Paper Reference(s)

6953/01

Edexcel GCE

Applied Information and Communication Technology

Unit 3: The Knowledge Worker

19–23 May 2008

Time: 2 hours 30 minutes

Materials required for examination
Short treasury tag
GBBC_exam.xls
Sales Data_exam.txt

Items included with question papers
Cover sheet

Instructions to Candidates

Complete your candidate details on the cover sheet provided.
At the end of the examination use a treasury tag to attach your printouts to Page 2 of the cover sheet in the correct order.

Information for Candidates

There are **five** activities in this examination totalling **88** marks. **2** further marks are allocated to Standard Ways of Working giving a paper total of **90** marks.
The marks for each of the activities are shown in round brackets: e.g. **(Total 10 marks)**.
There are suggested timings against each activity: e.g. **(15 minutes)**.

Advice to Candidates

Read the Scenario carefully as it contains additional information.
Work through the activities in order.
Attempt **ALL** activities.
Label your printouts clearly as instructed.
Printing must be undertaken within the examination time.

Printer's Log. No.
N30265A

Turn over

W850/R6953/57570 6/6

edexcel
advancing learning, changing lives

The Green Bay Building Company

The Green Bay Building Company was founded by David Green in 2003. David trained as an architect and has been designing houses since 1985. Over time, David has become concerned about global warming and has introduced into his house designs aspects to minimise the carbon footprint of the occupiers. Unfortunately these modifications tend to make the houses more expensive to produce. The building firm that David worked for at the time did not like the modifications as it meant less profit. As a result, David was instructed to remove them from his designs.

Unable to find a building company to take on his revolutionary designs, David decided the only way he was going to get his designs accepted was if he formed his own building company. Consequently the Green Bay Building Company was formed.

Since its inception the Green Bay Building Company has created many successful developments. David has found that some people will pay extra if they think the house is eco-friendly and would pay even more if they thought there would be a fuel saving.

The Green Bay Building Company has recently acquired 100,000m^2 of brown-field building land in Tewkesbury and David plans to build an eco-friendly housing estate there. David has set the target that the whole estate should have a predicted maximum carbon footprint of 1000 tonnes per year. Being a businessman he needs to make a profit. To help achieve this he has set a development cost limit of £95,000,000. In order to get planning permission Green Bay Building Company has had to agree that no more than 200 of a particular housing type would be built.

Currently the Green Bay Building Company has five different housing types. The table shows the housing type, how much each costs to build and the minimum area of land required.

Housing Type	**Build Cost**	**Required Area**
1 Bedroom Flat	£100,000.00	130m^2
2 Bedroom Terrace	£167,000.00	150m^2
3 Bedroom Semi Detached	£200,000.00	200m^2
4 Bedroom Detached	£230,000.00	300m^2
5 Bedroom Detached	£280,000.00	375m^2

All the buildings are made from materials manufactured by processes designed to minimise carbon emissions. Additionally there are extra features which could be used to reduce the fuel costs and thereby reduce the carbon footprint.

The features and their costs are in this table.

Features	**Costs**
Solar Panels	£500.00
Wind Turbines	£6,000.00
Cavity Wall Insulation	£6,000.00
Loft Insulation	£6,000.00
Double Glazing	£6,000.00

Your Role

You have been employed as an Information Technology expert by the Green Bay Building Company. You have been given a partially completed model which your predecessor created to help advise the Green Bay Building Company about various aspects of the development.

Description of the model

The partially completed model allows you to try different combinations of housing types in the estate and also allows you to add fuel saving features.

Worksheet	Description
Calculation Page	The 'Calculation Page' worksheet is the summary page where you will be adjusting the numbers of each house type in the development and also assigning the fuel saving features to the particular housing type. The area covered by your development, its carbon footprint, its initial cost and the profit you will make will be displayed on this page. The margin column can be set to give a profit of up to 9% on individual house types.
House Types	The 'House Types' worksheet will contain basic details about each housing type. These details include the average carbon footprint and the average area taken up by each housing type.
House Costs	The costs of building the development will be calculated from initial costs stored in this worksheet.
Fuel Bills	This worksheet will calculate the average fuel bills for each housing type. It will take into account whatever fuel saving aspects you have included.
Costs	This worksheet will contain the costs of the various fuel saving features and will be used to calculate the average fuel bills.
Sales Data	This worksheet will contain data about the number of each housing type that would be sold at different prices.

Some cells in the model are password protected. Should you wish to experiment with the model, the password is *edexcel*. Be aware that if you change the contents of any protected cell the model may not work.

The Task

You have been asked to recommend how many of each housing type the Green Bay Building Company should build in the Tewkesbury development.

You need to recommend which fuel saving features should be included with each housing type and the profit margin for each. Any feature you add will increase the cost of the buildings but will reduce the fuel bills and the carbon footprint. You can assign up to five solar panels to a particular housing type but only one of each of the other features.

