of the **Author** of this project, again selecting this from the **General** drop down box.

At this point, the Page Setup box should appear as follows:



(iv) Now select the **Left** tab and from the icons double click on the icon for the '**Insert Current Date**'.

(v) Finally, select the **Right** tab and again from the icons, double click on the icon for '**Insert Current Time**'.

5 Displaying the **Legend**

This displays at the bottom of each page of the Gantt chart a legend explaining the lines, bars and colours of the chart. In this current exercise, this is not essential, so:

(i) Select the **Legend** tab.

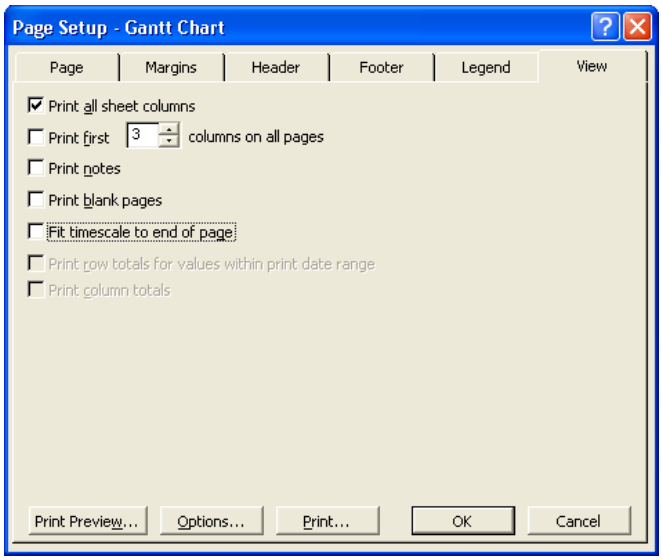
(ii) Choose **None** in the **Legend on** option.

6 **Modifying** the view

This allows you the opportunity to state how much information to display on a printout.

(i) Select the **View** tab.

(ii) Check the first box '**Print all sheet columns**'. This includes all the table columns in your Gantt chart printout such as Task Name, Task Duration, Start Date, etc. Ensure that all the other boxes are unchecked/cleared. The window should appear as below.



(iii) Finally, click on the **Print Preview** button.

This allows you to preview what the printout will look like prior to printing. If changes are required then go back to the Page Setup windows and click the appropriate tab and make the changes. (There is a Page Setup button on all the Print Preview screens to do this easily.)

Note that the **Page Setup** option can be used to format the appearance of most of the reports you will use.

When in the **Print Preview** mode for most reports, a **Page Setup** button will appear in the **Toolbar** allowing you to alter and try out various features and facilities as above, before you decide to print.

Once you are satisfied that the display is exactly how you want it, click on the **Print** button.

Now close your project and save it to your file storage area.

A 9

Re-open your project schedule for MedicExpress again, the '**Southern Depot**' project, and set the following Gantt chart features, page and print options to produce the required printout.

1 Alter the Gantt chart display to show the critical tasks highlighted in red and leave all the other options as offered by the default.

2 Now prepare the Gantt chart view for printing and reporting by setting the following features.

- Set the page orientation for 'Landscape'.
- Adjust the scaling so that all the tasks in the task list fit into a single page depth – vertically.
- Ensure that the Page Size is set to A4.
- Add a page Header, centre justified, consisting of the Company Name on the first line and the Project Title on the second line, both items selected from the General list.
- Add a page Footer, as follows:
- In the centre insert the text '**Page:** ', followed by the page number selected from the icons.
- On the left, insert today's date from the icon list.
- On the right, insert the current time, selected again from the icon list.

3 Now preview the report and if satisfactory, take a printout of the report, ensuring that all of the data columns are included on the first page, and with no legend appearing.

4 Finally close the 'Southern Depot' project, saving it to your file storage area.

Organising Project Information

The Gantt chart provides you with a great deal of information about a project. However, there is a far greater amount of information available within the applications Pack as well as the facility to organise the information to suit your own needs by, for example, sorting the data, organising it into groups, and also selectively filtering the data – facilities which are available in most Microsoft Packs.

To help with this section, you will need a project with more tasks and resources than you have been working with to date. Start by copying into your file storage area the following project – '**Short Film Project.mpp**', which is a project to help with organising the tasks involved in the production of short films. Your tutor will advise you where to locate this project file.

In this chapter you will learn how to:

- Sort task and resource data.
- Organise task and resource data in groups.
- Filter or highlight task and resource data.

For each of these topics you will learn how to:

1 Apply pre-defined sorts, groups, and filters; and also

2 How to create your own custom sorts, groups and filters to meet specific requirements.

Although the built-in views, tables, and reports in MS Project provide many different ways to view the project plan and data, you may wish to re-arrange specific views of it to meet your own requirements or to share with others.

In this chapter, you will use some of these formatting tools in MS Project to change the way your data appears. MS Project includes powerful tools to enable you to organise and analyse data in a wide range of formats.

Sorting Project Details

Sorting is the simplest way to re-organise task or resource data in a project. You can sort tasks or resources by predefined criteria, or you can create your own sort order with up to three levels of sorting. For example, you can sort resources by **resource group**, and then sort by **cost** within each **resource group**, to let you see how much each group of resources is costing.

Sorting does not change the underlying data of your project plan; it simply re-orders the actual data you have on display. The one exception is the option it offers to renumber the task or resource IDs after sorting. Be careful with this however, after tasks or resources are renumbered, you cannot restore their original numbered sequence.

In this exercise, you will sort the data in the resource view. Try the following.

1 Start by opening the **Short Film Project.**

2 From the **View** menu or the **View bar**, select **Resource Sheet**.

The Resource Sheet view appears as follows:

Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Cod
16-mm Camera	Work		16mm	Equipment	300%	$250.00/wk	$0.00/hr	$0.00	Start	Standard	
16-mm Film	Material	100 Feet	Film	Film and Lat		$20.00		$0.00	Prorated		
500-Watt Light	Work		5000WL	Equipment	400%	$100.00/wk	$0.00/hr	$0.00	Prorated	Standard	
Anne L. Paper	Work		AP	Talent	100%	$75.00/day	$0.00/hr	$0.00	Prorated	Standard	
Camera Boom	Work		Boom	Equipment	200%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
Clair Hector	**Work**		**CH**	**Productior**	**100%**	**$800.00/wk**	**$0.00/hr**	**$0.00**	**Prorated**	**Standard**	
Crane	Work		Crane	Equipment	100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
Daniel Penn	Work		DP	Talent	100%	$75.00/day	$0.00/hr	$0.00	Prorated	Standard	
David Campbell	Work		DC	Talent	100%	$75.00/day	$0.00/hr	$0.00	Prorated	Standard	
Dolly	Work		Dolly	Equipment	200%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
Doug Hampton	Work		DH	Production	100%	$15.60/hr	$0.00/hr	$0.00	Prorated	Standard	
Editing Lab	Work		EL	Film and Lat	100%	$200.00/day	$0.00/hr	$25.00	Prorated	Standard	
Electrician	Work		EL	Crew	200%	$22.00/hr	$33.00/hr	$0.00	Prorated	Standard	
Eric Lang	Work		EL	Production	100%	$15.50/hr	$0.00/hr	$0.00	Prorated	Standard	
Eric Miller	Work		EM	Talent	100%	$75.00/day	$0.00/hr	$0.00	Prorated	Standard	
Florian Voss	Work		FV	Production	100%	$22.00/hr	$0.00/hr	$0.00	Prorated	Standard	
Frank Lee	Work		FL	Crew	100%	$14.00/hr	$21.00/hr	$0.00	Prorated	Standard	

You will see that each resource is assigned to one of several resource groups.

These groups have names like ***Crew, Production, Talent,*** etc, names that make sense in a film production company. For your project plans, you might use resource ***groups*** to represent functional teams, departments, or whatever best logically describes collections of related resources. Sorting all resources by resource group enables you to see more easily the costs associated with each different resource group. This can help you plan and manage your project's budget.

By default, the standard **Entry** table appears in the Resource Sheet view. However, the Entry table does not display the total costs per resource. You will need to switch to the Summary table instead, to see such information.

3 From the **View** menu, select **Table: Entry**, and then select **Summary** from the sub-menu, which shows a list of 'summary' data about the resources.

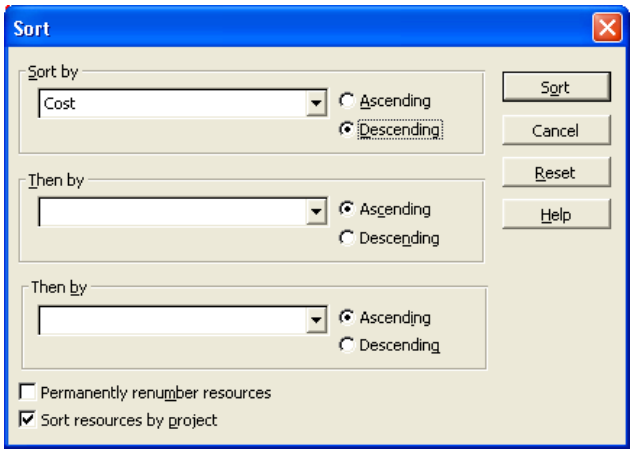
The Summary table appears. Your screen should look similar to the following:

Resource Name	Group	Max. Units	Peak	Std. Rate	Ovt. Rate	Cost	Work
16-mm Camera	Equipment	300%	300%	$250.00/wk	$0.00/hr	$900.00	144 hrs
16-mm Film	Film and Lak		eet/hr	$20.00		$5,800.00	290 100 Feet
500-Watt Light	Equipment	400%	400%	$100.00/wk	$0.00/hr	$330.00	132 hrs
Anne L. Paper	Talent	100%	100%	$75.00/day	$0.00/hr	$731.25	78 hrs
Camera Boom	Equipment	200%	100%	$0.00/hr	$0.00/hr	$0.00	46 hrs
Clair Hector	**Productior**	**100%**	**200%**	**$800.00/wk**	**$0.00/hr**	**$7,520.00**	**376 hrs**
Crane	Equipment	100%	100%	$0.00/hr	$0.00/hr	$0.00	32 hrs
Daniel Penn	Talent	100%	100%	$75.00/day	$0.00/hr	$412.50	44 hrs
David Campbell	Talent	100%	100%	$75.00/day	$0.00/hr	$2,475.00	264 hrs
Dolly	Equipment	200%	200%	$0.00/hr	$0.00/hr	$0.00	56 hrs
Doug Hampton	Production	100%	50%	$15.60/hr	$0.00/hr	$1,887.60	121 hrs
Editing Lab	Film and Lak	100%	100%	$200.00/day	$0.00/hr	$5,100.00	200 hrs
Electrician	Crew	200%	200%	$22.00/hr	$33.00/hr	$2,178.00	99 hrs
Eric Lang	Production	100%	100%	$15.50/hr	$0.00/hr	$372.00	24 hrs
Eric Miller	Talent	100%	100%	$75.00/day	$0.00/hr	$675.00	72 hrs

Now you are ready to sort the Resource Sheet view.

4 On the **Project** menu, point to **Sort**, and select **Sort By**.

The **Sort** dialog box appears as follows.



5 Under **Sort By**, select **Cost** in the drop-down list, and next to that, click **Descending**.

Make sure that the **Permanently renumber resources** check box is **NOT** checked:

If the **Permanently renumber resources** (or when in a task view, the Permanently renumber tasks) check box is selected, it will permanently renumber the resources or tasks in the Project plan. Because you might not want to permanently renumber resources or tasks every time you sort, it's a good idea to make sure this check box is **NOT** checked.

6 Now click the **Sort** button.

The Summary table in the Resource Sheet view is now sorted by the **Cost** column, in descending order. Your screen should look similar to the following illustration:

Resource Name	Group	Max. Units	Peak	Std. Rate	Ovt. Rate	Cost	Work
Scott Cooper	**Productior**	**100%**	**200%**	**$775.00/wk**	**$0.00/hr**	**$10,268.75**	**530 hrs**
Jo Brown	Production	100%	100%	$18.75/hr	$0.00/hr	$9,037.50	482 hrs
Max Benson	Crew	100%	100%	$24.00/hr	$0.00/hr	$8,592.00	358 hrs
Clair Hector	**Productior**	**100%**	**200%**	**$800.00/wk**	**$0.00/hr**	**$7,520.00**	**376 hrs**
Michael Patten	Production	100%	100%	$700.00/wk	$0.00/hr	$6,230.00	356 hrs
16-mm Film	Film and Lat		eet/hr	$20.00		$5,800.00	290 100 Feet
Editing Lab	Film and Lat	100%	100%	$200.00/day	$0.00/hr	$5,100.00	200 hrs
Johnathan Perrera	Production	100%	100%	$22.00/hr	$0.00/hr	$4,840.00	220 hrs
Jan Miksovsky	Production	100%	100%	$18.75/hr	$28.12/hr	$3,637.00	196 hrs
Kim Yoshida	Production	100%	100%	$9.40/hr	$0.00/hr	$3,384.00	360 hrs
Richard Lum	Production	100%	100%	$625.00/wk	$0.00/hr	$3,125.00	200 hrs
David Campbell	Talent	100%	100%	$75.00/day	$0.00/hr	$2,475.00	264 hrs
Electrician	Crew	200%	200%	$22.00/hr	$33.00/hr	$2,178.00	99 hrs
Florian Voss	Production	100%	100%	$22.00/hr	$0.00/hr	$2,024.00	92 hrs
Doug Hampton	Production	100%	50%	$15.60/hr	$0.00/hr	$1,887.60	121 hrs

This new arrangement is fine for looking at resource costs for all resources in the entire project. But what if you'd like to see this cost data organised by the different resource **Groups**. To see this, you'll need to use a two-level sort order.

