RECOGNISING ACHIEVEMENT

ADVANCED GCE UNIT **G054/IC**

APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY

UNIT 15: Software Development

INSTRUCTIONS FOR CANDIDATES

MAY 2007

Pre-release Material and Tasks – Candidate Instructions
To be opened on receipt

This document consists of **7** printed pages and **1** blank page.

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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.

The work produced in response to the pre-release tasks must be submitted to your teacher when it is completed. The work must be presented as a hard copy.

It is not acceptable or advisable for you to copy large parts of material from other sources as the tasks require you to apply your knowledge to the case study. Any books, information leaflets or other material (e.g. videos, software packages or Information from the Internet) which you have used to help you complete this work must be clearly acknowledged in the work itself. To present material copied from books or other sources without acknowledgement will be regarded as deliberate deception.

You **must not** submit any material other than your response to the pre-release tasks.

The work must be collated so that it is presented in task order.

Each page of the work must be marked clearly with your name, Centre number and task number.

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 Canal Capers:

- a feasibility study
- investigation methods
- a hardware specification
- security, implementation and training strategies.

Task 2

Develop a Level 0 (context diagram) and a Level 1 data flow diagram (DFD) for the current system in use at the boat yard at Canal Capers. The process starts when the boat yard is notified of the booking and ends when the narrow boat is returned to the fleet. This information is given in Appendix 1.

Briefly evaluate the methods you used to develop these DFDs. **[15]**

Task 3

Develop an Entity Relationship Diagram (ERD) for the proposed system. **[10]**

Task 4

Produce a flowchart for the decision table given in Appendix 2. **[5]**

Canal Capers

Canal Capers is a small business based in the Midlands. The main function of the business is to hire canal narrow boats to customers for holidays on the local canals. The business has a range of narrow boats sleeping from two to eight people. The head office of Canal Capers is based in a purpose built office complex on the outskirts of Birmingham. The owner of Canal Capers is based at this office, as is the main administration office. The narrow boats are moored in a boat yard on The Four Counties Canal Ring, which is approximately 12 miles away.

The narrow boats can be hired for weekend short breaks or midweek short breaks.

If a narrow boat is booked for a weekend short break the boat will be ready for the customer at 1.00 pm on a Friday and must be returned to the boat yard by 9.30 am on the following Monday. If the narrow boat is hired for a midweek short break then it is ready for collection at 1.00 pm Monday and must be returned to the boat yard by 9.30 am on the following Friday.

It is possible for customers to combine weekend and midweek short breaks to provide a longer hire period. For example, by combining a midweek and a weekend short break the customer will collect the narrow boat on a Monday afternoon and return it by 9.30 am the following Monday. Customers pay for the hire of the narrow boat at the time of the booking. Any extra costs, such as extra cleaning if dogs are taken on the boat or the cost of any minor damage or breakages, are calculated when the narrow boat is returned to the boat yard. These are paid for before the customer leaves the boat yard.

At the moment all communication between the two sites is by phone, fax or by a member of staff driving between the two sites delivering the information by hand. This information may be on paper or on electronic media.

There are two desktop computers at head office. One computer is in the owner's office. This computer is used for keeping staff personnel records and recording the company accounts.

The other computer is in the main administration office and 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 costs.

Neither of these computers has any form of security leaving the information stored on them open to misuse.

There is one desktop computer at the boat yard. This computer is situated in the office and is supposed to be used to keep records about the narrow boats. As there is no formal method for keeping these records, the computer is very rarely used. Most of the information is stored on paper and pinned to the notice board on the wall in this office. This method of storing the information is very disorganised and information is often lost or misplaced.

The owner wants to modernise the business and the working practices. She is very concerned about the poor security of the information currently held on the computers. Her other concern is that the computers do not have Internet access. The owner has asked that the new system has full Internet access with e-mail communication, both internal to the business and externally. In future it is hoped that the business would develop a website to advertise the business and enable bookings and payments from customers to be made on-line.

