AS GCE INFORMATION AND COMMUNICATION TECHNOLOGY

G062/01   Structured ICT Tasks

MAY 2015

Issued September 2014

Maximum Mark 80

INSTRUCTIONS TO CANDIDATES

* You should attempt all the 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 submission of marks to OCR by 15th May 2015.
* There are no restrictions on computing facilities, hardware or software that may be used.
* All work produced for the tasks must be kept secure within centres and not published or distributed externally in any form.
* You **must not** be given, either individually or as a group, any assistance, verbal or written, in the carrying out of the tasks or evidence to produce.
* **Once your tasks have been marked by the Centre, they cannot be resubmitted for improvements.**

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 software tools, such as spellcheckers, to help achieve this.**

Notice to candidates

1   The work which you submit for assessment must be your own.
    However, you may:

   (a) quote from books or any other sources: if you do, you must state which ones you have used;

   (b) receive any guidance from someone other than your teacher: if so you must tell your teacher, who will record the nature of the assistance given to you.

2   If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, **you may be disqualified from at least the subject concerned.**

3   When you hand in your coursework for assessment, you will be required to sign that you have understood and followed the coursework and portfolio requirements for the subject.

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* This document consists of **16** pages. Any blank pages are indicated.

OCR is an exempt Charity

Turn over

Attempt **all** the tasks.

Task 1 – Relational Database [40 Marks]

EnviroCo is a company that sells renewable energy related products and services. It sells products from different suppliers. It sells to customers who are invoiced for the orders that they have placed. The company wants to create a new order management database system.

Viewing Customer data

The file *customers.csv* contains customer details. Import this data into a table.

A form is required for viewing, adding and modifying customer records. EnviroCo has specified the following house style:

- headings in Arial, 18pt, black, bold
- sub-headings in Arial, 14pt, black, bold
- all other text in Arial, 12pt, black
- form background colour RGB (253, 234, 218) (Hex code #FDEADA).

The form should also meet the following requirements:

- the main heading should be 'Customer Details'
- sub-headings should be used on the form to group related fields together, eg contact details, invoice address, etc
- default navigation buttons and record selectors should be removed
- customised buttons should be added for record navigation, addition and deletion.

(a) (i) Print evidence of the data types used in the table, making sure that appropriate data types have been selected for each field. **[1]**

(ii) Print the completed customer form. **[2]**

Viewing Products with related Supplier data

Details for the product (*products.csv)* and the supplier (*suppliers.csv*) records are provided. Import this data. The relationship between supplier and product is 1:M. At present, the company does not store images for the products. The company wants to have an image for each product stored.

A form is required for viewing the product details. It should meet the following requirements:

- display all product details, including a stored image of the product
- it should be possible to select the supplier for a product
- when a supplier for the product is selected, the related supplier details should be shown and they should be read only.

(b) (i) Print the completed products form. **[1]**

(ii) Produce annotated evidence to explain how pictures for the products were stored and displayed on the form. **[1]**

(iii) Produce annotated evidence to explain how the related supplier details were displayed and how they were made read only. **[1]**

Viewing Orders that have been placed

EnviroCo keeps track of the orders that customers have placed. You should import the files *orders. csv* and *orderlines.csv*. These contain details of the orders, the products that have been ordered, the quantity ordered and the price paid at the time the order was placed.

EnviroCo wants a form to allow the order details to be viewed for orders that have been placed. Fig. 1.1 shows a suggested form layout.

Order details

Customer ID	1000 ⇩ [View Customer]
Date of Order	/ / Payment Due Date / /
Invoice Dispatched?	✓ Paid? [ ]
Order ID	1000

Details relating to the products in the order should be displayed here (such as the product id, the quantity ordered and the price paid)

Total Order Value £

Customised buttons for navigation between orders to go here

Fig. 1.1

The form should meet the following requirements:

- a button to 'View Customer' should open the customer form and show the details for the customer who has placed the current order
- check boxes should be present for Invoice Dispatched? and Paid?
- an invoice must have been dispatched to a customer before the Paid? check box can be ticked
- the products ordered should be displayed
- the Total Order Value should be displayed
- customised buttons should be added to allow navigation.

