

Skill Set 1

Planning a Solution

By the end of this Skill Set you should be able to:

- Understand the purpose for using IT
- Identify what methods, skills and resources will be needed
- Plan how to carry out tasks using IT
- Identify any factors that may affect the task
- Select IT systems and software applications
- Understand why particular IT applications were chosen
- Identify any legal/local guidelines or constraints

Exercise 1 - Purpose

Knowledge:

In the course of your personal and working life, you will often come across problems that can be solved using IT (Information Technology). Although not every problem that you encounter will require a computer-based solution, many could benefit from the significant speed and accuracy advantages that IT systems offer. Indeed, you now live in a world where computers are used in almost every aspect of modern life, from business, education, media and banking to communications and shopping.

Defining the problem

The first step towards finding a solution to a problem must start with a close look at the problem itself. Questions you should ask are:

- What exactly is the problem that needs to be solved?
- What information is needed to solve the problem?
- Can a computer be used to simplify or enhance the solution?
- Who will use the solution?
- Will they require assistance?
- How much pre-existing knowledge can you assume?
- How and where will it be used? For example, on a computer or as a printed document?
- When is the completed task required? How long do you have to finish it?

When solving a problem for others, you will have to communicate with the people involved – friends, colleagues, customers. Hold meetings with these people, as a group *and* individually. Gather information on the problems facing them and ask about their requirements for a solution. Make sure you know what their problem actually is; people may be talking about the symptoms of a problem rather than the cause itself. Perhaps more importantly, ask yourself whether a computer can help you create a solution (in most cases you will probably find it can, especially when you are faced with tight deadlines!).

The intended users of your solution can also have a major impact on how you go about creating it. For example, building a report on company performance will be different for the general staff of a company than it will for a Financial Director, and a letter to a friend would look different to a business letter to a customer.

Consider also the cultural background of the audience and make sure your solution is both relevant and appropriate. With technical content, you should be aware of the level of knowledge that the intended audience has, and plan your solution accordingly. Too much explanation of areas with which the audience is familiar may cause them to lose interest; too little explanation for an audience with little or no subject knowledge may put them off.

Exercise 1 - Continued

In the assessment for this unit you will be given a scenario describing a well defined problem. You should read the details of the scenario carefully and make sure you can answer all the questions discussed in this exercise. You may find it useful to write down specific aims before starting the task, and to refer to them through the course of developing your solution; this can help prevent effort being spent in areas that are not relevant.

Example scenarios

Four sample scenarios will be used throughout this guide to illustrate key points. Each will represent one of the software applications that could *potentially* be used to solve a problem (word processing using *Word*, spreadsheets using *Excel*, presentations using *PowerPoint*, and databases using *Access*).

Scenarios:

- A. You are asked to produce a newsletter for a local garden centre's customers, highlighting new plants available for this season. All of the necessary content exists as documents, text files, picture files, etc. It all needs to be used in one document and formatted to a professional standard with headers and footers, fonts, images, etc. A house style should be followed. The file is to be printed and sent to a mailing list of customers today.
- B. You have been given a partially finished presentation highlighting a new campaign at a nearby zoo – children's birthday parties. You need to complete the presentation by adding additional information: pictures, information about optional activities, and prices. The presentation will be run on a large screen in the zoo gift shop so customers can see it as they browse. It should be ready for viewing by the end of today.
- C. You are provided with sets of figures relating to pay for workers in a small manufacturing company. You are asked to work out overtime payments for staff that are on various rates of pay, work various hours, and have worked on different projects. You have been given pay slips containing the information to be input; the overtime pay details are required by the end of the day.
- D. You are asked to update a local estate agent's viewing diary. Customer details, agent details, and property details are all held separately on spreadsheets. The structure has already been created; you only need to add the appropriate new information. The goal is to make it easier for others to find, manage and update the existing information. It should be ready for use by the end of the day.