It is very important that the two sites are in touch with each other as there have been instances in the past when narrow boats have been double booked leading to customer dis-satisfaction. This has mainly occurred when customers have combined weekend and midweek breaks. In addition to this there are other problems that need to be solved by the new system. The main ones are narrow boats still being booked out to customers when they are out of the water for:

- painting
- routine maintenance
- servicing.

All boats that use the canals must have an up-to-date safety certificate (SC). These certificates last for one year. Canal Capers takes each narrow boat out of the water a week before it is due for the SC inspection. This is also causing a problem as narrow boats being prepared for the SC inspection are still being booked to our customers.

The owner would also like to be able to produce reports detailing:

- the bookings for each narrow boat in the fleet
- the amount of revenue each narrow boat brings to the business
- an up-to-date list of the status of each narrow boat on a weekly basis.

She has also asked that the software, which is used throughout the company, is standardised. At present the offices use different software packages and this has proved to be a problem when information and data has to be shared.

It is hoped that the new computer system will meet the owner's requirements and solve the problems with the current system. The staff who work at the boat yard, who will be using the new system, have very few ICT skills and so will need to be fully trained in order to use the new system. The administration staff are computer literate as they currently use computers to carry out many tasks. They will, however, need specific training on the new system.

The owner has asked that head office has five computers, which must be linked, and the boat yard has three, these should also be linked. The owner would also like a laptop computer that can be used when she is working away from the office. This laptop must be able to access the Internet and, when the owner is working in the head office, must be able to share information and files with the rest of the business. The owner would also like to upgrade the peripherals that are currently used by the business. She is aware that files and information can be transferred between the sites through the use of the Internet and feels that this would be an appropriate method for her business, although she is very concerned about the security implications of this.

The new system must be implemented within 20 weeks and the budget for the hardware and software is £40,000.

[Turn over

Appendix 1.

When a customer books a narrow boat the following procedures take place within Canal Capers:

- the customer advises a member of the administration staff of the start date, type of break and duration
- a member of the administration staff enters the booking onto the booking system
- the cost is worked out and the customer is given a booking reference and an invoice
- the customer pays the invoice
- the information about the booking is sent to the boat yard
- a record of the booking is made – this is done by hand
- the customer goes to the boat yard on the first day of the hire period to collect the narrow boat
- the customer returns the narrow boat
- the cost of any extra cleaning, repairs or breakages is calculated
- the customer pays this cost
- the narrow boat is returned to the fleet.

There are however problems with this procedure:

- narrow boats being double booked
- narrow boats being out of the water for painting but still being booked out to customers
- narrow boats being out of the water for routine maintenance but still being booked out to customers
- narrow boats being out of the water for servicing but still being booked out to customers
- narrow boats being booked out to customers when being prepared for safety certificates (SC).

The following entities could be used when developing the new system

BOAT (**Boat_Name**, *Boat_Number*, berths, weekend_cost, midweek_cost)
CUSTOMER (**Customer_Number**, customer_surname, customer_firstname, address, contact_number)
BOOKING (**Booking_Number**, *Boat_Number*, *Customer_Number*, start_date, duration)
BOAT_RECORDS (**Boat_Number**, Boat_Name, maintenance_date, painted_date, last_service_date, SC_due_date, available)

Key
Primary Keys are in **bold**
Foreign Keys are in *italics*

Appendix 2.

The following simple decision table is used by boat yard staff to check if a narrow boat needs to be serviced, repaired, painted or is due for safety certificate (SC) preparation. There are other rules where conditions are combined.

Conditions	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5
SC due date = 7 days	Y	N	N	N	N
Last service > = 6 months	N	Y	N	N	N
Painted > = 12 months	N	N	Y	N	N
Maintenance > = 10 hire periods	N	N	N	Y	N
Actions					
SC preparation	X				
Service		X			
Paint			X		
Routine maintenance				X	
No action					X