You must ensure that any constraints listed in the scenario are adhered to in your final solution. David will expect you to balance the amount of profit against the use of fuel saving features.

You will then present your findings to the board of the Green Bay Building Company.

Sales Data

For the model to work you will need to provide figures which will predict how many of each housing type you would sell at a given price. The higher the price the fewer buildings you will be able to sell. Sales figures have been calculated from a survey conducted in three similar developments previously built by the Green Bay Building Company. The three developments are in Slough, Ipswich and Birmingham. Two hundred owners of each housing type were asked the question "What is the maximum amount you would pay for your house today?" The results have been collated by your assistant and are contained in the text file "**Sales Data_exam.txt".**

What you have to do

Read the remainder of the paper and then undertake the tasks in order. Each task has an estimated time limit. This is a guide only but may help you plan your work.

All printouts MUST have a header and a footer. The header must contain the activity number. The footer must contain your name, candidate number and centre number.

Minimum font size of 10 should be used throughout.

All spreadsheet printouts should show gridlines and row and column headers.

For some of your spreadsheet printouts you may need to adjust column widths. To do this you will need to unprotect the worksheets. The password is *edexcel.*

Activity 1 – Understanding the situation (suggested time 15 minutes)

You should look at all the information available and make sure that you understand the situation.

On **one** sheet of A4:

- ❑ Summarise the current situation
- ❑ Outline the decisions you have to make
- ❑ State any assumptions you are making.

Save and print.

(Total 13 marks)

Activity 2 – Sources of information (suggested time 15 minutes)

On **one** sheet of A4:

- ❑ Analyse the source of sales data with regard to accuracy and the likelihood of it providing a good prediction of the sales of each particular housing type.
- ❑ There are several factors that have not been taken into account in the compilation of the sales data. List these factors.

Save and print.

(Total 15 marks)

BLANK PAGE

Activity 3 – Computer modelling (suggested time 50 minutes)

Open the spreadsheet model

The model is stored as **GBBC_exam.xls**.

- ❑ Open the spreadsheet model and familiarise yourself with it.

Importing Data

- ❑ Insert a new worksheet and import the survey data into it (Sales Data_exam.txt)

- ❑ On **one** sheet of A4, print off this worksheet showing the data. Remember to show gridlines and row and column headers.

Sales Data

- ❑ Using the data in your newly created worksheet, transfer the data into cells A2:F43 of the 'Sales Data' worksheet

- ❑ On **one** sheet of A4, print off columns A to F of the 'Sales Data' worksheet showing **formulae**.

Costs

- ❑ Enter suitable values into Cells B2 to B6 of the 'Costs' worksheet

- ❑ On **one** sheet of A4, print off columns A to B, rows 2 to 6 only of the 'Costs' worksheet showing **data**.

House Costs

- ❑ In cell I8 of the 'House Costs' worksheet enter a suitable formula to calculate the total development cost

- ❑ In cell J8 of the 'House Costs' worksheet enter a suitable formula to calculate the total development revenue

- ❑ On **one** sheet of A4, print row 8, columns F to J only of the 'House Costs' worksheet showing **formulae**.

House Types

- ❑ In cell D8 of the 'House Types' worksheet enter a suitable formula to calculate the total area used in the development

- ❑ In cell F8 of the 'House Types' worksheet enter a suitable formula to calculate the carbon footprint of the development, excluding fuel savings

- ❑ In cell H8 of the 'House Types' worksheet enter a suitable formula to calculate the carbon footprint of the development, including fuel savings

- ❑ On **one** sheet of A4, print rows 2 to 8, columns D to H only of the 'House Costs' worksheet showing **formulae**.

Calculation Page

- ❑ In cell B11 of the 'Calculation Page' worksheet enter a suitable formula to transfer the total development revenue from the 'House Costs' worksheet

- ❑ In cell B12 of the 'Calculation Page' worksheet enter a suitable formula to transfer the total development costs from the 'House Costs' worksheet

- ❑ In cell B13 of the 'House Types' worksheet enter a suitable formula to calculate the profit made

- ❑ On **one** sheet of A4, print rows 9 to 13, columns A to B only of the 'Calculation Page' worksheet showing **formulae**.

Use the spreadsheet model to try to find the best combinations of housing types within the development. Try to find a solution which meets all the constraints including showing a profit.

With your proposed solution displayed:

- ❑ On **one** sheet of A4, print off the 'Calculation Page' worksheet showing data.

(Total 35 marks)

Activity 4 – Recommendations (suggested time 20 minutes)

Write a report for David Green of the Green Bay Building Company, recommending your proposed solution.

You should include:

- ❑ the alternatives you have considered
- ❑ the decisions you came to
- ❑ an explanation of why you made these decisions
- ❑ any other factors that David may need to take into account.

Use graphical information as well as textual information in your report.

Save and print.

(Total 18 marks)

Activity 5 – Evaluation (suggested time 10 minutes)

Write an evaluation considering:

- ❑ how well the spreadsheet model performed
- ