

Chapter 1.7 Choosing Applications Software

1.7 (a) Custom Written and Off-the-Shelf Software.

When the analyst has analysed the problem and come to a conclusion about how it can be solved, a decision has to be made about the software that should be used.

There are many pieces of software that have already been written and are immediately available to buy. This type of software is called 'off-the-shelf' software because you can literally go into a computer shop and pick a copy off the shelf.

Off-the-shelf package – advantages

- The software has already been written and so is immediately available rather than having to wait, sometimes a considerable time, for it to be written.
- The software will be used by many people or organisations; therefore they share the development costs rather than one having to foot the whole bill. This implies that the software will be considerably cheaper.
- Copies of the software have been in use for some time and will have been in use by a variety of users. This means that any bugs in the software should have been found and rectified; consequently it can be expected to work.
- If it comes as part of a suite of software it can be relied upon to be compatible with other applications, allowing, for example, the import of data.
- Because the software will be in general use there are likely to be well established training courses for the staff to be sent on to learn about the software.

Off-the-shelf – disadvantages

- can be over-complex as it tries to cover as many aspects as possible (e.g. most users of Word only utilize about 10% of its features)
- the software is often a compromise since it is intended for many users all with different requirements
- may be very complex to learn because of the complexity caused through having unwanted features
- may not fit exactly into the company requirements causing a compromise in the way it has to be used within the organization
- if there are major concerns with a software problem it is unlikely that it will be fixed immediately (since it may cause problems with other users and/or cause software instability)

A Custom package is one that has been specially written to solve a specific problem. Perhaps there is no freely available piece of software that will satisfy the needs of the company, A piece of custom software should mean that the organisation gets a piece of software that will do all the things that it requires doing, and, equally importantly, does not contain extra routines that will never be used.

Custom-written Software – advantages

- specifically designed for the application and therefore more efficient and will only contain the features wanted; since it will be devoid of unwanted features the software can take its specific requirements to new levels which will make it very powerful
- can be customized to interface with all other software within the company thus preventing software clashes
- easier to use since very specific and the writers of the software can also be involved in the training of staff which will be geared towards their requirements
- can be modified/updated as the company's requirements change
- much better customer support since they will be in direct contact with the software designers

Custom-written Software – disadvantages

- very dependent on the suppliers of the software; if they go out of business there will be little or no support if problems occur
- less likely to be as well developed/tested as off-the-shelf software
- much more expensive since all the development costs need to be met by the company (but efficiency savings may compensate for this and it may prove to be less expensive in the long run)
- the development time can be very long which may cause problems
- difficult to tell how good the final software package will be (could be a real problem if the company have waited 2 to 3 years to receive their new software only to find it doesn't meet their needs!!)

1.7 (b) Features of Common Applications

Stock control:

As the name implies, stock control systems are used to keep track of the stock being held by an organization. There are typically three areas that need to be handled by a stock control program. The first is to keep details of the individual items that the organisation holds in its stock. These details will differ dependent on the item being held and the information about it that the organisation decides is important. A consignment of towels in the stock of a shop will need to have the colour of the towels stored, whereas the information stored about bulldozers stored by a plant hire firm would not include colour as it is irrelevant to their function. What would be included would be the horse power of the machines, which obviously does not apply to the towels. The second is to store information related to the product though not directly about the product itself. Examples would be storing details of the supplier, or where the goods are being stored in the shop/warehouse. The third is to do with the use of the goods. Who has hired the bulldozer out? Where is it? When is it due back? What sort of condition was it in when it was hired out?

Stock control systems are all to do with keeping track of stock, recording stock levels and the condition of the stock and keeping track of where it is going.

Payroll:

The payroll is a perfect example of a batch process. All the records need to be processed during the same run because all the workers need to be paid. Each record undergoes the same type of processing, working out the number of hours worked, multiplying by the hourly rate and then doing the tax calculations. The process requires no human intervention during the processing.

The traditional picture of the payroll application is that the master file of workers is held on a tape, as is the transaction file that holds the workers' details for that week. The two are arranged in the same order and then run together and the results stored on a new master file, again held on a tape. This gives rise to the ancestral filing system form of backing up of files which was introduced in section 1.3. In this system, the old files are kept so that if the new versions are corrupted they can be reproduced using the old master and transaction files. Nowadays, the file is likely to be held on a disk with an index to allow fast access to individual records; this would imply that the records are overwritten and that there is no new version of the master file created.

Process control:

As the name implies, this is the use of a computer to automatically control a process. The computer receives information about the process from sensors which allow it to make decisions. The results of these decisions are actions that are carried out. The next set of input from the sensors not only tells the system about the current state of the process but also allows the computer to compare with the last set of inputs to decide whether the actions that it took last time had any impact. This process is known as feedback.

Point of Sale systems:

A computer used at a point of sale needs to carry out three actions. The first is to identify the goods being bought, the second is to carry out whatever processing is required and to produce a satisfactory output, and finally to arrange for payment.

The identification of the goods can be done in a number of ways, but the standard method is to read a code from a barcode. This code is then validated (see chapter 1.8.c) and then sent to the processor. The processor uses this barcode as the key field when searching the product file. When the record is found the contents of the record are used to produce a printout for the customer (till receipt), and to accumulate the total value of all the goods that have been bought. Finally, the payment can be made electronically by sending details of the customer account to the bank or Credit Card Company from where payment will be made to the store immediately.

1.7 (c) Generic Applications Software.

There is nothing frightening about this section. The intention is simply that students should be able to suggest sensible software for given applications. The software automatically divides itself into specific uses. The student should be able to isolate the important characteristics of an application from the description and then decide which of the generic software best fits the application characteristics.

Word processing:

Used for applications that have the need to communicate with others using text. Writing letters, mail merging, preparing text documents for use in other software packages, are all typical uses of a word processing package.

Spreadsheets:

Spreadsheets are a type of software that allows data to be stored. If this were all that a spreadsheet was to do then there would be other, more satisfactory types of software available. A spreadsheet is particularly useful because it can store different types of data, including numerical data, and that it can perform calculations on the areas (cells) where the numerical data is being stored. Spreadsheets should be considered for any example where data is stored and calculations need to be carried out on it. Examples would be profit and loss accounts, budgeting, payrolls (although other, more specialised, payroll software would be used in a large scale application), indeed any example that requires the manipulation of figures to give accurate results or forecasts or predictions.

Desktop publishing (DTP):

This type of software is characterised by the ability to produce a page of printed output that has been designed by using advanced layout techniques. The page may well contain text, graphics, tables and many other types of output each one of which may be better produced using a word processor or a drawing package or a spreadsheet. The value of the DTP is that it contains powerful tools for arranging these individual items on the page, the printout of which can be used directly as the starting point for a printing process. Typically DTP software is used for the production of leaflets, posters, proof copies of books and magazines. Many word processors now have features which previously would only have been found in a DTP, for instance the ability to produce text in columns or to surround graphics with text, and the distinction between a DTP package and a word processor has become less clear cut.

Presentation software:

The growth of the use of presentation software has followed the development of portable computer systems. If a salesman is to do a presentation to a group of people it is now possible for him to take a computer to the meeting with a previously prepared presentation on it. The software allows for the preparation of a show which typically follows a storyboard of individual screens. The software allows morphing from one screen to another and also allows animation and full use of text and graphics within individual screens. If required, a soundtrack can be added to complement the pictures being shown. Ideally, such a presentation should be output via some device that would be

designed for the audience expected to be watching. This would mean that a single monitor would be fine for some automated display in a department store, but would require something more akin to a projection screen for a larger audience. This could be accomplished using an over head projector linked to the computer or an RGB projector.

Drawing packages:

This is a package that produces graphics output. Often such output is exported to a DTP for inclusion in some publication, or to a piece of presentation software for inclusion in a display sequence. Another use for such output is to enliven a page on the World Wide Web. There are many different forms of graphics package split into groups dependent on the way that the graphic is produced. The two most common are bitmap graphics where each pixel is treated separately, and vector graphics where the lines on the drawing are created mathematically. Different software packages create the graphics in different ways for instance Paintbrush creates pictures in bitmap form while Draw uses vectors. The simple way of describing the difference is in sizing the drawing. If a drawing held as a bitmap is increased in size then each of the pixels is increased in size and hence becomes more obvious. If a drawing stored using vector graphics is increased in size the only thing that changes is the mathematical formulae for producing the lines, which will produce a picture of comparable quality whatever the size.

This section further refers to the techniques provided in common software packages that can allow the user to use the package in an effective way. There are too many to list them all here but a few examples should provide the idea of what is expected.

Notice the word 'simple' in the syllabus. No student is expected to be an expert in any of the different types of software, so little used techniques are not required and there is not enough time in the examination to be able to test a complex technique. Another problem is that different brands of software will have different things available and the syllabus is free of individual software brands, so the techniques asked for will be ones that you would expect to find in any piece of software of a particular type.

For instance, if the piece of software is a word processor, it would be acceptable to ask about the production of mail merged letters. The answer would expect the generation of the standard letter, with variable values, to be replaced by specific values, from a database. Alternatively, the question may ask about the use of templates to which the answer would be that they dictate the shape of some output that is required, that it is standard, that it requires areas filling with other values to make the output unique, that the user is prompted for responses. Notice that this answer would be just as acceptable for the concept of a template in any piece of generic software.

In addition to the fact that any problems that are asked about will be simple, the problems will be based on a common piece of software that the student will reasonably have been expected to have used during their courses.