Note: *It should be stressed that these are sample scenarios, designed only to illustrate key points introduced in this unit. They have no connection with any scenario which may form part of the testing of this unit.*

Exercise 2 - Software Choice

Knowledge:

Once you've identified a problem and considered the need for a solution, you can then consider possible IT systems that can help. How and where your solution will be used – delivered in electronic format or printed and distributed on paper – will also dictate the software that you choose to create it.

Note: At this level it is assumed that a single software application will be appropriate to solve any problem. It is also assumed the software you use is part of the Microsoft Office suite of applications.

You will have to decide upon and justify which software application is best suited to your given task. The following notes will help you to understand the differences between them and appreciate their separate uses.

Word processing

One of the most widely used computer applications are word processing programs. Software such as *Microsoft Word* enables you to produce professional, well-styled documents for many different purposes. Typical word processing solutions include:

- Letters and newsletters
- Marketing mailings
- Reports

Word processing applications are appropriate for any task that requires a largely text based solution, particularly if printed output is required. The entry, presentation and formatting of text are easily handled by an application such as this, as to is the ability to include different types of objects such as images, tables and charts. *Word* can also create contents and index pages automatically, and merge documents with customer data to produce bespoke letters and mailings.



Another important advantage of word processing applications is their widespread use and acceptance. If an electronic version of your solution needs to be used by other people in the future (e.g. perhaps to update and reprint a newsletter), it is highly likely they will be able to do so.

Presentations

Presentation software is an appropriate choice for any task that requires a more *visual* solution, particularly if on-screen viewing is required. If text is restricted to brief notes or bullet points, software such as *Microsoft PowerPoint* will allow you to create complex and impressive presentations with relative ease.

Exercise 2 - Continued

Presentations can be used as on-screen shows controlled by a presenter, eye catching automatic presentations for use in public places, or even as interactive presentations on the Internet. It is an excellent tool for promotions or staff training.



Presentations can include text, pictures, charts, graphs, sounds, film clips and animations. Even information and pictures from the Internet (provided you are legally allowed to use them) can be added to a presentation. Furthermore, *PowerPoint* can produce presentation notes or handouts that can be printed.

Spreadsheets

Spreadsheets are commonly used to manipulate figures and financial information. They are most commonly used for the following purposes:

- Accounting
- Cash flows
- Budgets, forecasts, etc.

Any task involving the use of numbers can be done using a spreadsheet, and *Microsoft Excel* is one of the best software packages available to do this.



The biggest advantage that a spreadsheet has over other methods of manipulating data (e.g. using a table in a word processing application for example) is its ability to constantly update figures without the need to redo any calculations manually. Once a spreadsheet is set up correctly, any changes in data is recalculated automatically and accurately.

Spreadsheets can also take basic data and present it in an attractive way, using formatted lists, tables and graphs. More powerful and complex features are also available for advanced users (such as conditional formatting, data validation, complex formulas, linked data, hyperlinks, and a range of chart types).

Databases

Databases are efficient at handling large amounts of data held in a number of different locations. *Microsoft Access* is an application which allows databases to be built and managed easily and effectively.



Data in a database is held in tables, and if there is a logical connection between the data, the tables can be linked together (related). When used properly this should mean that no item of data is ever held in more than one place.

Exercise 2 - Continued

Access makes it easy to find, manage and update database contents using the following techniques:

- **Queries** These allow data to be extracted from tables using simple instructions.
- **Forms** These allow data to be viewed and/or updated using on-screen forms.
- **Reports** These allow data to be extracted, analysed and presented using specifically formatted layouts.

Scenarios:

- A. The newsletter scenario requires a word processing solution. This is because the solution involves extensive use of text and formatting. If the solution required the newsletter to be viewed on screen (on an intranet, for example) then a presentation or web site solution could be considered, but given the focus on text, word processing should be the selected method.

The solution could also have used a desktop publishing application such as *Microsoft Publisher*, but at this level, word processing would probably be chosen because of greater familiarity and better choice of formatting functions.