7 On the Project menu, again point to **Sort**, and select **Sort By** once more.

The Sort dialog box appears again. In it, you can apply up to three levels of sort criteria.

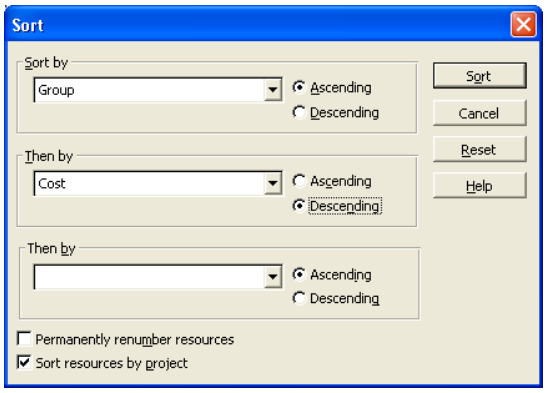
8 This time, under **Sort By**, select **Group** in the drop-down list, and next to that, click **Ascending**.

Note: that you can sort by any field, not just the fields visible in the active view, although it will make a sort more meaningful if the 'sorted' data is one of the columns on display.

9 Under **Then By** (in the centre of the dialog box), select **Cost** in the drop-down list, and next to that, click **Descending**.

10 Again, make sure that the **Permanently renumber resources** check box is **NOT** checked.

Your screen should look similar to the following illustration:



11 Finally, click the **Sort** button.

MS Project sorts the Resource Sheet view to display resources by Group (Crew, Equipment, and so on in ascending order) and then by Cost within each group in descending order. Your screen should look similar to the following illustration:

Resource Name	Group	Max. Units	Peak	Std. Rate	Ovt. Rate	Cost	Work
Max Benson	Crew	100%	100%	$24.00/hr	$0.00/hr	$8,592.00	358 hrs
Electrician	Crew	200%	200%	$22.00/hr	$33.00/hr	$2,178.00	99 hrs
Megan Sherman	Crew	100%	100%	$18.00/hr	$0.00/hr	$972.00	54 hrs
Frank Lee	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
Keith Harris	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
Ted Bremer	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
Tim O'Brien	Crew	100%	100%	$14.00/hr	$21.00/hr	$784.00	56 hrs
16-mm Camera	Equipment	300%	300%	$250.00/wk	$0.00/hr	$900.00	144 hrs
500-Watt Light	Equipment	400%	400%	$100.00/wk	$0.00/hr	$330.00	132 hrs
Camera Boom	Equipment	200%	100%	$0.00/hr	$0.00/hr	$0.00	46 hrs
Crane	Equipment	100%	100%	$0.00/hr	$0.00/hr	$0.00	32 hrs
Dolly	Equipment	200%	200%	$0.00/hr	$0.00/hr	$0.00	56 hrs
Reflector Kit	Equipment	100%	0%	$0.00/hr	$0.00/hr	$0.00	0 hrs
16-mm Film	Film and Lak		eet/hr	$20.00		$5,800.00	290 100 Feet
Editing Lab	Film and Lak	100%	100%	$200.00/day	$0.00/hr	$5,100.00	200 hrs
Scott Cooper	**Productior**	**100%**	**200%**	**$775.00/wk**	**$0.00/hr**	**$10,268.75**	**530 hrs**

This sort offers an easy way to identify the most expensive resources in each resource group working on the short film project.

To conclude this exercise, you'll re-sort the resource information and return it to its original order, so . .

12 From the **Project** menu once more, point to **Sort**, and then click **by ID**.

Project re-sorts the resource list by **Resource ID**. See the left-most column of Resource IDs now in the normal ascending order. The data is once more in the original order by which it was entered in the first place

Note: On your previous screens, there was no visual indication that a task or resource view had been sorted other than the order in which the rows of data appear. You cannot save custom sort settings that you have specified, something which you can do with grouping and filtering. However, the sort order you most recently specified will remain in effect until you re-sort the view later.

Grouping Project Details

Another important tool to help you organise the project data in task and resource views is by ***grouping*** the data within any of the views.

Grouping allows you to organise task or resource information into specific groups, as opposed to simple sorting of the data records on any one or more columns. Grouping also allows you more control over the type of groups you might like to see, something which is not available with simple sorts. For example, grouping also allows you to add summary values, or "rollups", at intervals that you can customize to meet your own needs. For example, you can group resources by their cost with a $1,000 interval between groups.

Like sorting, grouping does not change the underlying structure of your project plan; it simply reorganises and summarises the data on display.

MS Project includes several predefined task and resource groups, such as grouping tasks by 'duration' or resources by 'standard pay rate'. You can also customise any of these built-in groups or create your own group.

In the next exercise, you will use one of the pre-defined groups to group resources by their **Group** name (this is the value in the *Group field—Crew, Equipment,* and so on).

This is similar to the sorting you did in the previous exercise, but this time you will see summary cost values for each resource group calculated and added to the display.

Ensure that the Short Film Project is still open and you have the Resource Sheet on view.

First of all, notice that the values in the Group column are in no particular order.

1 On the **Project** menu, point to **Group By: No Group**, and then select **Resource Group**.

MS Project reorganizes the resource data into resource groups, adds ***summary cost values*** per group, and presents the data in an expanded outline form.

Your screen should look similar to the following illustration:

	Resource Name	Group	Max. Units	Peak	Std. Rate	Ovt. Rate	Cost	Work
	Group: Crew	**Crew**	**800%**	**800%**			**$14,962.00**	**741 hrs**
13	Electrician	Crew	200%	200%	$22.00/hr	$33.00/hr	$2,178.00	99 hrs
17	Frank Lee	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
25	Keith Harris	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
30	Max Benson	Crew	100%	100%	$24.00/hr	$0.00/hr	$8,592.00	358 hrs
31	Megan Sherman	Crew	100%	100%	$18.00/hr	$0.00/hr	$972.00	54 hrs
40	Ted Bremer	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
41	Tim O'Brien	Crew	100%	100%	$14.00/hr	$21.00/hr	$784.00	56 hrs
	Group: Equipment	**Equipment**	**1,300%**	**100%**			**$1,230.00**	**410 hrs**
1	16-mm Camera	Equipment	300%	300%	$250.00/wk	$0.00/hr	$900.00	144 hrs
3	500-Watt Light	Equipment	400%	400%	$100.00/wk	$0.00/hr	$330.00	132 hrs
5	Camera Boom	Equipment	200%	100%	$0.00/hr	$0.00/hr	$0.00	46 hrs
7	Crane	Equipment	100%	100%	$0.00/hr	$0.00/hr	$0.00	32 hrs
10	Dolly	Equipment	200%	200%	$0.00/hr	$0.00/hr	$0.00	56 hrs
35	Reflector Kit	Equipment	100%	0%	$0.00/hr	$0.00/hr	$0.00	0 hrs
	Group: Film and La	**Film and L**	**100%**	**100%**			**$10,900.00**	**200 hrs**
2	16-mm Film	Film and Lak		eet/hr	$20.00		$5,800.00	290 100 Feet
12	Editing Lab	Film and Lak	100%	100%	$200.00/day	$0.00/hr	$5,100.00	200 hrs

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As you can see, after grouping resources by the Group field, MS Project adds summary values for each group. MS Project also applies coloured formatting (in this case, a yellow background, depending on how your application was configured) to the summary data rows. Because the summary data is derived from subordinate data, you cannot edit it directly. Displaying these summary values has no effect on the cost or schedule calculations of the project plan.

To get even more control over how MS Project organises and presents the data, let's now customise this view and create your own customised group.

Start by making a copy of one of the standard groups

2 On the **Project** menu, point to **Group By:**, and then click **More Groups** from the sub-menu.

The More Groups dialog box appears:

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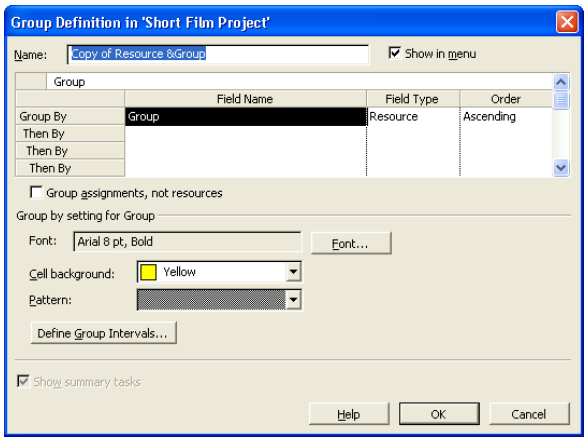
In this dialog box you can see all the available predefined groups for tasks (when in a task view) and resources (when in a resource view). Your new group will be most similar to the Resource Group, so you'll start by copying it.

3 Make sure that **Resource Group** is selected, and then click the **Copy** button.

The **Group Definition in** dialog box appears as follows.



4 In the **Name** box, type **XX Resource Groups by Cost** where **XX** represents your own initials.

Now in this Group Definition box, specify the 'group' criteria

5 In the first cell in the **Field Name** column, **Group** is already selected, so click the next empty cell below **Group**.

6 Type or select **Cost** (Clicking in the field will produce a drop-down list).

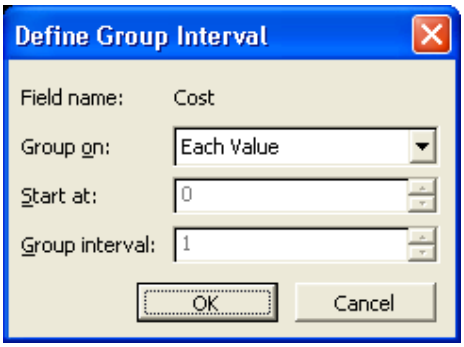
7 In the **Order** column, select **Descending** for the **Cost** field (Click as above).

The resources will be sorted within their groups by cost from highest to lowest values.

Next specify the cost 'intervals' at which MS Project will group the resources.

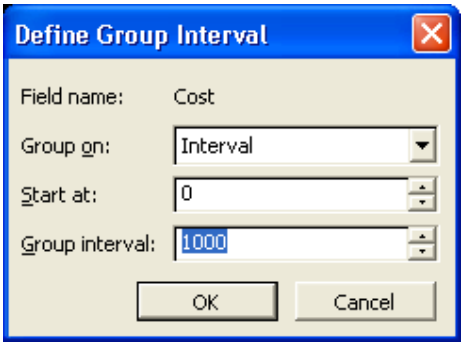
8 Click the **Define Group Intervals** button.

The **Define Group Interval** dialog box appears.



9 In the **Group on** box, select **Interval**.

10 In the **Group interval** box, type **1000**. The box should appear as follows.



11 Click the **OK** button.

12 Click **OK** again to close the **Group Definition in** dialog box.

XX Resource Groups by Cost appears as a new group in the **More Groups** dialog box (Remember that **XX** represents your own initials).

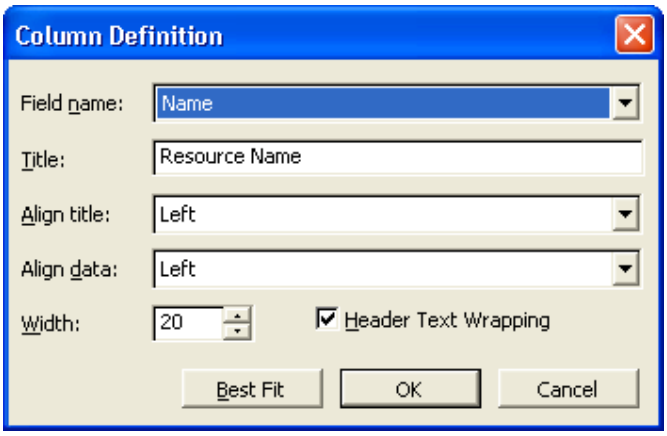
13 Click the **Apply** button.

Project now applies the new group criteria to the Resource Sheet view.

Get a better look at the groupings by widening the Resource Name column.

14 Double-click the **Resource Name** column heading.

The **Column Definition** dialog box appears.



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15 While 'Resource Name' appears in the Title box, click the **Best Fit** button.

MS Project widens the Resource Name column.