(c) (i) Print evidence to show the relationships that you have set up between the tables in the system. The degree of each relationship should be made clear. **[1]**

(ii) Print the completed form for order ID 1000 and provide annotated evidence to explain how the requirements were met. Any calculations or queries used must be explained. **[4]**

Stock reordering report

A report is required that identifies which products need to be reordered. A product needs to be reordered if the current stock level is less than the minimum stock level. If this is true, the amount specified by the reorder quantity should be reordered.

The report should meet the following requirements:

- the report should be grouped by supplier and the supplier's details should be displayed
- products that need to be reordered should be identified with the description, price and reorder quantity displayed
- the total cost of the order should be calculated and displayed for each supplier.

(d) (i) Print the completed report. **[1]**

(ii) Produce annotated evidence of all queries and calculations that were required to create the report. **[2]**

Overdue payments report

A report is required that lists all orders where payment is more than 28 days past the payment due date.

The report should meet the following requirements:

- the overdue orders should be grouped by customer
- the customer's details should be shown at the top of that customer's group of overdue orders
- each overdue order that a customer has should be displayed
- all products in each overdue order should be displayed
- the value of each overdue order should be calculated and displayed
- the total amount that a customer is overdue in paying should be calculated and displayed.

(e) (i) Print the completed report. **[1]**

(ii) Produce annotated evidence of any queries or calculations that you have used to generate the totals in the report. **[3]**

Daily invoice generation

EnviroCo wants to be able to run an automated batch process at the end of each day that will generate the invoices for the orders that have been placed.

The automated routine has the following requirements:

- it must be automated
- invoices must be generated for all orders where the Invoice Dispatched? value is currently False
- the Invoice Dispatched? value must then be set to True.

The invoice should meet the following requirements:

- there should be one invoice per order
- each invoice should be on one side of A4
- EnviroCo's name and address (23 Windy Lane, Hilltops, Cumbria LA22 0LD) must be displayed
- the customer contact and address details must be displayed
- payment methods and terms and conditions must be specified
- the date the order was placed and the payment due date must be displayed
- the order number and the details for the order, including the product details and quantity, must be displayed
- the total cost of the order should be calculated and displayed.

(f) (i) Print the completed invoices that are generated when the routine is run. **[2]**

(ii) Produce annotated evidence to explain how the requirements for the automated routine were met. **[3]**

