

**Tuesday 11 June 2013 –Afternoon**

**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.

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- 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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- 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 The Mobile Car Wash:

- 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
- details of end-user documentation.

**Task 2**

Develop a L1 data flow diagram (DFD) for the current stock system (see Appendix 1). The process starts when the valeters create their daily order and ends when the stock is delivered to the warehouse.

Briefly evaluate the methods you used to develop this L1 data flow diagram (DFD). **[15]**

**Task 3**

Develop Structured English to show how costs are calculated based on the number of cars at a location. **[10]**

**Task 4**

Design a user interface to enable the administration staff to book customer appointments. **[5]**

## The Mobile Car Wash

The Mobile Car Wash is a small business in Chester. The main function of the business is to wash and valet cars at customers' homes or workplaces. The business currently has 25 vans which are used by the valeting staff (valeters). Each valeter has their own designated van.

The company is based on a site on the outskirts of Chester. The main office and a warehouse are based in two separate buildings on this site. The administration staff, personnel and accounts staff are based in the main office. The owner of the company is also based in the main office.

The Warehouse Manager has an office in the warehouse. The stock for the valeting and washing is stored in the warehouse. The vans are parked outside the warehouse each night. The stock required for the day's appointments is loaded onto the vans each morning.

The Mobile Car Wash offers four different services. The price for each service is shown in Table 1.

Service	Price
Wash and Interior Vacuum	£15.00
Mini Valet	£25.00
Part Valet	£45.00
Full Valet	£65.00

**Table 1**

The prices shown are for a standard size car, such as a Honda Civic or a Volkswagen Golf. For a 4 × 4, such as a Range Rover, or a larger car, such as a Jaguar Estate, each price is increased by £5.

If a number of cars are being washed and valeted at one location, then the total price is reduced. This reduction is shown in Table 2.

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

**Table 2**

For example, if two cars are being given a full valet at the same location, one being a standard size and the other a 4 × 4, the cost to the customer would be:

$$(\text{£}65.00 + \text{£}65.00 + \text{£}5.00) - \text{£}10.00 = \text{£}125.00$$

Most customers of The Mobile Car Wash have regular appointments, but cars can also be washed and valeted as a one-off appointment. For example, if a customer is using their car for a special occasion, such as a wedding. Regular customers can arrange any changes to their appointments and others can book one-off appointments by visiting, emailing or telephoning the head office.

The Mobile Car Wash currently has six desktop computers. Five of these are used in the main office and the sixth is located in the warehouse.

Three of the computers in the main office are used by the administration staff.

One of these (the stock system) is used to keep records of:

- all stock ordered by each valet
- stock levels held in the warehouse.

Another (the appointment system) is used to:

- keep records of all the appointments
- identify the type of service required for each appointment
- identify the allocated valet for each appointment
- print the day's appointments for each valet.

The third computer used by the administration staff is for the day-to-day administration of The Mobile Car Wash business. This includes creating flyers for the valets to give to the customers detailing special offers and promotions. This computer is also used to up-date and print a pre-printed form used to record the stock required by each valet.

The computer used by the accounts staff is used to record payments made to the suppliers and from the customers. The computer used by the personnel staff is used to keep staff records. Both of these computers can only be accessed by the relevant members of staff and the owner. The owner has a laptop which is used for keeping private company information such as the financial accounts of the business. Security on these last 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 stock (in and out). The computer also holds records of the vans, such as service history, MOTs and running costs.

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 washing and valeting stock is ordered centrally by the administration staff. This strategy enables the company to order stock in bulk and to get discounts from their suppliers.

A pre-printed form details all the stock required to carry out the services offered by The Mobile Car Wash. Each afternoon, each valet uses the form to check the stock on their van and completes it with the number of each item required. The valet then phones a member of the administration staff to tell them the required quantity of each stock item. The member of administration staff completes their copy of the form with the valet's requirements.

When all of the stock orders from the valets have been received, 25 in total, they are put onto a spreadsheet. Each valet's order is recorded separately. The spreadsheet calculates the total amount of each stock item required.

The spreadsheet also calculates the amount of each stock item that needs to be ordered from the suppliers. This is calculated by adding the orders from the valets and taking this number from the amount of stock currently held in the warehouse. A minimum stock level to be held in the warehouse has been set and the orders to the suppliers are based on these levels. A copy of the order spreadsheet is sent to the Warehouse Manager so that they can organise each order ready to be put on the vans the next morning.

