OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Education Advanced Subsidiary Level

INFORMATION AND COMMUNICATIONS TECHNOLOGY 2513

PAPER 7838 Structured Practical ICT Tasks

Issued September 2000
Maximum Mark 120

INSTRUCTIONS TO CANDIDATES

You should attempt all tasks, working independently from other candidates.

There are no time limitations on the tasks other than that they must be submitted by the appropriate internal deadline set by the Candidate's Centre. This deadline will reflect the need for the Centre to complete marking of the tasks and submit the marks to OCR by the required date.

There are no restrictions on computing facilities, hardware or software, that may be used.

You are strongly advised to keep all your working notes as these may be required by the moderator.

Reasons for answers to tasks are expected to form part of the work submitted.

INFORMATION FOR CANDIDATES

Candidates are reminded of the need for good English and clear presentation in their answers. They will be expected to have used computer tools, such as spellcheckers, to help achieve this.

This question paper consists of 8 printed pages.

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Task 1 (Total 19 marks)

This task is a design exercise. No implementation is required.

A travel agency requires a spreadsheet to be developed to carry out currency conversions. An amount of money in one currency (the **source currency**) is converted into an amount in another currency (the **destination currency**). The design specification is shown in Tables 1.1 to 1.3.

Input Requirements		
Data to be input	**Validation**	**Examples**
Source currency	Selected from a list of 30 possibilities	Belgian Francs (BEF)
Amount to be converted	Must be integer	1240 BEF
Destination currency	Selected from a list of 30 possibilities Source and destination currencies must be different	Pounds Sterling (GBP)

Table 1.1

Processing requirements	
Processing stage	**Notes and Examples**
1. Look up, from a table, the conversion rate between the two currencies inputted.	Rate = 0.0176
2. Convert source currency (multiply by conversion rate)	1240 x 0.0176 = 21.824

Table 1.2

Output requirements	
Information to be output	**Notes and Examples**
Quantity of source currency to be converted	1240 BEF
Quantity of destination currency to be issued, rounded to the nearest whole currency unit (whole currency unit for GBP = 0.01)	21.82 GBP
Conversion rate	0.0176

Table 1.3

All of the data used by the application is stored on one spreadsheet. You are required to design the layout of this spreadsheet. **No implementation is required.**

1 **(a)** Copy and complete the table below to show all of the data that is input, output and stored on the spreadsheet during the processing.

You must include any references and typical values of the data stored.

Data	**Typical cell/range reference**	**Typical value(s) held**
Amount of source currency	A1	1240
Lookup table of currencies		
Conversion rates		
Amount of destination currency		

[6]

(b) The user is prompted to enter the input data into a dialogue box. The dialogue box prompts for the source currency, the amount to be converted and the destination currency.

(i) Design the dialogue box showing any necessary labels, data entry boxes, menus and buttons. [5]

(ii) State **one** item of invalid data and design a box showing a suitable error message if this data were to be entered. [2]

(c) The spreadsheet model is to be tested to ensure that it only accepts valid data and that the results it produces are accurate.

(i) State **three** criteria that you will need to identify before producing test data. [3]

(ii) Draw up a table of test data showing data inputs and expected outputs, including any error messages, for conversions between Belgian Francs and Pounds Sterling and *vice versa*, using the conversion rate in Table 1.3. You must include **one** set of data that produces an error. [3]

Task 2 (Total 23 marks)

This is a software development task and an implementation task.

A carpet fitting company supplies and fits carpets in homes, offices and hotels. Software is used to produce estimates for customers.

Customers are able to enter the details of a room and the type of carpet required. The system will generate an estimate showing a range of prices depending on the type of carpet to be fitted.

The requirements for this are shown in Tables 2.1 to 2.4 below.

Input Requirements	
Data to be input	**Validation**
Size of room (length, width) metres to 2 decimal places	Numbers to 2 decimal place between 1.00 and 20.00
Carpet material type	Natural or man-made
Amount of wear expected	Heavy, medium or light

Table 2.1

Processing Requirements	
Processing stage	**Notes and Examples**
1. Table of prices referenced by material type and wear (see Table 2.4 opposite)	E.g. natural, light wearing carpet – £14 per square metre
2. Calculate area of room using the length and width inputted	Length x width
3. Calculate costs.	Multiply results from stage 1 by results from stage 2
4. Calculate underlay cost. (£3.50 per square metre for heavy wearing, £2.50 otherwise.)	IF hard wearing – £3.50m x result from stage 2 ELSE £2.50 x result from stage 2
5. Calculate total costs	Carpet costs + underlay cost + £50 fitting
6. Add VAT at 17.5%	Result from Stage 5 + (Result from Stage 5 x 17.5%)

Table 2.2

Output Requirements	
Information to be output	**Notes and examples**
All input data.	To be presented on screen with an option to print out
Estimated total costs, with breakdown of results from stages 2, 3, 4, 5 and 6.	

Table 2.3

Type \ Wear	Heavy	Average	Light
Natural	16	15	14
Man-made	14	13	12

Table 2.4: Costs used in the estimation routine (values in £)

2 **(a)** Build a software model to allow customers to enter data and obtain an estimate. Where invalid data is entered, appropriate error messages should be displayed.