New Order Processing

A method to process new orders is required. An order form is to be set up and a suggested layout is given in Fig. 1.2.

```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│   New Order                                                 │
│                                                             │
│   Order Number   [10        ]                               │
│                                                             │
│   Customer       [1001, Mr Lance Boyle, EcoFixit    ⇩]      │
│                                                             │
│                              [    Add New Customer    ]     │
│                                                             │
│   Date of Order  [29/08/2013]   Payment Due  [29/09/2013]   │
│                                                             │
│   ┌───────────┬──────────────┬──────────────┬──────────┐   │
│   │Product ID │ Description   │ Retail Price │ Quantity │   │
│   │2          │ Solar charger │ £64.96       │ 3        │   │
│   │5          │ 69 W Solar panel│ £149.99    │ 1        │   │
│   └───────────┴──────────────┴──────────────┴──────────┘   │
│                                                             │
│   [       Process Order       ]                             │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
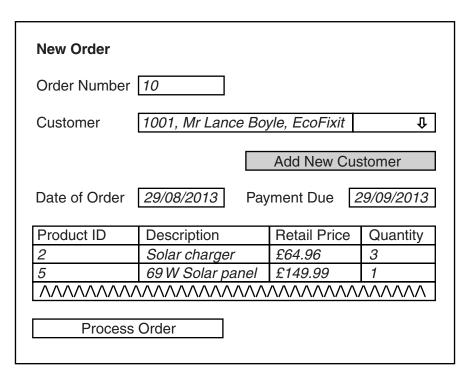
Fig. 1.2

The New Order form should meet the following requirements:

- when the form loads, a unique Order Number should be generated
- it should be possible to select existing customers from a drop down list
- there should be an 'Add New Customer' button that, when clicked, will bring up a form where it is possible to enter a new customer's details
- the Date of Order should be set to today's date and the Payment Due date should be set to today's date plus one calendar month
- when a Product ID is entered, the Description and Retail Price should be automatically displayed
- it should be possible to enter the quantity for each product to be ordered. If there is insufficient stock, an appropriate error message should be generated.

When the 'Process Order' button is clicked, the following should happen automatically:

- the order details must be stored into the order and order line tables
- the Retail Price must be recorded as the Price Paid for the product in the order (the product prices may change in future so the price at the time the order is placed must be recorded)
- the Invoice Dispatched? and Paid? values should both be set to False
- the Current Stock Level for each product ordered must be updated.

(g) Print the completed form and produce annotated evidence to explain how the requirements were met. All queries, routines and calculations must be fully explained. **[9]**

Main Menu

A main menu is required for users to access the different parts of the system. The menu should load automatically when the system is started. The menu should conform to the house style and contain appropriate headings and instructions.

(h) **(i)** Print the completed main menu. **[1]**

(ii) Produce annotated evidence to explain how the menu appears automatically when the system is loaded. **[1]**

(iii) Produce annotated evidence to explain how navigation to one of the components of the system was implemented. **[1]**

User Guide

A user guide is required for the ordering system. The user guide must contain instructions to allow a user to:

- load the system
- navigate between the system components
- view existing orders
- place new orders
- generate invoices.

(i) Produce and print the user guide for the ordering system. **[5]**

Task 2 – Spreadsheet [26 Marks]

EnviroCo offers a service to customers to advise them about the government Feed In Tariff (FIT) payments.

The file *FIT_Rates.csv* contains a table of rates set by the government for different types of domestic renewable systems. The values given are the amount in pence per unit for electricity generated that the government pays the owner of a system. Fig. 2.1 shows a suggested form design to enter the parameters that are required to calculate the FIT payment rate.
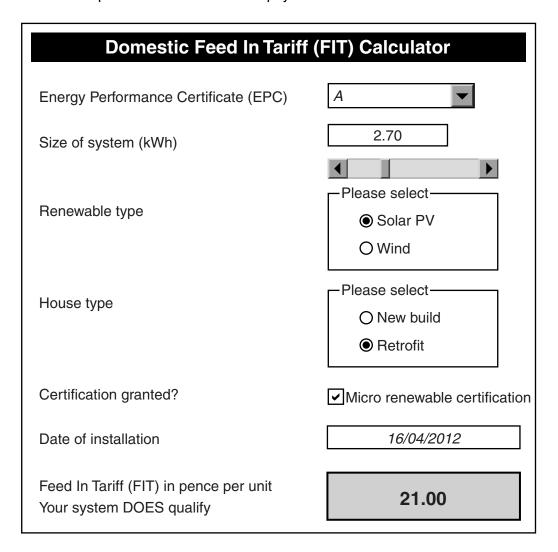

Domestic Feed In Tariff (FIT) Calculator

Energy Performance Certificate (EPC) | *A* ▼

Size of system (kWh) | 2.70
◄ | | ►

Renewable type

┌── Please select ──┐
◉ Solar PV
○ Wind
└───────────────────┘

House type

┌── Please select ──┐
○ New build
◉ Retrofit
└───────────────────┘

Certification granted? | ☑ Micro renewable certification

Date of installation | *16/04/2012*

Feed In Tariff (FIT) in pence per unit
Your system DOES qualify | **21.00**

Fig. 2.1

The parameters that must be entered are the EPC, Size of system (kWh), Renewable type, House type, Certification granted? and the Date of installation. A FIT is calculated that is based on these values.