Your screen should look similar to the following illustration:

	Resource Name	Group	Max. Units	Peak	Std. Rate	Ovt. Rate	Cost	Work
	Group: Crew	**Crew**	**800%**	**800%**			**$14,962.00**	**741 hrs**
	Cost: $8,000.00 - <$9,000.00	**Crew**	**100%**	**100%**			**$8,592.00**	**358 hrs**
30	Max Benson	Crew	100%	100%	$24.00/hr	$0.00/hr	$8,592.00	358 hrs
	Cost: $2,000.00 - <$3,000.00	**Crew**	**200%**	**200%**			**$2,178.00**	**99 hrs**
13	Electrician	Crew	200%	200%	$22.00/hr	$33.00/hr	$2,178.00	99 hrs
	Cost: $0.00 - <$1,000.00	**Crew**	**500%**	**500%**			**$4,192.00**	**284 hrs**
17	Frank Lee	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
25	Keith Harris	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
31	Megan Sherman	Crew	100%	100%	$18.00/hr	$0.00/hr	$972.00	54 hrs
40	Ted Bremer	Crew	100%	100%	$14.00/hr	$21.00/hr	$812.00	58 hrs
41	Tim O'Brien	Crew	100%	100%	$14.00/hr	$21.00/hr	$784.00	56 hrs
	Group: Equipment	**Equipment**	**1,300%**	**100%**			**$1,230.00**	**410 hrs**
	Cost: $0.00 - <$1,000.00	**Equipment**	**1,300%**	**100%**			**$1,230.00**	**410 hrs**
1	16-mm Camera	Equipment	300%	300%	$250.00/wk	$0.00/hr	$900.00	144 hrs
3	500-Watt Light	Equipment	400%	400%	$100.00/wk	$0.00/hr	$330.00	132 hrs
5	Camera Boom	Equipment	200%	100%	$0.00/hr	$0.00/hr	$0.00	46 hrs
7	Crane	Equipment	100%	100%	$0.00/hr	$0.00/hr	$0.00	32 hrs
10	Dolly	Equipment	200%	200%	$0.00/hr	$0.00/hr	$0.00	56 hrs
35	Reflector Kit	Equipment	100%	0%	$0.00/hr	$0.00/hr	$0.00	0 hrs
	Group: Film and Lab	**Film and L**	**100%**	**100%**			**$10,900.00**	**200 hrs**
	Cost: $5,000.00 - <$6,000.00	**Film and L**	**100%**	**100%**			**$10,900.00**	**200 hrs**

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After applying a two-level group, information is grouped first by resource group and then within each group by cost. The resources are grouped by their resource group value (the yellow bands that bind together Crew, Equipment, and so on) and within each group by cost values at $1,000 intervals (the ***gray*** bands).

To conclude this exercise, you'll remove the grouping.

Removing the 'grouping' and returning data to its original state

16 On the **Project** menu, point to **Group By: Resource Groups By Cost**, and select **No Group**.

Project removes the summary values and outline structures, leaving the original data. Remember that displaying or removing a group has no effect on the data in the project.

Remember, all predefined groups and any groups you create are available to you through the **Project -> Group by** options.

Filtering Project Details

Another useful tool to help you change the way you view a project's task and resource information is by ***filtering***. As the name suggests, filtering hides task or resource data that does not meet certain criteria you specify, displaying only the data you're interested in.

Like sorting and grouping, filtering does not change the data in your project plan; it just changes the way the data appears.

Similar to sorting and grouping, there are two ways to use filters. Either customise a filter to meet your own requirements, or apply an ***AutoFilter*** to a view.

You would use **AutoFilters** for ad hoc filtering in any view in MS Project. When the AutoFilter feature is turned on, small arrows appear next to the names of column headings. You simply click the arrow to display a list of criteria by which you can filter the data. Which criteria you see depends on the type of data contained in the column—for example, AutoFilter criteria in a date column include choices like ***Today*** and ***This month,*** as well as a ***Custom*** option, with which you can also specify your own criteria.

AutoFilters in MS Project are used in the same way you would use AutoFilter in any other applications package. Filtering hides rows in task or resource sheet views that do not meet the criteria you specify. You might see gaps in the task or resource ID numbers. The "missing" data is only hidden and not deleted.

Let's start with using an **Auto Filter**.

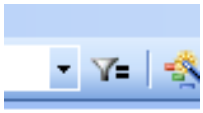
A commonly used format for communicating schedule information on a film project is called a ***shooting schedule***. In this exercise, you will create a filter that displays only the incomplete film shoot tasks. In the next chapter, you'll combine this filter with a custom table and a custom view to create a complete shooting schedule report for everyone on the film project.

Ensure that the Short Film Project is still open and on display.

1 From the **View** menu or **View bar**, select **Gantt chart**, to ensure it is on display.

The Gantt chart view appears. Before you create a custom filter, let's 'auto-filter' the tasks to see only those tasks you're interested in by applying an AutoFilter.

2 On the **Formatting** toolbar, click the **AutoFilter** button: (if this icon is not on the toolbar, you should inform your tutor, or you may be able to set it up from the **View -> Toolbars** menu options).

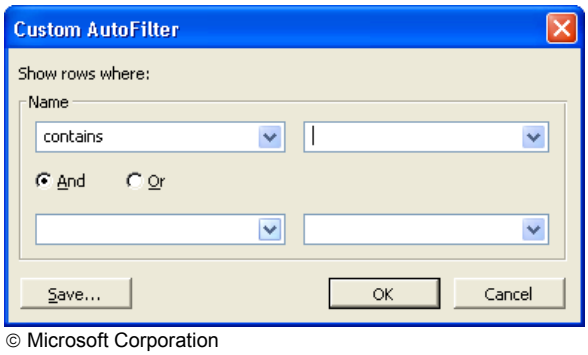


MS Project now displays an arrow to the right of each of the column headings. Your screen should look like the following illustration (pull the divider bar to the right to reveal all the columns):

Task Name	Duratio	Start	Finish	Predecessors	Resource Names
Pre-Production	**59.5 days**	**Mon 07/03/05**	**Fri 27/05/05**		
Review script	1 wk	Mon 07/03/05	Fri 11/03/05		Scott Cooper[50%],C
Develop script breakd	1.05 wks	Mon 14/03/05	Mon 21/03/05	2	Scott Cooper,Johnatl
Develop production bo	1.05 mons	Mon 21/03/05	Thu 21/04/05	3	Scott Cooper,Kim Yo
Scout locations	2 wks	Thu 21/04/05	Thu 05/05/05	4	Jo Brown,Jan Miksov
Select locations	1.05 wks	Thu 05/05/05	Thu 12/05/05	5	Scott Cooper,Clair He
Hold auditions	1.05 wks	Thu 12/05/05	Thu 19/05/05	6	Clair Hector,Scott Co
Apply for filming permi	1 wk	Fri 20/05/05	Thu 26/05/05	7	Kim Yoshida
Reserve camera equip	3 days	Tue 24/05/05	Fri 27/05/05	8FS-50%	Jan Miksovsky,Eric L
Reserve sound equipn	3 days	Tue 24/05/05	Fri 27/05/05	9SS	Eric Lang[50%]
Pre-Production comple	0 days	Fri 27/05/05	Fri 27/05/05	10	
Staff planning meet	**45.25 days**	**Mon 14/03/05**	**Mon 16/05/05**		
Production	**48.5 days**	**Fri 27/05/05**	**Thu 04/08/05**	**1**	
Scene 7	**4.5 days**	**Fri 27/05/05**	**Fri 03/06/05**		
Scene 7 setup	6 hrs	Fri 27/05/05	Mon 30/05/05		Jo Brown,Max Bens

3 Click the down arrow in the **Task Name** column heading, and then select **(Custom).**

The **Custom AutoFilter** dialog box appears as follows:



You'd like to see just the tasks that contain the word ***shoot***.

4 Under **Name**, make sure ***contains*** appears in the first box.

5 In the adjacent box, type **shoot**.

6 Click **OK** to close the Custom AutoFilter dialog box.

Project filters the task list to show only the tasks that contain the word ***shoot*** and their summary tasks. Your screen should look similar to the following illustration:

Task Name	Duration	Start	Finish	Predecessors	Resource Names
Production	**48.5 days**	**Fri 27/05/05**	**Thu 04/08/05**	**1**	
Scene 7	**4.5 days**	**Fri 27/05/05**	**Fri 03/06/05**		
Scene 7 shoot	8 hrs	Tue 31/05/05	Wed 01/06/05	26	Scott Cooper,Jo Bro
Scene 3	**4 days**	**Fri 03/06/05**	**Wed 08/06/05**	**24**	
Scene 3 shoot	8 hrs	Tue 07/06/05	Tue 07/06/05	32	Scott Cooper,Jo Bro
Scene 1	**6 days**	**Thu 09/06/05**	**Thu 16/06/05**	**30**	
Scene 1 shoot	8 hrs	Wed 15/06/05	Wed 15/06/05	38	Scott Cooper,Jo Bro
Scene 2	**3 days**	**Fri 17/06/05**	**Wed 22/06/05**	**36**	
Scene 2 shoot	4 hrs	Mon 20/06/05	Mon 20/06/05	44	Scott Cooper,Doug H
Scene 5	**6 days**	**Wed 22/06/05**	**Wed 29/06/05**	**42**	
Scene 5 shoot	8 hrs	Tue 28/06/05	Tue 28/06/05	50	Scott Cooper,Jo Bro
Scene 6	**13 days**	**Thu 30/06/05**	**Tue 19/07/05**	**48**	
Scene 6 shoot	1.5 days	Tue 12/07/05	Wed 13/07/05	56	Scott Cooper,Jo Bro
Scene 8	**8 days**	**Tue 19/07/05**	**Fri 29/07/05**	**54**	
Scene 8 shoot	8 hrs	Tue 26/07/05	Tue 26/07/05	62	Scott Cooper,Jo Bro
Scene 4	**4 days**	**Fri 29/07/05**	**Thu 04/08/05**	**60**	
Scene 4 shoot	2 hrs	Tue 02/08/05	Tue 02/08/05	68	Scott Cooper,Doug H

After applying an AutoFilter, note that the filtered column name and its AutoFilter arrow are formatted in blue. These are visual indicators that an AutoFilter has been applied to this view.

Next you will turn off the AutoFilter and create a ***custom filter***.

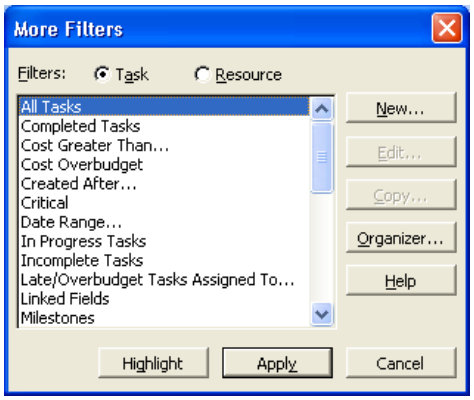
7 On the **Formatting** toolbar, click the **AutoFilter** button again.

MS Project toggles the AutoFilter off, redisplaying all tasks in the project plan.

Now let's create a **customised filter** to see or highlight only the task or resource information that meets the criteria of the filter. For example, some predefined filters, such as the **Task Range** filter, prompt you to enter specific criteria, such as a range of task IDs. If a task or resource sheet view has a filter applied, the filter name appears in the Filter button on the Formatting toolbar.

8 On the **Project** menu, point to **Filtered For:**, and then from the sub-menu select **More Filters**.

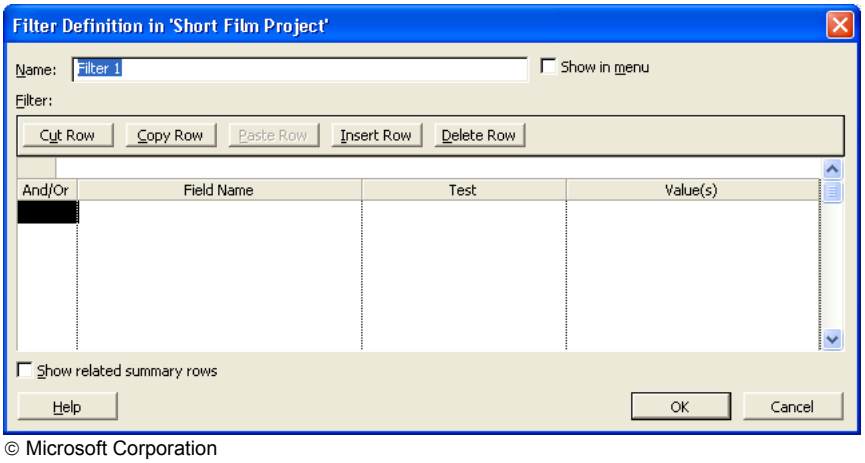
The More Filters dialog box appears:



In this dialog box you can see all the predefined filters for tasks (when in a task view) and resources (when in a resource view) available to you, as you saw above when organising with the resources.

9 Click the **New** button.

The **Filter Definition in** dialog box appears:



10 In the **Name** box, type **Incomplete Shoots**.

11 In the first row in the **Field Name** column, type or select ***Name***.

12 In the first row in the **Test** column, select ***contains***.

13 In the first row in the **Value(s)** column, type the word ***shoot***.

That covers the first criterion for the filter; next you'll add the second criterion.

14 In the second row in the **And/Or** column, select ***And***.

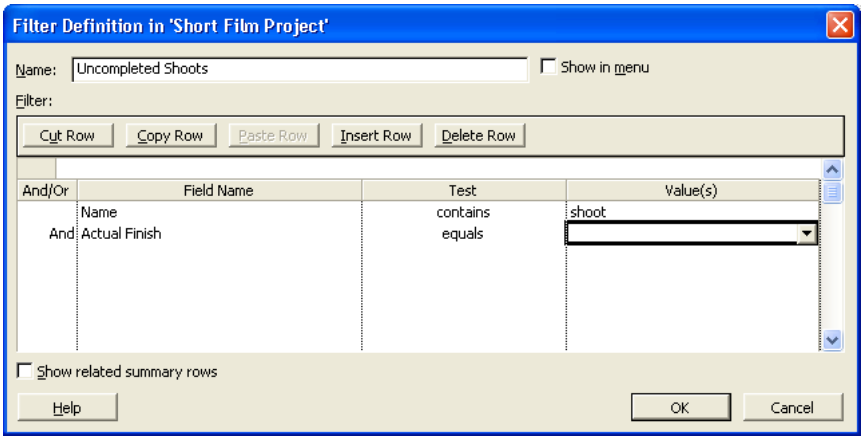
15 In the second row in the **Field Name** column, type or select ***Actual Finish***.