1.7 (d) Applications for which Common Packages are not appropriate

Common applications packages are those that have been designed to satisfy particular needs that are common to a number of different applications. There are many other examples where computers are necessary but where the use is so specialised that the software will need to be written (or at least tailored) for that particular use. Uses that would require such specialist software are legion, but would include many uses of control software. Robots used on production lines tend to be one-off machines, designed for that particular purpose, consequently, the software that would drive them would, similarly, be one-off. A stock control system in a warehouse would have standard modules, but would have other sections which would be for that warehousing system alone. The important consideration is how different from the standard design is the system for which we want the software, the further away from the standard, the more difficult it is to use standard software, and the more likelihood there is that the system will require software written specially for it.

1.7 (e) Purpose and Impact of Generic Software.

The purposes of the different types of generic software were covered in section 1.7.c. The impact of the different types of software has been profound.

Word processing:

Expectations have changed markedly since the days of the typewriter, which can be thought of as the direct precursor of the word processor. Letters or other documents are perceived to be unacceptable if they contain an error. If an error is spotted then it is corrected and the document is reprinted. The advent of electronic machines was heralded as the start of the paperless office, whereas the facts are that the amount of paper consumed in office applications has multiplied enormously. The use of computers running word processing programs was greeted with fear by most type writer operators for two reasons. The first was because of the fear of unemployment. The logic went along the lines of: Each operator will be able to work much faster and hence produce more; therefore some of the operators can be made redundant. While this happened a little, the truth was far from this, and there are now more computer operators than there ever were typists. The second fear was that in order to use one of the new machines typists would have to undergo considerable training. While this was true to some extent, and there were some typists who, largely through being older found great difficulty in changing their old practices, most had little problem and even learned new skills making them better qualified, giving more job satisfaction and the capacity for higher paid jobs.

Spreadsheets:

A spreadsheet is essentially an area which can be split up into rows and columns forming 'cells', in which data can be placed. In its simplest form then, a spreadsheet is simply a data storage system. However, spreadsheets begin to take on added significance when formulae are applied to the numeric data in the sheet to make calculations, particularly calculations that make predictions about what would happen if some value were to be changed. Spreadsheets can also be expected to have presentation tools like graphing packages in order to produce the results in easily understandable form. The addition of a language so that algorithms can be programmed makes a spreadsheet a very powerful software tool which goes beyond simply juggling with figures necessary for doing a payroll or keeping the accounts and makes it possible to model situations in mathematics and the physical sciences.

Desk Top Publisher (DTP):

Strictly speaking, a DTP combines elements of software and output devices so that published quality material can be produced from a desk top computer system. In order to do this the output device needs to be top quality otherwise the other parts of the system are let down, and the software needs to enable the user to combine graphics images and textual images and manipulate them around the page before being printed out. This system compares with the system that used to be in operation of creating the page physically from cold type and attaching the page to a commercial printer before printing out multiple copies. Commercial printing presses are now electronically set up meaning that the publication and the press can all be controlled from a single micro computer. In

the 1970's there were fewer than 200 magazine periodicals available in Britain because of the difficulty of setting up a new publication and the cost which could only be recuperated if there were sufficient sales of the magazine. The cost of producing a magazine has fallen so much that a small circulation title will still make a profit, and the production is very simple, often a one person job. This has led to there being many thousands of titles now available, although it has, perhaps, done little for the quality of such titles.

Presentation Software:

Presentation software allows someone to prepare a series of inter related slides to accompany a talk that is being given, or even to be a stand alone system. Each slide has animations, colour and colour change, the ability to morph into the next slide and many other features. When such software was first available those who used it produced presentations that were out of the ordinary and consequently it was seen as something to aspire to because of the novelty factor being able to hold the attention of an audience. However, as the use of such presentations became more common, it became necessary to use more and more complex techniques to maintain the novelty factor. This leads to presentations becoming overloaded with tricks in order to make an impact. This distracts from the message that is being attempted to be put across to the audience. There is no doubt that presentation software can be used to make a message more accessible to the audience, but it is also true that no amount of clever gimmickry can hide a poor message.

Drawing Packages:

Drawing packages are, strictly speaking, software that allows the creation of graphics using vector graphics as opposed to painting packages that use bitmaps. However, in this context the syllabus is referring to the concept of the user being able to create graphics which can then be imported into other software packages to enhance the work that is being done. No longer does the school worksheet need to be a simple text document, but diagrams, pictures, even photographs can be included.

Example Questions.

1. Discuss the reasons that a solicitors' practice would have for choosing off-the-shelf software rather than custom written software if it was decided to change the word processor currently being used because it was perceived to be out of date. (4)
2. In the same scenario, State **two** reasons why custom made software might be more appropriate than off-the-shelf software. (2)
3. Describe how CAD/CAM can be used to produce prototype designs in a manufacturing process. (4)
4. A firm produces widgets for sale to the brewing industry. A brewing company may come to the firm with a proposal for a widget to fit a particular container which will need to be produced by the firm which will then ship the finished product in batches and invoice the brewing company. Sometimes the sales team will be sent to try to persuade the brewing firm of the advantages of the company's widgets.

Explain how the company can use commonly available software in the running of its business. (6)