Model requirements

A worksheet should be designed to calculate the FIT a system would be eligible for when the parameters are set.

- EPC. Houses are rated in terms of energy efficiency. Houses in bands A to D are rated high and houses in bands E to G are rated low. A dropdown list should be used to select the EPC band (A to G).
- FIT rate. Any Solar PV system fitted before 03/03/2012, or one fitted on a property in the high EPC band at any date, qualifies for the higher FIT rate. Any Solar PV system fitted on a property in the low EPC band on or after 03/03/2012 qualifies for the lower FIT rate.
- Size of system (kWh). Domestic systems can be up to a maximum size of 9.99 kWh. A scroll bar or spinner should be used to select the system capacity. The control should allow values between 0 and 9.99 kWh to be input with increments of 0.01 kWh.
- Renewable type. Option buttons should be used to allow either a Solar PV system or a Wind system to be selected.
- House type. House types can either be new build or retrofit. Option buttons should be used to select the type of house.
- Micro renewable certification. A system is either certified or it is not. Systems that have not been certified will not be eligible for any FIT payments. A check box should be used to enter the certification status.
- Date of installation. Systems installed before 01/04/2010 are not eligible. A validation rule should be set up to generate a customised error message if an invalid date is entered.
- The actual value of the FIT must be calculated.
- If the system is not eligible for payments the FIT rate should be set to zero. The message 'Your system DOES NOT qualify' should be displayed. The background to the cell containing the FIT rate should automatically be set to red.
- If the system is eligible for payments the FIT rate should be displayed. The message 'Your system DOES qualify' should be displayed. The background to the cell containing the FIT rate should automatically be set to green.

Interface

- The worksheet should be named *FIT_Tariff*.
- Row and column headings should be removed.
- Grid lines should be removed.
- Instructions should be present.
- A 'Print Rates' button should be added. When clicked it should print the worksheet on one side of A4.

(a) (i) Print screenshot evidence of the completed interface for the *FIT_Tariff* worksheet. **[1]**

(ii) Produce annotated evidence to explain how the interface was set up to meet the requirements. You should explain any values that the form controls use. **[5]**

(iii) Produce annotated evidence to explain how the print button was implemented. **[1]**

(iv) Print the worksheet showing the formulae. The row and column headings must be displayed. **[7]**

Produce annotated evidence to explain how all of the requirements for the calculations were met. Your explanations should clearly identify how the different parameters are used to generate the FIT rate.

The government pays the FIT rate for 20 years to the owners of eligible systems. EnviroCo want to be able to show customers how much they could receive and they want to show how long it would take to break-even on a potential investment. Table 2.1 shows a design for a model to achieve this.

FIT Rate (kWh)	£0.4130
Export Rate (kWh)	£0.0450
Start Year	2010
Units Generated (per year)	2250
Installation Cost	£15,000
Break-even Year	

System Year	Year	FIT Rate (kWh)	Export Rate (kWh)	Yearly Income	Cumulative Income
1	2010	£0.4130	£0.0450	£979.88	£979.88
2	2011				
:					
20					

Table 2.1

The model design contains the following:

- FIT Rate. This value should be brought forward from the *FIT_Tariff* worksheet.
- Export Rate. In addition to the FIT Rate, owners are paid for any electricity they export back to the national grid. 50% of all Units Generated are exported back to the national grid. Export Rate is a variable that will initially be set to £0.0450.
- Start Year. This value is based on the Date of Installation from the *FIT_Tariff* worksheet.
- Units Generated. This is a variable that holds how many units per year the renewable system will generate.
- Installation cost. This is a variable that holds the cost for the system being installed.
- Break-even Year. This is to be automatically calculated and is determined to be the year in which the system has cumulatively generated enough income to pay for the Installation Cost. If the break-even point is not reached within 20 years, a suitable message must be displayed.

A worksheet called *Break_Even* should be created for the model. The model should be set up to calculate the payments for 20 years. Payments made for the FIT and the Export Rate are increased by the rate of inflation each year.

