



Tuesday 17 June 2014 – Morning

A2 GCE

APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY

G054/01/IC Software Development

INSERT

Duration: 1 hour 30 minutes



INFORMATION FOR CANDIDATES

- This document consists of **8** pages. Any blank pages are indicated.

INSTRUCTION TO EXAMS OFFICER/INVIGILATOR

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 - You must always keep your work secure and confidential whilst you are preparing it. **If it is stored on the computer network, keep your password secure. When printing work, collect all copies from the printer and destroy those you don't need.**
 - Any materials (eg books, information from the internet you have used to help complete this work) must be clearly acknowledged in the work itself.
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- All work must be submitted to your teacher once completed. Ensure you include your name, candidate number and centre number on all pages and that each page is hole punched in the top left-hand corner.
 - **You must not submit any materials other than your response to the pre-release tasks.**
 - When you hand in your completed tasks, you will be required to sign that you have understood and followed the regulations.
 - Your work will be returned to you at the start of the exam, in the exam room. At the end of the exam, you must attach **all** tasks to your question paper using a treasury tag.

ALWAYS REMEMBER

YOUR WORK MUST BE YOUR OWN

PRE-RELEASE TASKS – INSTRUCTIONS FOR CANDIDATES

Read the attached case study and these instructions carefully, then carry out the tasks detailed below. There are two types of task.

In Task 1 you will produce notes that will help you to answer questions in the examination for this unit. The other tasks will be marked and will contribute up to 30 of the 100 marks available for this unit.

You will need your completed tasks when you take the examination for this unit.

Make sure that your name and Centre number is on each page.

When you have completed the tasks you must sign and date a Candidate Authentication Statement. You must then ask your teacher to sign to confirm that the work is your own.

Task 1

Produce the following for Tools Unlimited:

- a feasibility study
 - the purpose of the system
 - functional and non-functional requirements
 - process constraints
 - a list of deficiencies of the current system
 - the user requirements of the new system
 - recommendations for the development of the new system
- investigation, implementation and maintenance methods
- legislation implications.

Task 2

Develop a context diagram (L0 DFD) for the current stock system (see Appendix 1). The process starts when the warehouse manager manually completes the pre-printed stock check form. The process ends when the stock is stored in the warehouse.

Briefly evaluate the methods you used to develop this context diagram (L0 DFD). **[15]**

Task 3

Develop a decision tree to produce the order for a given stock item. **[10]**

Task 4

Design the invoice to be sent to account customers. **[5]**

CASE STUDY

Tools Unlimited

Tools Unlimited is a small business based in The Lake District. The main function of the business is to supply machines for hire, such as floor sanders, concrete mixers and generators. Tools Unlimited has a shop in Ambleside and a warehouse in Millom.

The head office of the business is based at the Ambleside shop. The administration, personnel and accounts staff are based in the head office. The owner of the company is also based in the head office.

The machines for hire are stored in the purpose built secure warehouse in Millom. The warehouse manager has an office in the warehouse. The lorries and vans, used to deliver and collect the machines, are also stored on this site.

The machines can be hired on a weekend or midweek basis.

If a machine is booked for a weekend, it will be ready for the customer to collect at 1.00pm on a Friday and it must be returned to the warehouse by 9.30am on the following Monday. If a machine is hired on a midweek basis, it is ready for collection at 1.00pm Monday afternoon and must be returned to the warehouse by 9.30am on the following Friday.

It is possible for customers to combine weekend and midweek hires to provide a longer hire period. For example, by combining a midweek and a weekend hire period the customer will collect the machine on a Monday afternoon and return it by 9.30am the following Monday.

Customers pay for the hire of a machine at the time of booking. Any extra charges, such as the cost of any minor damage or breakages, are calculated when the machine is returned to the warehouse.

If a number of machines are being hired to one customer, then the total price is reduced. This reduction is shown in Table 1.

Number of machines	Reduction
1	0
2	£10.00
3	£15.00
4 or more	£20.00

Table 1

Tools Unlimited offers other services to customers who are hiring machines. These include:

- collection and/or delivery of the machine
- safety equipment appropriate to the machine being hired
- an on-site demonstration of how to safely use the machine
- an operator who will use the machine on the customer's site.