16 In the second row in the **Test** column, select ***equals***.

17 In the second row in the **Value(s)** column, type ***na***.

'***na***' means "not applicable" and is the way MS Project marks some fields that have no value yet. In other words, any shooting task that does not have an actual finish date must be incomplete.

You have inserted two conditions for the filter, and your screen should appear as follows:



(Note that the '***na***' does not appear on the screen display above - but will on your display).

18 Click **OK** to close the Filter Definition in dialog box.

The new filter appears in the More Filters dialog box.

19 Click the **Apply** button.

Project applies the new filter to the Gantt Chart view, and your screen should look similar to the following:

		Task Name	Duration	Start	Finish	Predecessors	Resource Names
27		Scene 7 shoot	8 hrs	Tue 31/05/05	Wed 01/06/05	26	Scott Cooper,Jo Bro
33		Scene 3 shoot	8 hrs	Tue 07/06/05	Tue 07/06/05	32	Scott Cooper,Jo Bro
39		Scene 1 shoot	8 hrs	Wed 15/06/05	Wed 15/06/05	38	Scott Cooper,Jo Bro
45		Scene 2 shoot	4 hrs	Mon 20/06/05	Mon 20/06/05	44	Scott Cooper,Doug H
51		Scene 5 shoot	8 hrs	Tue 28/06/05	Tue 28/06/05	50	Scott Cooper,Jo Bro
57		Scene 6 shoot	1.5 days	Tue 12/07/05	Wed 13/07/05	56	Scott Cooper,Jo Bro
63		Scene 8 shoot	8 hrs	Tue 26/07/05	Tue 26/07/05	62	Scott Cooper,Jo Bro
69		Scene 4 shoot	2 hrs	Tue 02/08/05	Tue 02/08/05	68	Scott Cooper,Doug H

This shows the list of tasks whose name contains the word ‘shoot’ and which are not yet finished as at the date when the filter is applied. After applying a filter, MS Project hides information that does not meet the filter’s criteria. Note the gaps in the task IDs; this is one visual clue that a filter has been applied. The tasks have been filtered to show only the incomplete shooting tasks.

An alternative to hiding all those tasks which do not meet the filter criteria is to show the entire list, but this time just highlight those which ***do*** meet the filter criteria in ***blue***. This time, Open the **Project -> Filtered for -> More Filters** and click the ***Highlight*** button instead of the ***Apply*** button, and see the entire project list of tasks, but this time, those tasks which meet the filter criteria are highlighted in blue.

To conclude this exercise, you will remove the filtering.

20 On the **Project** menu, point to **Filtered For: Incomplete Shoots**, and then select **All Tasks**.

Project removes the filter and re-displays the original project. As always, displaying or removing a filter has no effect on the original data.

21 Finally close the 'Short film Project', saving it to your own file storage area.

Key Points to remember:

- Common ways of organising data in MS Project include ***sorting, grouping,*** and ***filtering.*** In all cases MS Project never deletes data; it just changes how it is displayed.
- MS Project includes many built-in sort orders, groupings, and filters, and you can create your own.
- Whereas sorting and filtering rearrange or selectively show only some data in a project plan, grouping adds summary values or "roll-ups" of values such as costs, based on whatever interval you choose.
- Tables of data are the primary elements of most views in MS Project. MS Project includes many built-in tables, and you can create your own.
- You work with data in MS Project via views. Views may contain tables, groups, filters, and in some cases graphical charts. The Gantt chart view, for example, consists of a table on the left and a time-scaled chart on the right.
- MS Project contains many built-in views, and you can create your own.

A 10

Start by re-opening the project schedule for MedicExpress – the '**Southern Depot**' project.

Sorting

1 With the Gantt chart on display showing all tasks, change the view to show Table: Costs. Sort the display in order of Total Costs in descending order. Use Page Setup to adjust the scale so that all the rows in the chart fit onto 1 page deep, then take a printout of this view showing all of the rows and the Gantt chart bars.

Return the sort order to the default sort order on Task ID for the Task sheet.

2 Now display the Resource Sheet using the Table: Costs view and again sort the resources by total cost in descending order. Use Page Setup again and scale the display to ensure that the sheet prints onto a single page, and take a printout of the display.

Return the sort order to the default sort order on Resource ID for the Resource sheet.

Groups

3 With the Resource Sheet still on display, and again using the Table: Costs view, insert a new column between the Resource Name column and the Cost column to display the resource Group. Now group the data on the Group column in ascending order. Take a printout of this display ensuring that all the sheet data is visible on a singe page.

Return grouping to display the default Group by: No Group.

4 With the same view of the Resource Sheet still on display, now group the data again by Group in ascending order and this time, within these Groups, also group on the Cost field again in ascending order. Take a printout of this display, scaling the view to ensure that all the sheet data is visible on a singe page.

Return grouping to display the default Group by: No Group.

Filters

5 The team would like to see a list of those tasks lasting longer than 7 days. With the Gantt chart on display in Table: Entry view, use the AutoFilter and 'Custom' to filter the tasks accordingly and display only those tasks lasting more than 7 days. Take a printout of this display printing only the first page of the Gantt chart showing the filtered tasks.

Again using the AutoFilter feature, return the display to show all tasks.

6 The team would also like to see a list of those tasks which are critical to the successful completion of the project. With the Gantt chart on display, filter the tasks to show only those tasks 'Critical' to the project finish date. Take a printout of this display ensuring that all the sheet data is visible on a singe page.

Return filtering to display the default Filtered for: All Tasks.

7 Finally the team would like to see the extent of Caroline Spenser's involvement in the project. Apply a filter for 'Using Resource' and select 'Caroline Spenser'. Take a printout of the display showing only those tasks on which Caroline is working.

Return filtering to display the default Filtered for: All Tasks.

8 Finally close the 'Southern Depot' project, saving it to your own file storage area.

Creating Customised Tables, Views and Reports

Tables and Views refer to the ways in which project information is displayed on your screen. They refer to the columns you see, for example, on the left side of your screen when in the Gantt chart view, with columns such as Task Name, Duration, Start date, etc. Or in views such as the Resource Sheet view with columns such as the Resource Name, Group, Std rate, Ovt rate, etc.

In this chapter you will learn how to alter the contents of such tables, views and reports in order to:

- **Create your own custom table**
- **Create your own custom view**
- **Create your own custom report**

Customising Tables

As just mentioned above, in MS Project a table is a spreadsheet-like presentation of all the project data you entered into the project, organised into ***columns*** and ***rows*** (what you see on the left-hand side of a Gantt chart). Each column represents one of the many fields in MS Project, and each row represents a single task or resource. The intersection of a column and a row can be called a cell (if you're oriented towards spreadsheets) or a field (if you think in database terms). MS Project comes ready-made with a wide range of tables that should meet most of your information needs. You've already used some of these tables, such as the **Entry** table, the **Cost** table and the **Summary** table. Chances are that these tables will contain the fields you want most of the time. However, you are free to modify any predefined table, by inserting extra columns or removing some from display, or you can create a new table that contains certain data columns in the order you want to see them.

In this exercise, you will create a table to display the information found on a ***shooting schedule***, a common format for presenting schedule information in film projects.

You will require the '**Short Film Project**' again for this exercise, so start by opening that project and ensure that the Gantt chart is on display.

Note: You should NEVER edit any of the default tables, views or reports available to you, but create your own by making a copy of any table or view similar to the one you wish to create, then edit the copy version, leaving the original default versions intact.

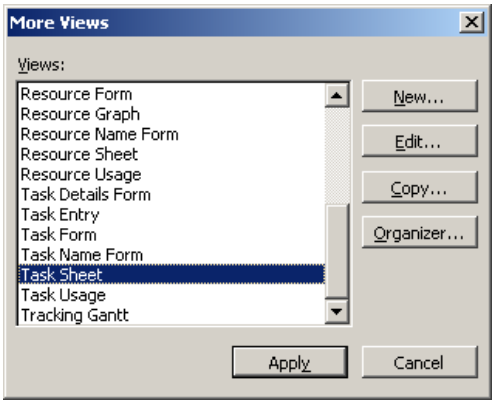
The general procedure for doing this is as follows

- **Select the table**, **view** or **report** closest to that which you wish to create
- **Make a copy** of that object
- **Edit this copy** version to meet your own requirements
- **Save the copy** version to the list of tables, views or reports
- **Finally apply and open this new version** in your project.

Let's start with creating a table where you only want to alter the ***range*** of columns on view.

1 On the **View** menu, click **More Views**.

The **More Views** dialog box appears.



2 Click **Task Sheet**, and then click the **Apply** button.

MS Project displays the Task Sheet view as follows:

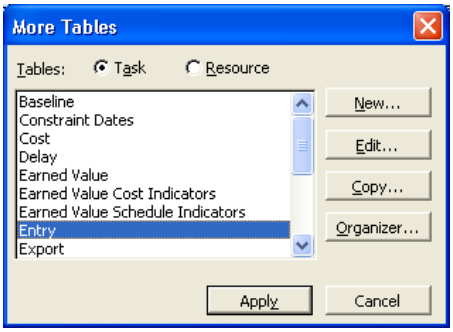
This lists columns from the table of Task information which was entered into the project.

	Start	Task Name	Cast	Location
1	**07 March 2005 08:00**	**Pre-Production**		
2	07 March 2005 08:00	Review script		
3	14 March 2005 10:00	Develop script breakd		
4	21 March 2005 13:00	Develop production bc		
5	21 April 2005 13:00	Scout locations		
6	05 May 2005 13:00	Select locations		
7	12 May 2005 15:00	Hold auditions		
8	20 May 2005 08:00	Apply for filming permi		
9	24 May 2005 13:00	Reserve camera equip		
10	24 May 2005 13:00	Reserve sound equipr		
11	27 May 2005 12:00	Pre-Production comple		
12	**14 March 2005 08:00**	**Staff planning meet**		
23	**27 May 2005 13:00**	**Production**		
24	**27 May 2005 13:00**	**Scene 7**		
25	27 May 2005 13:00	Scene 7 setup		
26	30 May 2005 10:00	Scene 7 rehearse		
27	31 May 2005 10:00	Scene 7 shoot	Richard, Store clerk #1, Store (	Grocery store
28	01 June 2005 10:00	Scene 7 teardowi		
29	02 June 2005 23:00	Scene 7-process		
30	**03 June 2005 08:00**	**Scene 3**		
31	03 June 2005 08:00	Scene 3 setup		
32	06 June 2005 08:00	Scene 3 rehearse		

Note that the Gantt chart part of the screen disappears from view now, since MS Project assumes you only want to see the Task Sheet part of the project information – the columns of data information.

3 Again from the **View** menu, point to **Table: Entry**, and then click **More Tables**.

The **More Tables** dialog box appears:

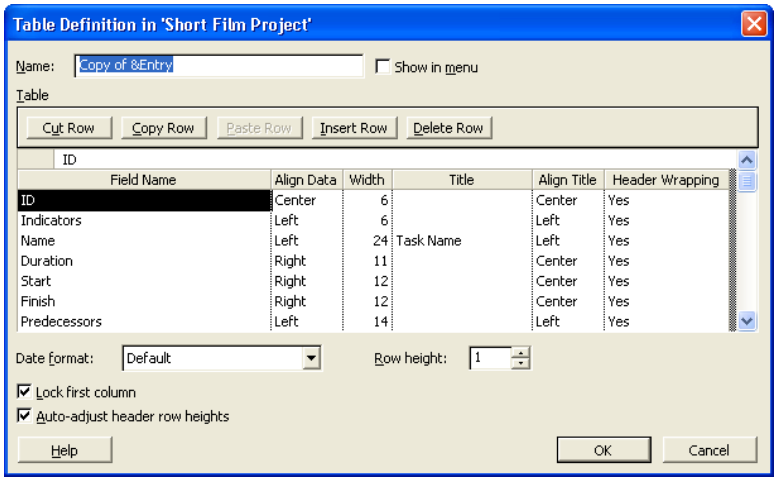


In this dialog box you can see all the available predefined tables for tasks (when in a task view) and resources (when in a resource view) – see the radio buttons at the top of the window.

4 Make sure that **Task** is the active radio button option, and then in the list of tables, make sure that **Entry** is selected. (This is the view you are currently looking at.)