- A table of estimated future inflation rates is provided in the file *Inflation.csv*
- The inflation rates should be imported into a separate worksheet in the system.

(b) (i) Set the values in the *FIT_Tariff* worksheet to those in Figure 2.1 and enter the following values for the variables in the *Break_Even* worksheet: **[1]**

- Export Rate = £0.0450
- Units Generated = 2300
- Installation Cost = £10,000

Print the *Break_Even* worksheet on one side of A4 making sure that you show row and column headings on the printout.

(ii) Produce annotated evidence to explain the formulae you have used in the *Break_Even* worksheet. **[4]**

All named ranges should be identified and row and column headings should be displayed.

(iii) Choose a formula in your solution which uses both relative and absolute addressing. Explain why you decided to use both forms of addressing in this formula, and how it helped you to create the solution. **[1]**

At a later stage the users of the system may want to protect various parts of the system. By default, it should only be possible to change variables in the *Break_Even worksheet*. Some worksheets such as the *Inflation* worksheet might be locked entirely.

(c) Produce a help sheet(s) to show how to protect cells and worksheets in the system. **[3]**

A test plan is required for the system that has been created.

(d) Complete the test plan in Table 2.2 to show how three different formulae in the system may be tested. **[3]**

Test Number	Description	Type of Test	Input Data Value(s)	Expected Output Value(s)
1				
2				
3				

Table 2.2

Task 3 – Website [14 marks]

EnviroCo has been successful and is expanding rapidly. The company wants to set up a website. It has produced the following specification:

Layout

- a header area for the page title
- a navigation area for navigation buttons
- a content area for the main page content.

Appearance

A text style must be set up for the title text, and a different text style for normal text.

Content Requirements

Homepage

- company name: EnviroCo
- contact address: 23 Windy Lane, Hilltops, Cumbria LA22 0LD
- company email: EnviroCo@progress-media.co.uk
- a brief introduction about renewable technology
- an embedded map of the company location centred on postcode LA22 0LD.

Services page

- text and images about solar photovoltaic installations
- text and images about wind turbines.

Job contact page

EnviroCo advertise vacancies on a job contact page. It provides an online form for potential applicants to request further information about vacancies. It must be possible to input the following information:

- name of applicant
- job the applicant is enquiring about
- email address of the applicant
- mobile telephone number
- home address
- date of birth
- comments (further information).

There must also be a submit button on the page.

(a) Create a design specification for the layout and appearance of the website. **[2]**

(b) (i) Implement your design specification as an external CSS file. Provide annotated evidence of how your external CSS file meets your design specification. **[2]**

(ii) Produce the website. Navigation must be implemented to allow movement between pages in the site. Print evidence of the web pages you have created. **[3]**

(c) Provide annotated evidence to show how your map is linked to an external source and is centred on the company's postcode. **[1]**

EnviroCo would like the data that is submitted from the job contact page to be validated. If all the data entered by the user is valid, a confirmation email should be sent to the user. If the user enters any invalid data, a message should be shown asking them to re-enter the data.

(d) (i) Produce annotated evidence of how you implemented and tested **two** different validation rules. The evidence you provide must be for different fields on the form. **[2]**

(ii) Draw a flowchart to explain the process that will take place when the submit button is clicked. **[1]**

Note: There is no requirement to implement this on a web server, but your answer should describe how client-server technology would be used.

The finished website will need to be tested to make sure that it will work as expected.

(e) Complete the test plan in Table 3.1 for the website showing **three** further tests. Each test should be for a different aspect of the website. **[3]**

Test Number	Item to Test	How to Test it	Expected Result
Example	Test the validation of the input fields on the job application page	Enter *3563XY* for the mobile telephone number	An error message should appear to inform the user that the data entered is invalid for the mobile telephone number
1			
2			
3			

Table 3.1

14

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