For example, the total order of polishing cloths from the 25 valeters is 20. The stock level currently held in the warehouse is 10 cloths. The minimum stock level for polishing cloths is 5. The calculations would be:

$$20 \text{ (stock required by the valeters)} - 10 \text{ (stock held in the warehouse)} = 10 \\ 5 \text{ (minimum stock level)} + 10 \text{ (stock required)} = 15 \text{ (number of cloths to be ordered)}$$

The administration staff submit orders to the suppliers by 5.30pm each day. The supplier delivers the stock to the warehouse on the morning of the following working day. For example, if the order was placed by 5.30pm on a Tuesday then the order would be delivered on Wednesday morning. The exception to this is when an order is placed on Friday when the delivery would be made on the following Monday.

When the orders have been sent to the suppliers, copies are sent to the Warehouse Manager. The Warehouse Manager uses these to check the stock that is delivered by the suppliers each morning. If there are any differences between the stock ordered and the stock delivered, then the Warehouse Manager contacts the relevant supplier, by phone, to notify them. The administration staff are told of any differences when they begin work.

The stock is stored in the warehouse – each item has a designated storage place to ensure that orders for the vans are collated efficiently. The order for each van is put into a separate crate, labelled with the valeters name. A copy of the order is included in each crate so that the valeters can check the stock against their order. A blank pre-printed order form, and a printed list of the day's appointments is also included.

When the vans have been re-stocked, the warehouse staff count the number of each item left in stock. These numbers are passed, by the Warehouse Manager, to the administration staff who update the spreadsheet to show the correct stock levels.

It is becoming apparent that the system of valeters phoning their orders is causing some problems.

The main problem which needs to be solved relates to the quantity of the stock required by each valeters. As the valeters phone through the order, there have been occasions when the quantity of stock items required has been recorded incorrectly by the member of the administration staff taking the phone call. This has been caused by bad mobile phone reception or incorrect recording of the name of the valeters. In addition, the amount of stock required can sometimes not be read due to illegible handwriting. This has led to the vans being incorrectly stocked.

The owner wants to modernise the business and the working practices. There is also concern about the poor security of the information currently held on some of the computers.

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

- the total number of each service completed (Wash and Interior Vacuum, Mini Valet, Part Valet, Full Valet) on a weekly basis
- the amount of revenue that each service brings to the business
- the number of cars cleaned/valeted each week, including a breakdown of the size of car, ie standard, 4 × 4, large.

To solve the issues caused by the valeters phoning through the orders, the owner has asked that these orders are submitted electronically. The owner has asked that each valeters is able to submit their orders on an order form template electronically, using a portable tablet computer. As the valeters have limited ICT skills, they have asked that the form they will use to submit their orders is user-friendly. Pre-populated fields should be included on the order form and the date of the order should be automatically changed by the software.

All staff working at The Mobile Car Wash will need access to the new system. The access granted to the system will depend on the job role.

The administration staff who use the appointment system have asked that customer contact details are accessed using a unique customer number. They would also like to be able to access the weekly appointments of each valet to ensure that all appointments requested by customers can be met.

The accounts staff have asked that supplier contact details, and the stock they supply, are accessible using a unique supplier number. The administration staff who use the stock system in the main 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 stock item held in the warehouse after the stock check and has requested that input errors are limited through the automatic facilities of the system. The Warehouse Manager has asked that the stock system shows the re-order levels of each stock 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 stock item held in the warehouse, the number to be re-ordered and the supplier number.

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 The Mobile Car Wash has a total of 10 computers, which must be linked. The owner has asked that the existing computers be incorporated into the new system. Each computer should be connected to a black and white printer, with those in the main 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 The Mobile Car Wash, they have requested, with the agreement of the owner, that the software vendor 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 considering an online appointment system to enable customers to book their own appointments. It is essential that the new system will be able to cope with the expansion. The system must also be able to be adapted for any other changes that may have an impact on the prices charged for services such as:

- changes in VAT
- changes in prices of stock
- increase in wage rates
- changes in the vans' running costs.

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 £15 000 for the hardware, software and installation costs.

The new system must be implemented over a weekend when the business is closed so that disruption is kept to a minimum.

## Appendix 1

The following procedures take place within The Mobile Car Wash when the daily stock required is ordered.

- The blank pre-printed order forms are included with the stock to be collected by each valet.
- The valet completes the stock order each afternoon and fills in the pre-printed order form.
- The order is telephoned to the main office.
- A member of the administration staff completes their copy of the form with the valet's requirements.
- A member of the administration staff enters these details onto a spreadsheet.
- The spreadsheet calculates the total amount of each stock item required.
- The amount of the stock item which needs to be ordered is automatically calculated.
- The order is sent to the relevant suppliers.
- Copies of the supplier and valet 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 administration staff are notified of the differences.
- The stock is stored in the warehouse.
- The stock needed, a copy of the order, a blank pre-printed order form and the list of the day's appointments are put into the appropriate crate.
- Stock in the warehouse is counted and the stock levels sent to the administration staff.
- The updated stock levels are entered into the spreadsheet.

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