5 Click the **Copy** button to make a copy of this table view.

The **Table Definition in** dialog box appears as follows:



6 In the **Name** box, type **Shooting Schedule Table**.

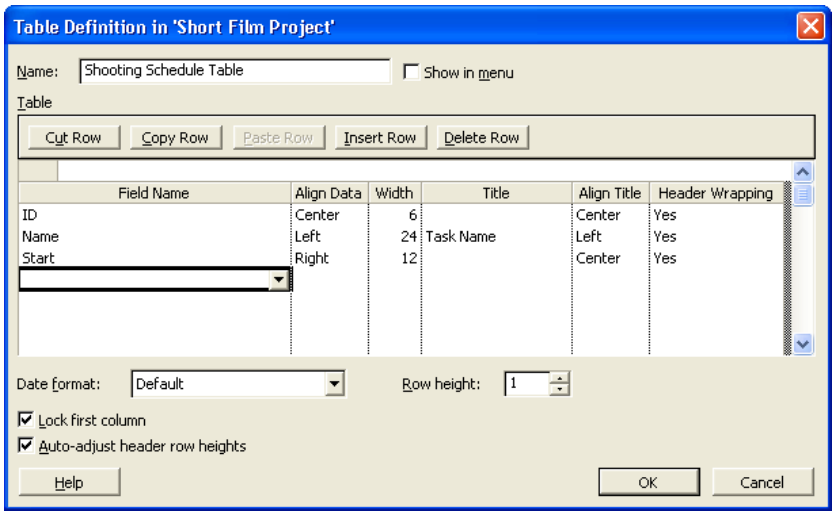
Next you will remove several fields, add others, and then put the remaining fields in the order you want.

Now delete the columns you don't want to see

7 In the **Field Name** column, select each of the following field names, and click the **Delete Row** button after selecting each field name to delete it from the list:

Indicators
Duration
Finish
Predecessors
Resource Names

After you've deleted these fields, your screen should look similar to the following:



Next add some fields you do want to see in this table definition.

8 In the **Field Name** column, click the down arrow in the next empty cell below **Start**, and then select **Cast (Text9)** from the drop-down list.

9 In the **Align Data** column in the same row, select **Left**.

As soon as you click in the **Align Data** column, MS Project completes row entries for the **Cast** field name by adding data to the **Width** and **Align Title** columns.

10 In the **Width** column, type or click **25**.

11 In the **Field Name** column in the next empty row below **Cast**, click the drop-down arrow and select **Location (Text10)** in the drop-down list.

12 In the **Align Data** column, select **Left**.

13 In the **Width** column, type or click **15**.

The two customized text fields **Cast** (Text9) and **Location** (Text10) contain the actors' names and the film locations for the shooting tasks.

Finally, the remaining work to complete this table definition is to reorder the fields to match the order commonly found on a shooting schedule.

14 In the **Field Name** column, click **Start**, and then click the **Cut Row** button.

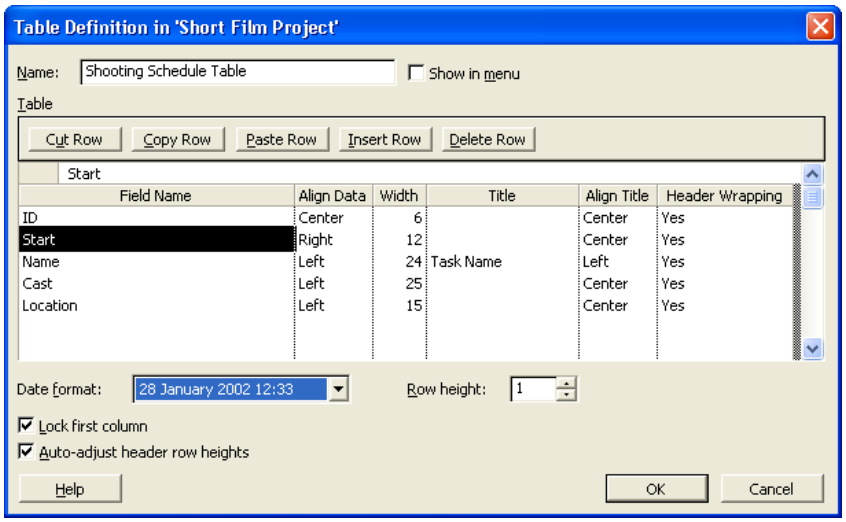
15 In the **Field Name** column, click **Name**, and then click the **Paste Row** button.

The **Start** field should now be inserted above the **Name** field.

16 In the **Date Format** box, select **28 January 2002 12:33**.

(This is the date and time this project was created).

Your screen should look similar to the following:



This matches the order in which information is commonly listed on a film-shooting schedule.

17 Click **OK** to close the **Table Definition in** dialog box.

The new table appears in the **More Tables** dialog box.

18 Click the **Apply** button, to display your customised table view

MS Project applies the new table to the Task Sheet view. If the Start column displays hash signs (###), double-click the column heading's right edge to widen it.

In the next section, you will combine a custom filter with this custom table to create a shooting schedule view for the film project.

Remember the procedure to create your own table is:

- Select the table closest to that which you wish to create
- Make a copy of that table
- Edit this copy version to meet your own requirements
- Save the copy version to the list of tables
- Apply this new version to your project.

Customising Views

As referred to previously, nearly all the data you see in MS Project appears in a ***view***. Unlike tables however, views can contain a wider range of different data types selected not only from a range of tables. Views can also contain sorts, groups and filters. A view might also contain elements such as a time-scaled grid or even graphic elements such as the graphic representation of tasks in the chart portion of the Gantt chart view.

MS Project already includes a wide range of views that help you to display the data in the most meaningful and relevant format to meet your specific needs. You might however find that you need to see your project information in some other way not available in the predefined views. If MS Project's available views don't meet your needs, you can edit an existing view or create your own view just as you did with tables.

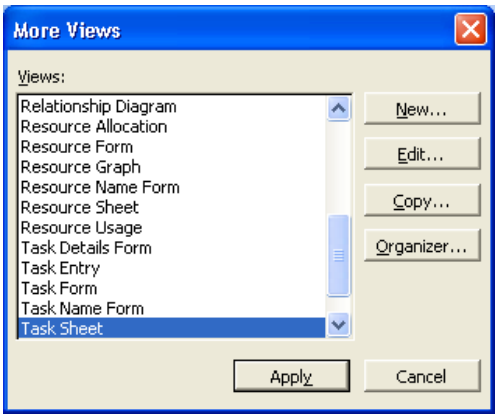
In this exercise, you will create a film-shooting schedule view that combines the custom filter and custom table you created previously. The view you create will more closely match a standard format used in the film industry.

Again, ensure that the Short Film Project is open and the Gantt chart is on view.

Start by making a copy of the view closest to the one you wish to create

1 From the **View** menu, select **More Views**.

The **More Views** dialog box appears:



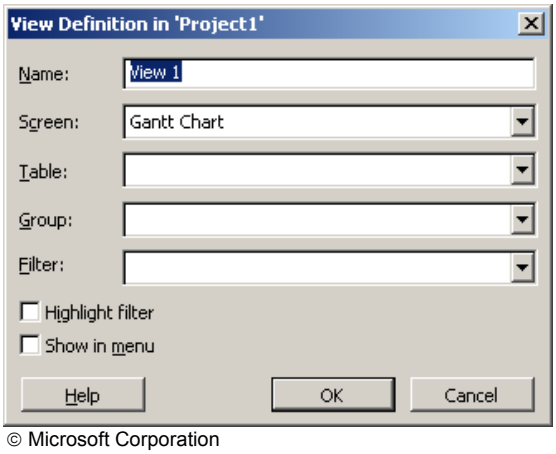
In this dialog box you can see all the predefined views available to you, with **Task Sheet** currently selected since this is the view currently on display.

2 Click the **New** button.

The **Define New View** dialog box appears. Most views occupy a single pane, but a view can consist of two separate panes, so

Make sure **Single View** is selected, and then click **OK**.

The **View Definition in** dialog box appears.



3 In the **Name** box, type **Shooting Schedule View**.

4 In the **Screen** box, select **Task Sheet** from the drop-down list.

5 In the **Table** box, select **Shooting Schedule Table** from the drop-down list.

The specific tables listed in the drop-down list depend on the type of view you selected in step 5: task-related tables or resource-related tables, and will include the customise table you created in the last section.

6 In the **Group** box, select **No Group** from the drop-down list.

The specific groups listed in the drop-down list depend on the type of view you selected in step 5.

7 In the **Filter** box, select **Incomplete Shoots** from the drop-down list.

The specific filters listed in the drop-down list depend on the type of view you selected in step 5.

8 Select the **Show in menu** check box.

The **View Definition in** box should appear similar to the following:

9 Click **OK** to close the **View Definition in** dialog box.

The new view appears and should be selected in the **More Views** dialog box.

10 Click the **Apply** button to apply your criteria to the new view.

Project applies the new view. Your screen should look similar to the following illustration:

	Start	Task Name	Cast	Location
27	31 May 2005 10:00	Scene 7 shoot	Richard, Store clerk #1, Store (	Grocery store
33	07 June 2005 08:00	Scene 3 shoot	Man on street, Richard	Street corner
39	15 June 2005 08:00	Scene 1 shoot	Garth, Man on street, Store cle	Street corner
45	20 June 2005 17:00	Scene 2 shoot	Garth, Shelly	Shelly's living roon
51	28 June 2005 08:00	Scene 5 shoot	Man on street, Garth, Old man,	Street corner
57	12 July 2005 08:00	Scene 6 shoot	Garth, Store Clerk #1, Shelly, C	Grocery store
63	26 July 2005 08:00	Scene 8 shoot	Garth, Store clerk #1, Man on s	Street corner
69	02 August 2005 08:00	Scene 4 shoot	Shelly, Richard	Elevator

This custom view is arranged like a shooting schedule, a standard format in the film industry. Now only incomplete shoots are displayed, and the fields appear in an order consistent with a standard shooting schedule for a film project. Also, MS Project added the **Shooting Schedule** view to the **View** menu. This view will be saved with this project plan, and you can use it whenever you want.

To conclude this exercise, you will adjust the row height and column width to display some information that is not currently visible.

11 While holding down the **Ctrl** key, click the task ID numbers for tasks **27**, **39**, **51**, **57**, and **63**.

In each of these selected rows, the names in the **Cast** column exceed the width of the column.

12 Drag the **bottom** edge of the task ID for **task 27** down approximately one row.

Note: While dragging the lower edge of the task ID downwards, look at the status bar in the lower left corner of the MS Project window. The status bar indicates the new row height as you drag the edge of the task ID. MS Project resizes the selected rows.

Do this for each of the selected rows in turn.

13 Double-click the **right** edge of the Location column heading.

MS Project resizes the column width to accommodate the widest value in the column. Your screen should look similar to the following illustration:

	Start	Task Name	Cast	Location
27	31 May 2005 10:00	Scene 7 shoot	Richard, Store clerk #1, Store clerk #2	Grocery store
33	07 June 2005 08:00	Scene 3 shoot	Man on street, Richard	Street corner
39	15 June 2005 08:00	Scene 1 shoot	Garth, Man on street, Store clerk #1	Street corner
45	20 June 2005 17:00	Scene 2 shoot	Garth, Shelly	Shelly's living room
51	28 June 2005 08:00	Scene 5 shoot	Man on street, Garth, Old man, Shelly	Street corner
57	12 July 2005 08:00	Scene 6 shoot	Garth, Store Clerk #1, Shelly, Old man	Grocery store
63	26 July 2005 08:00	Scene 8 shoot	Garth, Store clerk #1, Man on street	Street corner
69	02 August 2005 08:00	Scene 4 shoot	Shelly, Richard	Elevator

Note that:

- To resize a column's width, drag the right edge of the column heading, or double-click the right side of the column heading.
- To resize a row's height, drag the bottom edge of the task ID downwards.
- Selected rows are also resized.

Remember again the procedure for creating customised views:

- Select the view closest to that which you wish to create
- Make a copy of this view
- Edit this copy version
- Save the copy version to your list of views
- Apply this new version to your project.

Customising Reports

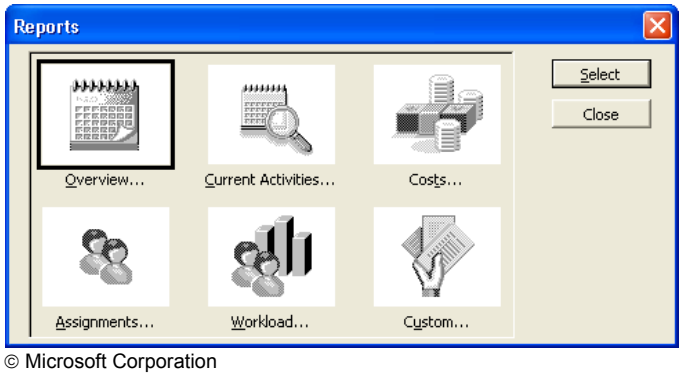
Again this process follows the same procedures you used to create customised table and views. Basically,

- Choose the report from a pre-defined list closest to the one you wish to create;
- Make a copy of this report;
- Customise the copy report to meet your own requirements;
- Save this new customised report to the list of reports;
- Finally apply this customised report layout to your data.

A wide range of reports is already available within the MS Project Pack and these can easily be seen as follows:

From the **View** menu, select **Reports.**

The following Reports dialogue window showing a menu of report categories appears:



You have already seen and used the **Overview -> Project Summary** report, but click on each of these menu options in turn to see a further sub-menu of reports available.

Select a few in turn to see a range of ready-made reports on the different kinds of project information available to you.

However, if you need to create a report which is not included in this wide and useful range, creating a customised report is just as easy as it was to create a customised table or view.

As always, when creating a customised report, you can start from scratch, but since there is already a wide range of ready-made reports available, it is more than likely that the report you want to create is similar to one already available but with a few changes to meet your own needs.

In these cases as with tables and views, it is always easier to start with one of the ready-made reports and customise it to produce a report to meet your needs. You should never edit one of the ready-made reports; but as you did previously, create a copy of the closest matching report, give the copy report a new name, then edit the copy to meet our own needs.