- B. The zoo promotional scenario requires a presentation solution. This is because the scenario requires simple important text to be presented in an eye-catching way. A presentation application such as *PowerPoint* is the most ideal way to achieve this.
- C. The accounts scenario requires a spreadsheet solution. This is because it will mainly involve the processing and presentation of numbers. A spreadsheet offers a wide range of tools to help perform calculations.
- D. The estate agent's viewing diary scenario would be best handled with a database solution. This is because the existing data is held in a number of different locations and it would be more efficient to have them related in a single system. Also, the process of finding, managing and updating data can be made much easier by using database features such as forms, queries and reports.

Exercise 3 - Justification

Knowledge:

Having compared IT applications and decided on one which meets the needs of your current task, you should be prepared to justify your choice of application – why did you choose it over other applications? This includes justifying the use of an IT solution rather than a manual approach. Although for the purposes of this qualification it is assumed that an IT solution will be used, you should be aware that in the real world, the overall use of IT within an organisation would have to be considered before deciding on any solution.



Indeed, within any business or organisation, there may be various issues which affect people's attitudes to IT.

- People who have never used IT systems in the past can be wary of using them – they are unfamiliar and can seem difficult to use.
- People may distrust IT systems because they see them as intrusive and capable of monitoring their activities.
- People may favour IT solutions because they like their flexibility (the possibility of home working, for example).
- Some see IT systems as environmentally friendly because they can reduce the use of paper. However, others consider them environmentally unfriendly because of their high demands on electricity.

In general, however, there are many benefits to be gained from using an IT solution:

- For many tasks it will usually be better to use an IT solution. It will produce results far more quickly and accurately than solving the problem by hand. This is particularly true for repetitive or complex tasks.
- An IT solution should be more convenient to produce as all the necessary information and software tools will be available from a single point – the computer.
- An IT solution should produce more consistently high quality results, without the time and expense of employing specialists.

Exercise 3 - Continued

- An IT solution should also produce more consistently accurate results. Of course, this depends on the accuracy of the input data.
- An IT solution should improve productivity, as staff will spend less time performing and checking manual tasks.
- An IT solution should help to produce more integrated and consistent (streamlined) processes throughout an organisation. This can result from using the same fonts, colour schemes, images, etc., across solutions, and by integration and reuse of data. For example, the results in a spreadsheet can be easily used later in the creation of a report.

It should also be noted that there are potential negative aspects to IT solutions:

- Any IT solution has a development time and cost. This should be weighed up against the time and cost benefits it may produce.
- Be aware that people who will be asked to run any new IT system must have the necessary skills to use it efficiently. This may involve retraining.

Scenarios:

- A. Word processing is the ideal solution for the newsletter task. It is a quick and simple way to produce a good looking document with the required structure. The only alternative would be to use specialist printers and publishers which would involve much more time and money. Non IT staff could easily take over the production of future editions if a template were produced.
- B. Similarly, an application such as *PowerPoint* is the only practical way that a professional looking presentation could be produced easily and quickly. Alternatives would be to employ specialist marketing people.
- C. The purpose of the accounts task is to calculate a range of numeric data and present the results in a professional manner. Using a spreadsheet application to do this will create an efficient solution with the minimum of manual effort. Once the starting data is entered, all the pay rates can be calculated with guaranteed accuracy.
- D. Using a database for the estate agent's diary will integrate the data from the different spreadsheets into a single system. With forms and reports set up, the system can be easily managed by personnel with little IT experience. Some of the required output for the task could be achieved by manipulating the original spreadsheets in *Excel*, but there would be no integration between them.

Exercise 4 - Planning

Knowledge:

When the purpose of the task has been identified, the details of the solution need to be planned.



When planning your chosen solution, some thought should be given to how you are going to achieve the desired result. Consider the information that you plan to use and explain where that content fits into the finished resource. Think about who the resource is for, what level of detail is required, and what potential problems may arise.