The costs of these services are shown in Table 2.

Services	Additional cost
Collection/delivery	40p per mile
Safety equipment	£10 per machine
Demonstration	£15 per machine
Operator	£150 per day

Table 2

When customers contact Tools Unlimited to arrange hire of a machine they must provide the following details at the time of booking:

- the type of machine they want to hire
- the start and end date of the hire period
- contact details including the address of the site where the machine is going to be used
- any services they require.

Many customers have monthly accounts. Account customers can hire machines throughout a month. They are sent an invoice at the end of the month. The invoice shows:

- what machines were hired
- the dates of the hire
- the cost of the hire
- the cost of any services
- any discounts
- the total payable including VAT.

Tools Unlimited currently has six desktop computers. Five of these computers are used in the head office and the other computer is in the warehouse.

Three of the computers in the head office are used by the administration staff. One of these computers (the record system) is used to keep records of all machines owned by Tools Unlimited including:

- description of machine
- type of fuel/oil used
- cost of hire
- safety equipment required
- status (working or needing maintenance).

Another computer (the hire system) is used to:

- keep records of all the bookings made by customers
- print out the invoices, which are given to the customers
- record payments that are received for bookings
- record payments that are received for any extra charges.

The third computer is used for the day-to-day administration of the business, such as creating flyers to give details of special offers, new machines available and promotions. This computer is also used to print the hire form, which is used to record the details of the customer hiring the machine, and the stock check form, which is used by the warehouse manager.

The other two computers at the head office are used by the accounts staff and the personnel staff. The accounts staff use their computer to record payments made to suppliers and received from customers. The computer used by the personnel staff keeps records of all staff who work in the warehouse and the head office. Both of these computers can only be accessed by the relevant members of staff and the owner. The owner has a laptop computer which is used for keeping private company information such as the financial accounts of the business. Security on these three computers is provided by password protection. None of the other computers have any form of security, leaving the information stored on them open to misuse.

The computer in the warehouse is used by the warehouse manager to keep records of deliveries and collections required. It is also used to keep records of the machines such as service history, safety inspections and running costs.

The warehouse manager currently completes a daily stock check of consumable items (eg oil and safety equipment) which are held in the warehouse. He manually completes the pre-printed stock check form to show the number of each item in stock. The form is then sent to the administration staff in the head office.

When the stock check form has been received, the stock level of each consumable item detailed on the form is input into a spreadsheet by the administration staff. The spreadsheet calculates the number of each consumable item which needs to be ordered. This is calculated by taking the amount of stock currently held in the warehouse from a pre-set minimum stock level.

For example, the stock level of 1 litre tins of oil currently held in the warehouse is 15. The minimum stock level for 1 litre tins of oil is 35. The calculation would be:

$$35 \text{ (minimum stock level)} - 15 \text{ (stock held in the warehouse)} = 20 \text{ (number to be ordered)}$$

Orders to each supplier are based on the minimum stock level. When the orders have been sent to the suppliers, copies are sent to the warehouse manager. The warehouse manager uses these copies to check the stock that is delivered by the suppliers. If there are any differences between the stock ordered and the stock delivered, the warehouse manager contacts the relevant supplier, by phone, to notify them. The administration staff are also told of these differences.

The owner wants to modernise the business and the working practices. There is concern about the poor security of the information currently held on some of the computers. All staff working at Tools Unlimited will need access to the new system. The access granted to the system will depend on the job role.

All the computers were purchased recently and the owner would like to keep these as part of the new system. They use a standard windows operating system with an office suite. The owner would like to retain this software.

The administration staff, who use the hire system, have asked that customer contact details are accessed through the use of a unique customer number. They would also like to be able to access the bookings for each machine to ensure that all requested hires, including the hire period and machine, can be met.

The accounts staff have asked that supplier contact details, and the stock, machines and consumable items they supply, are accessible through the use of a unique supplier number. They have also asked that automated searches for customers based on the unique customer number are integrated into the new system.

The administration staff, who use the record system in the head office, have asked that they also have access to the supplier system to enable all supplier details to be accessed. Details of orders made will also need to be recorded.