To summarise, the procedure is as follows:

1 From the **Reports** dialogue box, select **Custom**.

2 From the list of reports available, select the report nearest to your requirements.

3 Make a copy of it, supplying a suitable name.

4 Specify the scope of the project, the columns required and any filters to be applied.

5 From the **Custom Reports** dialogue box, with the new report selected, select **Preview** to see this report or **Edit** it to alter it further.

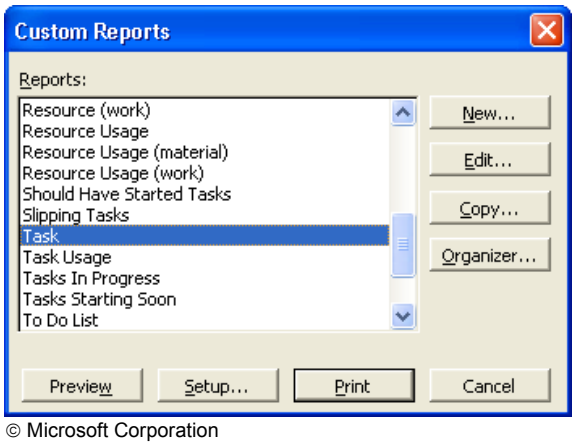
Try this out with the following exercise.

Ensure that the Short Film Project is still open and proceed as follows.

Start with creating a simple report listing the tasks of the project on a month-by-month basis.

1 Select **View -> Reports**. The **Reports** dialogue box appears

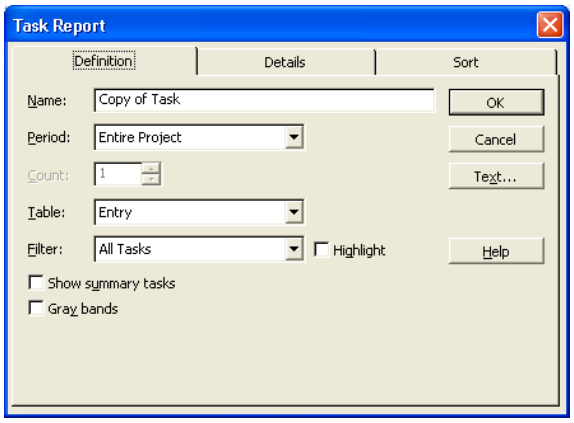
2 Select the option **Custom**, and the following **Custom Reports** dialogue box should appear:



Let's assume we want to create a custom report based on the information contained in the Task table, so

3 Click on **Task**, and then select **Copy** to create a copy of this standard report.

The Task Report dialogue box should now appear as follows:



4 With the **Definition** tab selected, provide a suitable **Name:** for this new report. To make it unique, enter a new name prefixed with your own initials. For example, in my case it might be **js_rep1**

The remaining options to be determined are as follows:

Period: This specifies how you want to see the tasks organised in the report, either as a complete single project list as it was created, or by year, or by month, or whatever.

Table: This determines the range of columns to be initially displayed. Remember **Table -> Entry** and **Table -> Cost** which you used earlier.

Filter: As before, you may want to filter the rows of the report to show only those rows meeting specific criteria.

5 For the this exercise, select as follows:

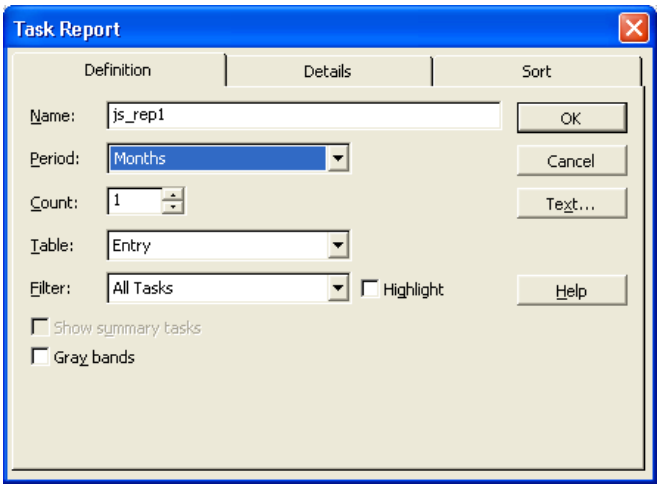
Period: **Months** (to display the tasks 'grouped' by individual months)

Count: **1** (this means show EVERY month as opposed to every 2 months)

Table: **Entry** (to include the basic columns from the **Entry** table - task name, duration, start date, etc)

Filter: **All Tasks** (to include all the tasks of the project in the report)

The dialogue box should appear as follows:



6 Finally, select **OK**.

Your new report now appears in the list of reports in the **Custom Reports** list.

Finally, with your customised report selected, select **Preview** to see the report prior to printing, or select **Setup** to set pagination, margins, header and/or footer.

7 When all of your requirements have been met, finally select **Print**.

Now let's customise the report further by creating a report which includes a filter.

Start as follows:

1 With the **Short Film Project** open, make sure the Gantt chart is on display.

2 From the **Project** menu, select **Filtered for: -> More Filters.**

3 With the **Task** radio button checked, select **Cost Greater Than…**

4 Select **Copy**, and enter a name for the filter as **XX High Cost 1**, where **XX** represents your own initials.

5 The **Cost** field should be pre-selected in the first **Field Name** row. If it is not, then select it from the drop down list.

6 In the **Value(s)** column, enter **2000**, to filter for only those tasks costing more than $2,000.

7 Click **OK.**

8 In the **More Filters** box, **XX High Cost 1** should be pre-selected, click on **Apply**.

The list of tasks should now only show those tasks which cost more than $2,000 with the Cost column on view to prove this.

Now create a custom report using this filtered information.

1 Select **View -> Reports**. The **Reports** dialogue box appears

2 Select the option **Custom**, to display the **Custom Reports** dialogue box

3 Click on **Task**, and then select **Copy** to create a copy of this standard report.

4 With the **Definition** tab selected, provide a suitable **Name:** for this new report. Relate it to the filter you have just created such as **XX High Cost Report 1**, where **XX** represents your own initials

5 For the remaining options, select as follows:

Period: **Entire Project** (to include all filtered tasks)

Count: Not available when **Entire Project** is selected

Table: **Cost** (to ensure the cost data is accessed)

Filter: **XX High Cost 1** (the filter you created above)

6 Select **OK**.

Your new customised report now appears in the list of reports in the **Custom Reports** list.

7 Finally, with your customised report highlighted, select **Preview** to see the report prior to printing. If the report is wider than 1 page, then select **Setup** and under the **Page** tab, adjust the Scaling until the report fits a single page width for printing.

8 When all of your requirements have been met, finally select **Print**.

9 And lastly, close the 'Short Film Project', saving it to your own file storage area.

A 11

Start by re-opening the '**Southern Depot**' project for MedicExpress.

1 Customising a Table View

The team would like to see a simple printout of the total costs and the standard rate of each of the resources in the project. Starting with the Resource Sheet, create a copy table using the Table: Cost view, and call the new table **XX Copy of Total Costs per Resource**, where **XX** represents your own initials.

This new table view should include only the following columns:

Resource ID
Resource Name
Group
Cost

After the Cost column, add a further column: **Standard Rate**. Apply this view and take a printout of the new view for the team.

2 Customising a report

Now create a report which lists only details of those tasks which are critical to the successful completion of the project. Using the 'Critical Tasks' report as a base model, create a new report and give it the name '**XX Critical Tasks Report**'. Ensure that the period is set to '**Entire Project**', the table '**Entry**' view is used and the filter is set to '**Critical**'. Do not show summary tasks. In the details tab, ensure that '**Border around details**' and '**Gridlines between details**' are both checked.

Preview the report and adjust the scaling till the report appears in a single window view, then take a printout of the report.

Finally, close the 'Southern Depot' project, saving it to your own file storage area.

Sharing Project Information

Once you have created your project schedules and any required tables, views and reports to meet your team's information needs, the last important thing you might need to do is distribute, or 'cascade', this information to all the members of the team as well as any other interested parties such as the clients of the project and other stakeholders following the development of the project.

So in this chapter you will learn how to:

- Copy and paste data from Project to other programs.
- Generate a new Office document from inside MS Project that contains essential project details using MS Project.

Project team members usually do not work on projects on their own. A group of team members, each offering a range of development skills will work together, as a team, in order to develop and progress a project to completion. Naturally, therefore, it is essential to be able to communicate the data contents and information about a project to other members of the team as well as other stakeholders who may have an interest in the project.

In this chapter, you will focus on two ways to publish data information from MS Project. In addition to the standard Windows '***copy and paste***' features with which you will be familiar, MS Project also offers a '***wizard***' tool which enables you to create files suitable for exporting to other applications directly from within MS Project, and which can incorporate project information in either text or graphical formats.

Copying and Pasting is the easiest way to share data between MS Project and other applications. You can copy and paste data to and from MS Project simply by clicking on either the **Copy Cell**, **Copy Picture**, **Paste**, or the **Paste Special** options on the **Edit** menu (or the corresponding buttons on the Standard toolbar).

When copying data from MS Project, you can choose one of two options, depending on the results you want:

- You can copy **text** (such as task names and dates) from a table and paste it as text into a destination program, such as Word.

- You can copy a **graphic image** of a view from MS Project and paste it as a graphic image in the destination program. With the Copy Picture command, you can create a graphic image of a view or a selected portion of a view. You would use the Copy Picture feature to optimize the image for onscreen viewing (in PowerPoint, for example) or for printing (in Word, for example). The Copy Picture command also includes an option to save the snapshot to a **.gif** image file. You can then include the **.gif** image in a Word document or e-mail message, or post it directly to an internet site.

Copy and **Copy Picture**

You should note that there is an important distinction between using **Copy** and **Copy Picture**. If you use Copy, you can edit the data in the destination program. However, Copy Picture yields an image that you can edit only with a graphics editing program. Since you will be copying graphical images of your project charts, then in this exercise you will use the **Copy Picture** option.

Paste and **Paste Special**

Many Windows programs, such as Word and Excel, also have a **Paste Special** command on their Edit menu, which gives you more options for importing text from MS Project into the destination program. For example, you can use the Paste Special command in Word to include any special formatting settings with the text, a picture, or a Project Document Object (an *OLE* object). You can also choose to paste just the data or paste it with a link to the source data in MS Project.

In the following exercises, you will copy graphic images from MS Project into two applications, Word and PowerPoint, and also create a **.gif** image which can be inserted into both an application as well as included in an e-mail or posted directly to an internet site.

Start by re-opening the **Short Film Project** again if it is not currently open, and ensure that the Gantt chart is on display. If the full project is not on display as a result of the exercises in the previous chapter, then clear all **Groups** and **Filters** still in effect using the appropriate tools from the **Project** menu option.

Let's assume that you'd like to paste an image of the Gantt chart into a letter you've prepared for a colleague who has assisted you on the project.

This will simply involve making a copy snapshot of the Gantt chart and pasting it into an MS Word document. You copy the same way regardless of the destination program you have in mind. Before you start though, you may want to format the Gantt chart view to enable you to show the information you want on one page. At present the Gantt chart view for the **Short Film Project** takes up about 10 pages.

Adjusting the scale of an image

1 Start by making sure you have the **Short Film Project** open and on display, with the Gantt chart showing all tasks, and proceed to format it and adjust the scale as follows.

2 On the **Project** menu, point to **Filtered For: All Tasks**, and then select **Summary Tasks**.

MS Project displays only the summary tasks in the project without all the individual sub-tasks.

This view still takes up 5 pages, so use the **Zoom** tool on the Standard toolbar to adjust the image size. The 'Plus' sign is used to zoom in and the 'Minus' sign is used to zoom out. So you will use the 'Zoom out' tool to get the 'bigger picture' in one screen.

More importantly, note that the Zoom tool only adjusts the ***horizontal*** dimension (the width) of a chart. It does not alter the ***vertical*** depth of a view - the number of rows you see on an image.

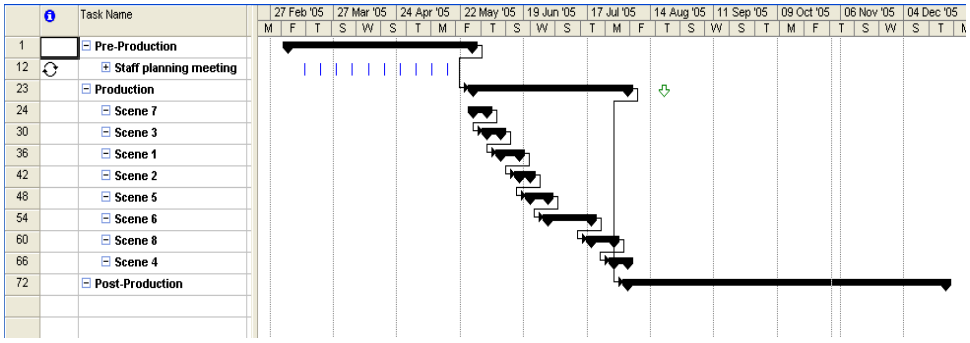
Or:

3 From the **View** menu, select **Zoom** which gives you more specific detailed options, and . .

The **Zoom** dialog box appears.