(i) Print your solution and annotate to identify:

– Input data (length, width, carpet material type, amount of wear expected)
– output data (costs, interim results)
– the table of costs (see Table 2.4)
– formulae used. [15]

(ii) Printout evidence of any error messages produced. [2]

(b) **(i)** Show **three** complete sets of test data, one of which must result in an error message. [3]

(ii) Using your sets of test data, produce annotated output which show that the expected results are achieved. [3]

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Task 3 (Total 32 marks)

This is a design task and a software development task.

The carpet fitting company from Task 2 requires an on-line tutorial to be placed in the shop for its customers to use.

The tutorial needs to:

demonstrate how to correctly measure a room to calculate the length and width
explain the differences between heavy, medium or light wearing carpets
identify areas of the house or office where each carpet wear type would be appropriate
explain the difference between man-made and natural carpet material types.

Table 3.1 Tutorial Requirements

You are to design and produce the tutorial.

The tutorial may be delivered using web pages, slideshow software or hyperlinked documents. The interface features should include differing pathways through the tutorial.

3 **(a)** Design the overall structure for the tutorial, mapping out the different possible pathways through the tutorial. [6]

(b) Build and print the on-line tutorial to meet the company's requirements listed in Table 3.1. [18]

(c) Not all users will be computer literate. A user manual needs to be produced for first-time users demonstrating how to use the on-line tutorial.

Produce the user documentation for first-time users. [8]

Task 4 (Total 46 marks)

This is a design task and a software development task.

A hotel has 24 bedrooms – 2 suites, 15 doubles and 7 singles. The rates for hiring the rooms, per night, are as follows:

Type	Suite	Double	Single
Cost	£110	£85	£75

The rates are per room, not per person.

The rooms are numbered 101 to 112 and 201 to 212 depending on whether they are on the first or second floor.

While at the hotel each customer may charge other costs to their room bill. These are for meals in the hotel restaurant, refreshments at the bar, use of leisure facilities, newspapers and telephone calls. Customers may make many purchases. They may make several purchases of the same item. For example, customers may use the telephone many times during their stay at the hotel.

Requests for bookings are received by the hotel in the form of letters, telephone calls and FAX. If the rooms requested are available a booking is made and the customer's name, home address and contact telephone number are entered into the system by a booking clerk. If a customer has used the hotel before, their details are looked up in the hotel's database. The start date of their booking, number of nights and type of room are also recorded. A customer may book more than one room but each is treated as a separate booking.

When a customer leaves, they are given an invoice containing an itemised account showing all expenses incurred similar to the one shown in Fig. 4.1.

The OCR Hotel Birmingham

Date: 12/08/00 Invoice No. 987654

Mr A N Other
The Citadel
High Street
Anothertown
Somewhere
AT1 6RD

Room No. 102	Type: Suite	Cost per Night: £110
Arrival Date: 10th Aug 2000	Departure Date: 12th Aug 2000	No. of Nights: 2

	2 Nights @£110 Bed and Breatfast	220.00
10/08/00	Restaurant	52.50
	Telephone	0.60
11/08/00	Restaurant	17.50
	Bar Refreshments	2.50
	Bar Refreshments	2.50
	Newspaper	0.70
12/08/00	Bar Refreshments	4.50
	Newspaper	0.70
TOTAL		£301.50

Fig. 4.1

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On arrival the customer is given a card for each room booked. The card contains the room number and customer ID on a magnetic strip. In order to make a purchase in the hotel, a customer must use the card if the cost of the purchase is to be charged to the customer's account.

Each day the following is printed:

- a list showing names and room numbers of new arrivals;
- an invoice for each customer departing the hotel;
- a list of rooms being vacated;
- a list of occupied rooms.

The first two are for receptionists and the last two are for the room-cleaning staff.

The hotel has a computer terminal in reception for entering new bookings, confirming details on arrival, producing invoices and recording payments. There are terminals in the restaurant, bar and leisure club. All of these terminals access the same database system.

This is a design task and a software development task.

4 **(a)** Design a set of screens that a receiptionist can use to enter the data when a booking has been received. You should annotate your design to indicate what data is to be entered, any buttons used together with details of menus and any drop down lists used.

Annotate your design to show what data has to be entered by the receptionist and data which may be obtained from the database.

You do not have to implement this design at this stage, but implementation will be required in **4(d)**. [12]

(b) **(i)** CUSTOMER and ITEM are two entities in the database.

An entity ITEM describes each type of item that may be charged for. Each item is given a unique reference code (e.g. 'tel' for a telephone call unit).

State the relationship between the entities CUSTOMER and ITEM. [1]

(ii) Normalise the hotel data to third normal form (3NF). Your output must include a listing of the entities, their attributes and identification of primary keys. [10]

(c) Build a database system based on the requirements of the hotel. As evidence of the system you should produce:

- printouts of the tables containing some sample data, (at least twenty customers, fifteen bookings and ten purchases)
- printouts of a booking form for use by the bookings clerk when recording bookings;
- printouts of an itemised invoice showing how data has been inserted from the database;
- printouts of a list showing names and room numbers of new arrivals each day, a list of rooms being vacated and a list of occupied rooms
- printouts of the routine used to calculate the total cost of the invoice [23]