The warehouse manager will be inputting the number of each consumable item held in the warehouse after a stock check. He has requested that input errors are limited through the automated facilities of the system. The stock system should show the re-order level of each consumable item.

The administration staff, who use the stock system, will also need access to the daily updated stock levels from the warehouse. A daily automatically generated report should be produced to show the number of each consumable item held in the warehouse, the number to be re-ordered and the supplier number.

It is becoming apparent that the system of the warehouse manager manually completing the stock check form is causing some problems.

The main problem which needs to be solved relates to the quantity of each consumable item required to maintain the minimum stock level. The amount of stock required can sometimes not be read due to illegible handwriting. This has led to the incorrect number of consumable items being ordered. This has sometimes meant that, for example, safety equipment ordered by customers has not been available.

Problems have also arisen with the process used for calculating the monthly invoices for the account customers. The forms used at Tools Unlimited for the account customers can be completed at the shop or the warehouse. Account customers are able to collect the machines they want to hire from Millom or Ambleside without making a hire booking. The forms completed at both sites are completed manually and then sent to head office, each week, where the information is input to the booking system. These forms can sometimes be mislaid prior to being sent to head office or are sent late.

Account customers do not always provide their account number when collecting machines. This means that when the manual booking forms are sent to head office the administration staff have to look up the account number before they can input the booking onto the booking system. If the name of the person collecting the machine rather than the account holder's business name is given, bookings can sometimes be allocated to an incorrect account. Illegible handwriting can also cause problems. The accounts staff have asked that searches for account customers can be completed by the use of a partial name of the business or account holder's name.

These problems have meant that the invoices sent to the account customers are not always accurate.

The new system should be able to produce the following reports:

- the total number of hires for each hire period (mid-week or weekend) on a monthly basis
- the amount of revenue that each machine brings to the business
- a breakdown of the number of hires for each machine, on a monthly basis
- a list of account customers who have outstanding invoices on a weekly basis.

To solve the issues caused by the warehouse manager manually completing the stock check form, the owner has asked that this form is submitted electronically.

The owner has asked that the warehouse manager is able to submit the stock check form electronically using a template on a handheld tablet computer. As the warehouse manager has limited ICT skills, the form will need to be user friendly. Pre-populated fields should be included on the form with the date automatically entered by the software.

The components of the new system should have helpful user messages with user errors limited through the automatic facilities of the system.

The owner has asked that the new system for Tools Unlimited has a total of twelve computers, which must be linked. He has asked that the existing computers are incorporated into the new system. Each computer should be connected to a black and white inkjet printer, with those in the head office also having shared access to a colour laser printer.

As the staff are familiar with the applications software that is currently used on the computers in Tools Unlimited they have requested, with the agreement of the owner, that the vendor of this is the same in the new system. The staff do, however, appreciate that upgrades may be required and that they will need to be trained to use the new software.

The owner will be expanding the business in the future and is also considering an online hire system to enable a customer to check that the machine they require is available prior to booking it. It is essential that the new system will be able to cope with the expansion and also adapted for any other changes which may have an impact on the prices charged for the services such as:

- changes in VAT
- increase in wage rates
- the running costs of the vans and lorries.

It is hoped that the new computer system will meet all these requirements and solve the problems with the current system. The owner has allocated a budget of £17 500 for the hardware, software and installation costs.

The new system must be implemented beginning at 12.30pm on a Saturday with completion before 8.30am on Monday morning. This is when the business is closed and so will minimise disruption.

Appendix 1

The following procedures take place within Tools Unlimited when consumable items are ordered.

- The blank pre-printed stock check form is completed by the warehouse manager.
- The completed form is sent to the administration staff in the head office.
- A member of the administration staff enters these details onto a spreadsheet.
- The number of each consumable item which needs to be ordered is automatically calculated.
- The order is sent to the relevant supplier.
- Copies of the supplier orders are sent to the warehouse manager.
- Stock is delivered by the suppliers.
- The stock is checked, differences are notified to the relevant supplier.
- The stock is stored in the warehouse.
- The administration staff are notified of the differences.



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