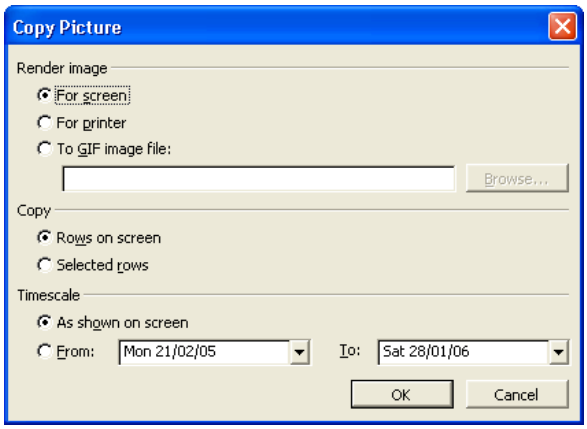
4 In the **Zoom** dialog box, click **Entire project**, and then click **OK**.

This pulls in the entire width of the project horizontally, so that all the bars can be seen on screen. The timescale of the Gantt chart is adjusted to show the entire project within one page. Your screen should look similar to the following diagram:



5 Now either select **Copy Picture** from the **Edit** menu, or click on the **Copy Picture** button on the toolbar:

The **Copy Picture** dialog box appears as follows:



6 Under the **Render image** label, ensure that **For screen** is selected.

Under the **Copy** label, ensure that **Rows on screen** is selected.

Under the **Timescale** label, ensure that **As shown on screen** is selected.

Finally, click on **OK**

MS Project copies a snapshot of the Gantt chart view to the Clipboard.

Next you'll open a document that's been created in a word processor, using MS Word.

7 Firstly, using Windows Explorer, locate and make a copy of the document named '**Letter To Kevin.doc**' into your file storage area. Your tutor will advise you where to find this file. Now open this document from your file storage area, so that you can edit it.

8 From your desktop, open the word processor **MS Word**.

9 In **Word**, from the **File** menu, select **Open**, and open the file you have just saved, '**Letter To Kevin.doc**'.

10 Once the document is open, select the paragraph where it says '**Insert Gantt Chart picture here**'.

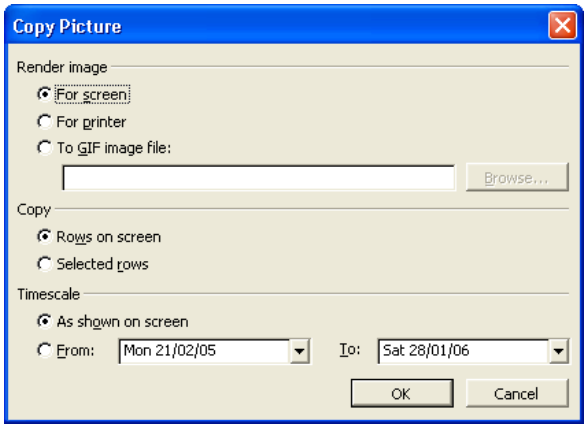
11 On the **Edit** menu, click **Paste,** or click the **Paste** button on the Standard toolbar.

MS Project pastes the snapshot of the Gantt chart view from the Clipboard into the document. Type in your own name at the foot of the letter as the Project Manager and **take a printout** of the letter.

12 On the Word **File** menu, click **Exit**. When prompted to save the document, click **No**.

Note: You 'condensed' the above chart to show only the summary groups before you pasted the graph into a Word document. If however, you wanted to include all of the sub-tasks in this graph, not just the summary groups, then you might find that some of the tasks are missing from the bottom of the screen. In such cases, there is an option which allows you to include all of the rows of the chart within the copied image.

After you select '**Copy Picture**' from the **Edit** menu list, you will remember that the following screen appeared:



In the middle section, under '**Copy**', indicating exactly what you want copied, there is a second option: '**Selected rows**'. This allows you to include as many rows as you require in your image.

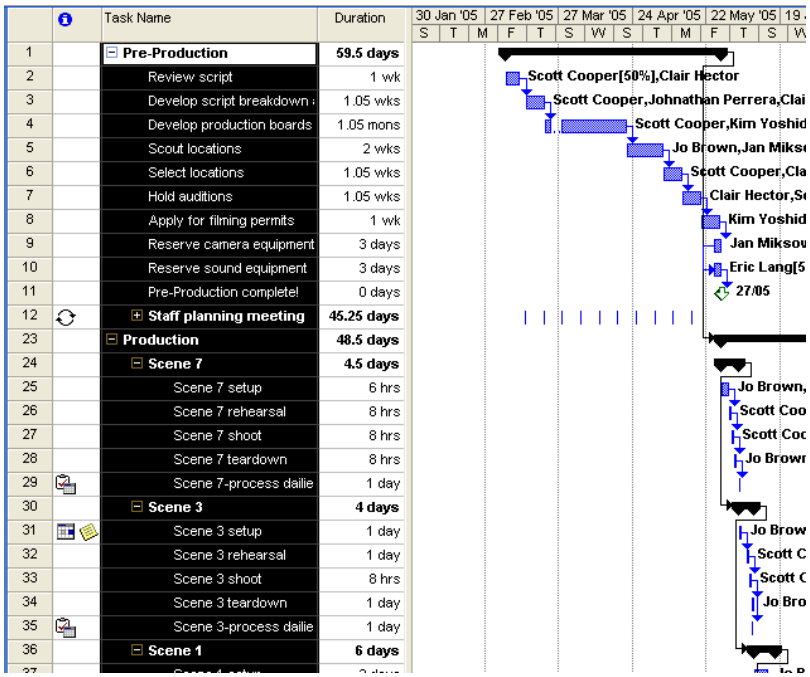
Try the exercise on the next page.

Getting all the rows in the picture

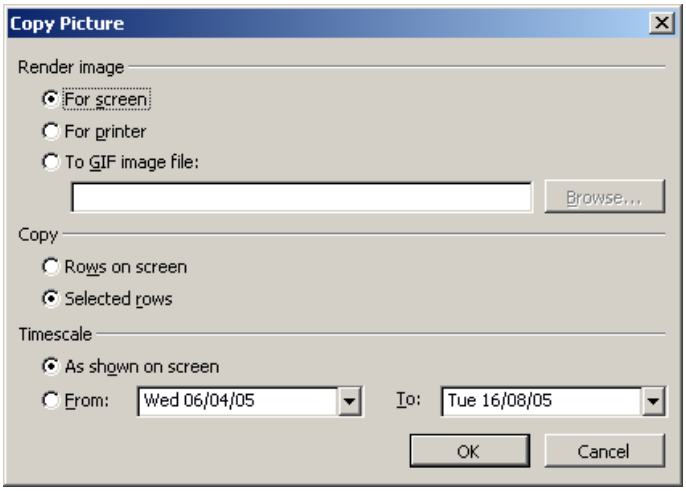
As you might gather from the window above, getting all the rows you require involves ***selecting*** the rows you want to include in the image. As with all applications, you do this by pointing to the first task in the **Task Name** column, then while holding the left mouse button, drag the pointer downwards to the last task in the schedule in the **Task Name** column, so that all the required tasks are selected.

So, with the **Short Film Project** Gantt chart still on display, switch off any sorting, grouping, and/or filtering still in place, so that all of the tasks in the project are again on display.

Now ***select*** the rows you want to include in the image as per the above guidance, so your screen may appear as follows with all the tasks in the Task column selected:



Now, select **Copy Picture** from the **Edit** menu. This time, the dialogue box should have the radio button for ***Selected rows*** checked as follows. If not, then select it now.



After clicking on the **OK** button, you can now go to your Word document, or any other target file, and paste the image. All of the selected rows should now be included in the image.

Using this technique of '***selecting rows***', condenses all of the rows of sub-tasks vertically such that they will fit into a single page image, ready for pasting into another document.

Using .gif images

You will also have noticed in the above dialogue box that there is a third radio button option in the '**Render image**' section. The option of **To GIF image file**.

This option allows you to create a **.gif** version of the image and save a copy of it to your file storage area. When this radio button is selected, the text box immediately following it along with the **Browse** button are activated asking you for a path and file name for the image.

The image can then be saved and inserted into any other application, as well as inserted into a web page for publication on the Internet.

Using the 'Copy Picture Wizard'

Note: This feature is only available if you are using one of the latest versions of MS Project 2003. Firstly check to see if the feature is available to you by looking in the View menu and selecting Toolbars. In the Toolbars sub-menu, you require to select the option 'Analysis'. If this option is not there, then you are not using the latest version of MS Project. In this case you will not be able to complete the following exercise and can only share project data with other applications using the 'Copy Picture' and 'Paste' facilities outlined previously.

If you do have the **Analysis** toolbar available to you, you may proceed with the remainder of this chapter.

In this exercise, you will create a Project Summary Report to be inserted into a Word document and a PowerPoint slide using the **Copy Picture to Office Wizard**.

This option links you directly to these other applications from MS Project without having to leave MS Project itself. In other words, it is an example of applications integration.

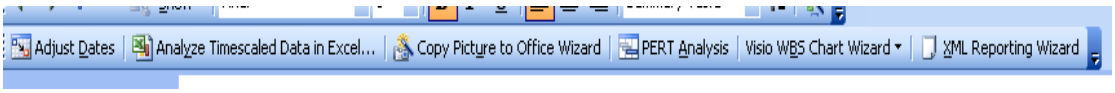
Although the **Copy Picture** feature is useful for moving an image of the active view to the Clipboard or to a **.gif** file, MS Project makes it easy to go a step further and generate a complete document in Word, PowerPoint, or Visio. MS Project enables this with the **Copy Picture to Office Wizard**, which steps you through the process of specifying the exact data you want included in the new Office document, and how you want it displayed.

The **Copy Picture to Office Wizard** generates a new Office document that may contain two items of project information: a table of field values that apply to your entire project (such as the project finish date), and a **.gif** image of the current Project view. The wizard gives you the option of generating a new document in any of the three most common Office formats for project status reporting: **Word**, **PowerPoint**, and **Visio**.

In this first exercise you will use the **Copy Picture to Office Wizard** to create a Word document with a **.gif** image of a Gantt chart. Make sure that the **Short Film Project** is still on display with the summarised Gantt chart on screen.

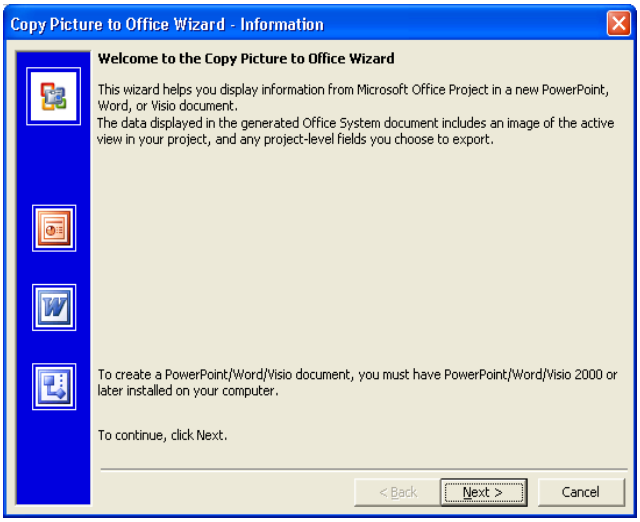
1 From the **View** menu, select **Toolbars**, and click **Analysis**.

The **Analysis** toolbar appears:



2 On the **Analysis** toolbar, click the **Copy Picture to Office Wizard** button:

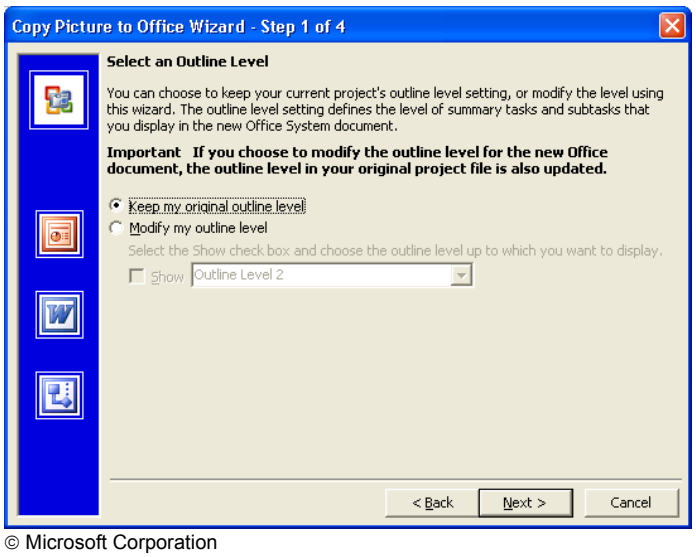
The Information page of the wizard appears. Your screen should look similar to the following illustration:



3 Click **Next**.

Step 1 of the wizard appears. Here you control the outline level of the task list.

4 Make sure that **Keep my original outline level** is selected. Your screen should look similar to the following illustration:



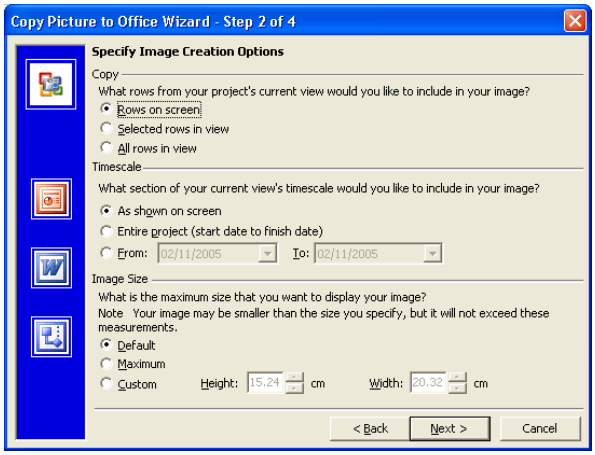
5 Click **Next**.