At this level your planning should pay particular attention to these points:

- **Software.** The software application to be used.
- **Source material.** What source information will be required and where will it come from? How do you evaluate this information – is it fit for purpose?
- **Content.** If there is more source material than is needed for the solution's content, what data items will you use? How will it be presented to users. Are there any special requirements for format and structure? For example, there may be a house style which must be used, or perhaps specific corporate images and logos.
- **Priorities.** If there are time constraints, which features must be included and which could be left out?
- **Resources.** What resources will be necessary to run the solution? For example, is any extra hardware or software needed, and will any extra personnel be required? Resources can include such things as:
 - Hardware - how many computers are available and what specification are they? Are they powerful enough?
 - Software - what software applications are available? Can they open and use a solution created in a particular application?
 - People - how many people are available to operate any new system and will any more be required?

Exercise 4 - Continued

- The skills and capabilities of the potential users - keep things simple and do not create a solution that will be technically beyond the users' abilities to operate.
- Your skills and capabilities - do not attempt a task that will be technically beyond your ability to develop successfully.
- Support – will you need support to complete the task?
- The needs of the organisation - there should be clear and definable objectives from the point of view of the organisation which justify the project. These objectives can be reviewed on completion to see how well they have been met.

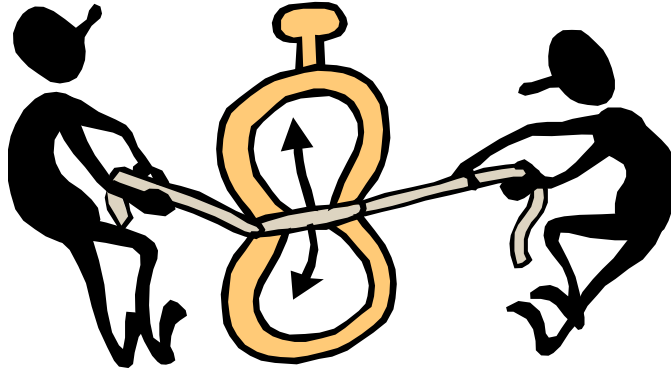
Scenarios:

- A. In the newsletter scenario, all content would be provided, but there may be more than is required. Select the most appropriate data based on the task specification. The newsletter is to present information on new seasonal plants; any information not relevant to this purpose should be left out. However, part of the specification was that the final report should be professionally presented, so pay particular attention to layout.
- B. In the promotional presentation scenario, all content would be provided, but again there may be more than is needed to meet the requirements of the solution. Select the most appropriate data based on the task specification. Include content that will be relevant to customers with children. This may include basic information about the zoo, details of facilities, information about the activity options on offer, etc.
- C. The accounts spreadsheet would probably have less emphasis on style and layout, although of course it should be clear and easy to understand. The main requirements of the system will be that it is accurate and easy to operate. All starting data would be provided, but check to see if it is all required. For example, any details of individual projects will probably not be required; it would be sufficient to show the project name.
- D. For the diary database task it will be necessary to identify what information is needed from the system and input the appropriate data only. As the data already exists on spreadsheets, it is possible to use this data to create database tables which are then maintained in Access.

Exercise 5 - Important Factors

Knowledge:

In completing any task there are a great number of factors to be taken into account to ensure the development of successful solution.



Many influencing factors have been touched on in previous exercises, but they can be summarised here with a little more detail.

- **Resources.** Are all of the required resources going to be available to allow you to develop your solution?
- **Information.** Is all of the information required by the task going to be available?
- **Timescales.** Are there limits as to when the completed solution must be available?
- **Costs.** Are there financial limits which may restrict development of the solution?
- **Style and format.** Are there any particular requirements for style (for example, eye-catching, simple, amusing, etc.) which may affect the form of the solution?
- **External factors.** What impact will the solution have on people outside of your business or organisation, e.g. customers, suppliers, public?
- **Personal preferences.** Are there any strongly held personal preferences which may affect the form of the solution?
- **Advance steps.** Are there any steps, maybe arising from the points above, which you must complete before starting your solution. For example, ordering new hardware/software or evaluating data sources.