Step 2 of the wizard appears. Here you specify exactly what you want copied, and at what size.

6 Make sure that:

under **Copy**, -> **Rows on screen** is selected,
under **Timescale**, -> **As shown on screen** is selected, and,
under **Image Size**, -> **Default** is selected.

Your screen should look similar to the following illustration:



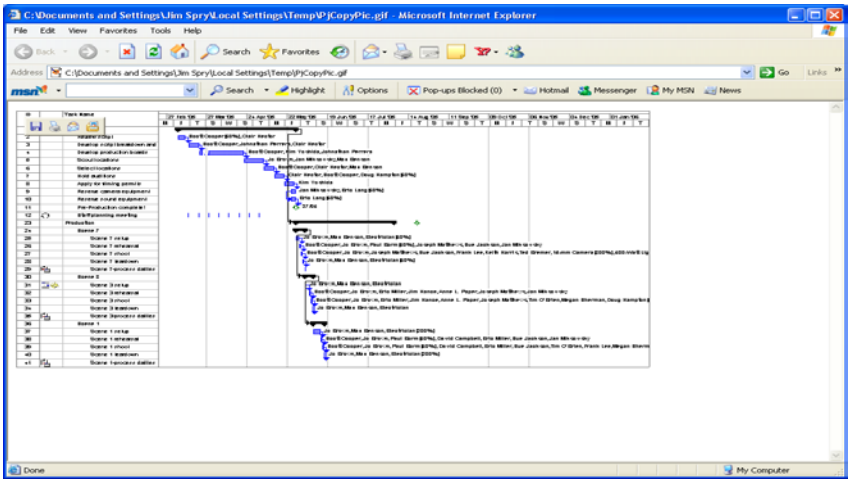
7 Click **Next**.

Step 3 of the wizard appears. Here you specify the Office application for which you want a new document created.

Before you pick an application, however, let's preview the **.gif** image the wizard will create. You preview it in a browser, though the wizard eventually inserts the GIF image of the active view into the application format you chose.

8 Click **Preview** - and wait - this may take a few moments.

Project displays the GIF image of your view in your browser. Your screen should look similar to the following illustration:



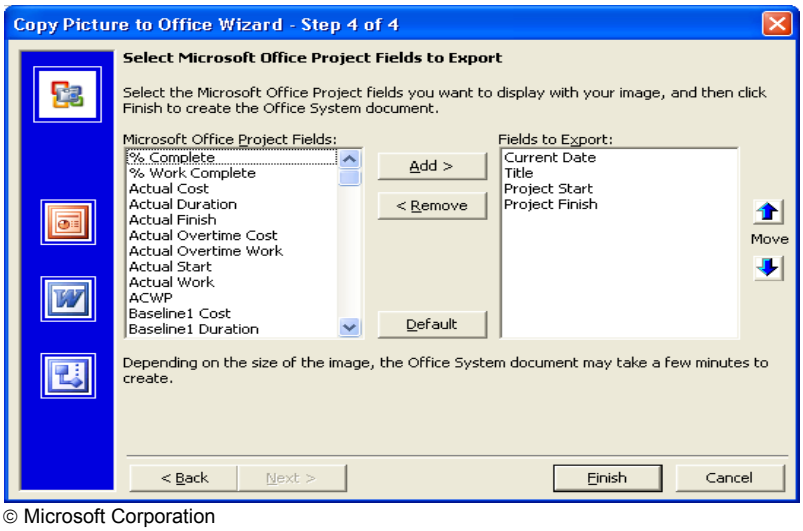
9 Close your browser, returning to **Step 3** of the wizard.

10 Under **Application**, select **Word**.

11 Under **Orientation**, select **Landscape**.

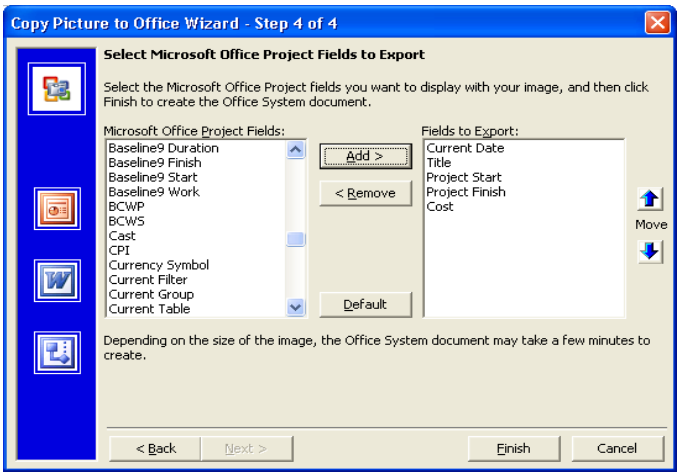
12 Click **Next**.

Step 4 of the wizard appears. Here you review and, if you wish, modify the project-level fields to be included in the new document. These fields will appear in a table above the GIF image as follows:



13 In the right-hand window is a list of the standard fields to be included in the image. These can be deleted as required. Leave them as they are. In the left-hand window, the **Microsoft Office Project Fields** box is a list of other fields you may select from. Select **Cost**, and then click the **Add** button.

The **Cost** field name appears at the bottom of the fields list in the **Fields to Export** box. Your screen should look similar to the following:



14 Click **Finish**.

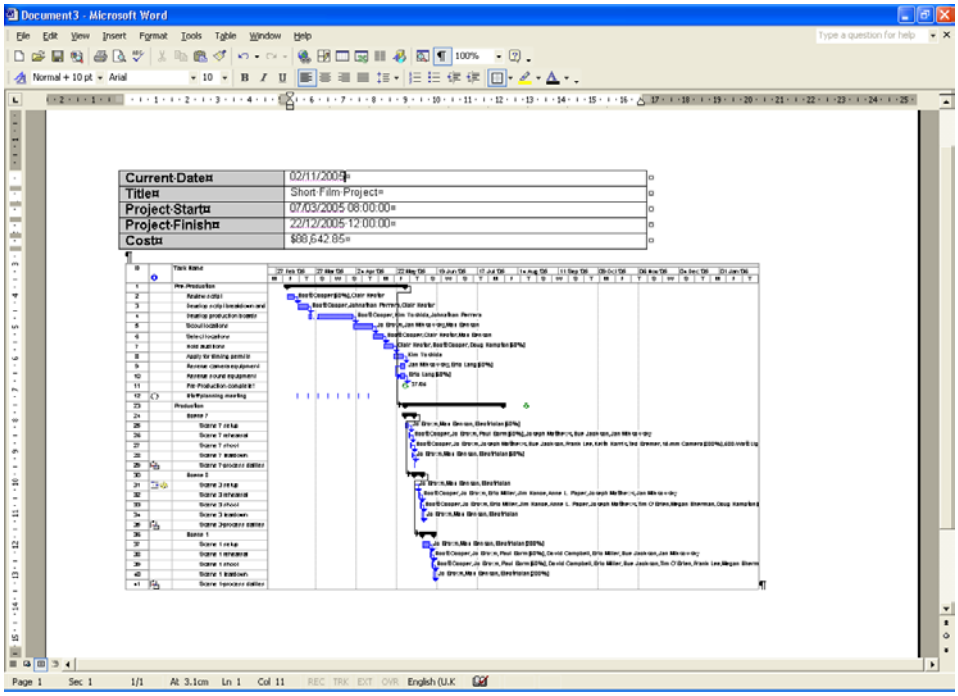
Project displays a confirmation message that it completed the new document creation.

15 Click **Close**.

The wizard starts Word, if it is not already running, and creates the new document.

16 If Word is minimized, click the Word icon on the taskbar and if necessary switch to the new document in Word.

Your screen should look similar to the following illustration:



The project-level fields appear in a table above the **.gif** image of the Gantt chart view. For your real-world reporting needs you could use such a document as a starting point for a project status report.

17 Finally, close the document in Word and switch back to MS Project. Do not save the Word document.

. . . and lastly with PowerPoint . .

Finally, repeat the above exercise again, using the wizard again, except this time, output the same project information to a PowerPoint slide in preparation for a slide show.

1 Ensure that the Gantt chart for the **Short Film Project** is still on display and the Analysis toolbar is still on display. If not, restore it by:

From the **View** menu, selecting **Toolbars**, and clicking **Analysis**.

2 On the **Analysis** toolbar, click the **Copy Picture to Office Wizard** button.

3 When the **Copy Picture to Office Wizard** appears, click **Next**.

When **Step 1** of the wizard appears, ensure that **Keep my original outline level** is selected.

4 Click **Next**.

5 When **Step 2** of the wizard appears, ensure that the following are selected:

under **Copy**	->	select **Rows on screen**
under **Timescale**	->	select **As shown on screen**
under **Image Size**	->	select **Default**.

6 Click **Next**.

7 When **Step 3** of the wizard appears, select the application you wish to output the information to. Select **PowerPoint**.

8 Under **Orientation**, select **Landscape**.

9 Click **Next**.

When **Step 4** of the wizard appears, add the **Cost** field from the **Microsoft Office Project Fields** across to the **fields to Export**.

10 Click **Finish**.

Project displays a confirmation message that it completed the new document creation.

11 Click **Close**.

The wizard starts PowerPoint, if it is not already running, and creates the new slide.

Again the project-level fields appear in a table above the GIF image of the Gantt chart view. For your real-world presentations, you would simply incorporate the slide into your slide show.

12 Close down PowerPoint and switch back to MS Project.

And for the last time, close the 'Short Film Project', saving it to your own file storage area.

A **12**

Using the MedicExpress '**Southern Depot**' project again, you are required to send a letter to HQ which includes a graph of the Gantt chart showing only the critical tasks in the project.

1 Start by creating the document on the following page using a word processor.

2 Now prepare the Gantt chart ready to insert into the letter at the point indicated as follows:

On the data part of the display, only the **Task Name** column should appear, and tasks should be filtered to show only the **critical** tasks in the project.

Use the Zoom tool to show the information required above on a single window display.

3 Now insert the image into the letter you have just created.

4 Finally, take a printout of the letter with the chart inserted.

And for the last time, close the 'Southern Depot' project, saving it to your own file storage area.

Insert your company name
Insert your Address line 1
Insert your address line 2
Insert your address line 3

Insert current date

Mr James Simpson
Chief Executive Officer
MedicExpress

Dear Sir,

We are pleased to inform you that the schedule for the location and build of the new distribution centre is going according to plan and we expect to be ready for stocking and distribution before the summer break.

Below is a graph of the Gantt chart for the project schedule.

(insert Gantt chart here)

On behalf of the team, may I express our gratitude for your continued support in this major project which will, I believe, place MedicExpress as the premier supplier of medical supplies in the UK.

Yours faithfully,

(your name)
Producer

Suggested Responses to Self Assessed Question

 **1**

1 Identify at least three different projects which you know of and have taken place near where you stay.

(Note that this does not necessarily have to be computing projects. Most projects take place, out of sight, within large organisations such as government departments, the health boards, power companies, etc. Such projects often take place without the knowledge of most of us outside the organisation. Likewise, they will remain unknown unless you happen to read specialised journals such as 'Computer Weekly' in the case of computing, where a project may only be referred to where it represents a phenomenal technological step forward - or as more often the case, where the project is a complete failure with millions of pounds wasted).

Suggested answer:

In my own region of Central Scotland, well-known and recent projects include:

- The new Scottish Parliament building;
- The Braehead retail Centre along with the Buchannan Galleries in Glasgow;
- A team to review the structural problems of the Forth Road Bridge and to advise Parliament on solutions including perhaps the construction of a new bridge;
- The need for a new bridge across the Clyde in Glasgow along with the development of the riverfront area;
- The Falkirk Wheel to link two major canals at different levels.

2 Describe at least two features which set projects apart from conventional manufacturing processes and systems?

Suggested answer: References might include:

- Projects being unique activities;
- Projects having precise start and finish dates;
- Projects having a specific budget, usually with penalties attached if the project is not completed according to schedule.

3 Name two major areas of responsibility affecting managers of projects as opposed to managers of conventional processes and systems?

Suggested answer: This may include references to the need to complete the project by a certain date and also having an agreed budget to follow.

4 List three key processes, or stages, involved in a project.

Suggested answer: From the notes, these are:

- Initiating and Planning the Project
- Executing and Controlling the Project
- Summarising and Communicating the Project

5 For each of these three processes, state at least 2 elements which take place for each.

Suggested answer: Any two listed from the notes as follows:

Stage 1: Planning;
Identifying Stages and Tasks, along with Milestones, etc;
Developing the project schedule;
Identifying skills required and resources, etc.

Stage 2: Creating a pool of resources;
Assigning resources to tasks;
Tracking progress;
Analysing project information.

Stage 3: Generating reports;
Communicating the project information.

6 Without referring back to the notes, try to state at least 5 of the keys listed to help with successful Project Management.

Suggested answer: Determining specific project goals;
Being aware of deadlines and constraints;
Establishing the budget;
Always recruit the best resources;
Constantly monitor progress;
Always communicate project information;
Etc.