Scenarios:

- ❖ For each scenario used in this assessment, the factors that may affect the task will be included in the scenario specification. For example, restrictions on time, cost or appearance. When planning the solution, take all such factors into account.

Exercise 6 - Local Constraints

Knowledge:

As well as the requirements and constraints of the individual task, there may be more general constraints that affect your solution. These may be security considerations or local constraints such as existing 'house styles' that are in use within your business or organisation.

- **House styles.** In your chosen task you may already be required to format all work to specified styles. House styles are formatting rules that are set by a business or organisation to be applied to all documents used. They will include instructions on which text fonts and sizes should be used in any given part of a document and which colour schemes and logos should be included. The house style may change slightly for different purposes, e.g. for internal and external documents or for particular projects or product brands.
- **Security.** Any solution should take into account data security. Data security can be divided into two areas: security against loss of data and security against unauthorised access to data. To help protect against data loss, make sure that your solution is backed up, i.e. copied to an alternative location, preferably off-site, and that it is included in any existing regular backup procedures.
- **Protection.** You must protect your solution against unauthorised access. The more sensitive your solution, the more effort you must invest in protecting it. Information security is the term used to describe methods for protecting data against compromise or unauthorised access. It can include such features as:
 - A user ID/password policy to cover access to all computers/files
 - Separate user-level security on individual systems/data files
 - A specific person responsible for each level of security
 - Antivirus measures, including use of a firewall
 - Procedures for educating staff about their responsibilities regarding information security

Security is particularly important when data contains personal information about individuals. Storage and use of such data is governed by strict legal regulations, as covered in the next exercise.

Scenarios:

- A. The newsletter task will involve the use of 'house styles' to ensure that the publication represents the garden centre's image. Any formatting requirements will be provided with the original specification. There is probably no requirement for security on the newsletter file, although the content could be password protected to avoid mischievous alterations.

Exercise 6 - Continued

- B. A promotional presentation will probably also involve the same house style considerations as the newsletter task. Although all required images and text will be supplied, in a real situation the images should all be checked for copyright issues.
- C. A spreadsheet solution to calculate pay is less likely to have house style and copyright issues, but will certainly have security and data protection implications.
- D. Database objects such as forms and reports can have formatting applied to them, so they may also require application of 'house styles' or company logos. Security involving user IDs and passwords may be an issue if the system can be accessed from a public area, and if the system becomes an important feature of the business, regular and comprehensive backups will be vital.

Exercise 7 - Legal Constraints

Knowledge:

IT and electronic communication now form an important part of many peoples' lives, so it is not surprising that a large amount of regulation and legislation exists to control it.



Many of these constraints could affect your solution, and some major examples are listed here.

- **Copyright.** Any image, text file or other item in print or on the Internet is considered to be the copyright of the person or organisation that created it. So, unless you have explicit permission, you cannot use or distribute any material obtained from the World Wide Web.
- **User Licence.** Normally when you buy any piece of software, you purchase a licence to use the software in a single location. Organisations will often purchase multiple user licences which allow them to run a certain number of copies (but no more) within their organisation. Therefore, giving away copies for others to use is illegal.
- **Data Protection Act.** An organisation which stores any personal data referring to any identifiable individuals is bound by the current version of this Act. In summary, this requires that all such data shall be:
 - Obtained and processed fairly and lawfully
 - Processed only for one or more specified and lawful purposes
 - Adequate, relevant and not excessive for those purposes
 - Accurate and kept up-to-date
 - Kept for the original purpose only and for no longer than is necessary.
 - Processed in line with the rights of the individual
 - Secure and protected against loss, damage and inappropriate processing
 - Not transferred to other countries unless they also have data protection

Exercise 7 - Continued

- **Computer Misuse Act.** This act covers the unauthorised access by individuals into computer systems, sometimes known as computer 'hacking'.
- **Consumer Rights.** In principle, buying goods or services electronically online is covered by the same consumer rights as buying from a high-street shop, with some extra entitlements such as an order confirmation and a 'cooling off' period.
- **Health and Safety.** The Health and Safety at Work legislation (HASAW) has many regulations referring to computer installations, such as suitability and accessibility of equipment (keyboards, screens, mouse mats, etc.), and time spent using that equipment.
- **Accessibility.** Computer installations should, wherever possible, be accessible to everyone regardless of age, gender, origin or physical disability.
- **Inappropriate Content.** The displayed content of any computer system is governed by the same laws relating to offensive or obscene content as for printed material. In addition, individual organisations may have their own guidelines on this subject.

Scenarios:

- A. Copyright laws and regulations on inappropriate content could apply to the newsletter solution. You must own or have permission to use any words or images that you use in the newsletter.
- B. The presentation will have the same considerations as the newsletter. However, issues relating to accessibility are applicable. Consumer rights may also be a consideration.
- C. The overtime accounts system holds details referring to individuals, and so security and legal constraints are likely to be much more important. In particular, the Data Protection Act would seem to apply.
- D. The database example will have the same considerations as the spreadsheet system.

Note: For all scenarios, you must have a licence to use the relevant software.

Exercise 8 - Develop Your Skills

You will find a *Develop Your Skills* exercise at the end of each Skill Set. Work through it to ensure you've understood the previous exercises.

Revision Scenario:

You are employed by a catering company and have a fixed weekly budget for fresh ingredients. The prices change regularly and your boss has given you the task of using IT in a way that can help work out what you can spend. The task is to be completed in a Microsoft Office environment.

1. Which application would you use to complete this task?
 - a) Database (*Access*)
 - b) Word processing (*Word*)
 - c) Spreadsheet (*Excel*)
 - d) Presentation (*PowerPoint*)

2. In the above scenario, which of the following resources would be necessary for you to complete this task?
 - a) Printer
 - b) Copy of *Microsoft Excel*
 - c) Copy of *Microsoft PowerPoint*
 - d) Scanner

3. In the above scenario, the following are all reasons for choosing an IT solution based on *Excel*. Which do you think is the most important in this particular example?
 - a) The data should look attractive
 - b) If the figures change, the calculations must stay correct
 - c) You can print out a copy of the spreadsheet every week

4. If you were given a selection of images copied from the Internet to include in a company presentation, what would be your main legal consideration?
 - a) Software licensing
 - b) Data Protection
 - c) Copyright

Note: Answers are listed in the **Answers** section at the end of this guide.

Summary: Planning a Solution

In this Skill Set you have seen how to plan the use of appropriate IT systems and software to meet requirements

Your ITQ evidence must demonstrate your ability to:

- Identify the purpose for using IT:
 - Who and what is the information for?
 - When must it be finished?
 - What information needs to be included?
 - Where will it be used (on screen, sent to others, printed)?
- Identify the methods, skills and resources required to complete the task:
 - What information sources are needed; how will they be found and evaluated?
 - What application software should be used?
 - What skills and resources are needed to complete the task successfully?
- Plan how to carry out the task using IT to achieve the required outcome:
 - What are the requirements for content, structure and layout?
- Identify reasons for choosing IT systems and software for the task:
 - Time, convenience, cost
 - Benefits of IT or manual methods of preparing, processing and presenting the same information
- Select IT systems and software applications as appropriate for the purpose:
 - Convenience and effectiveness at meeting needs, quality, and accuracy
 - How IT makes tasks easier than other methods
 - Any difficulties people have in using IT
 - Streamline business processes and increase productivity
- Identify any legal or local guidelines or constraints that may affect the task:
 - Data protection, copyright, software licensing, and security
 - Organisational house-style or brand guidelines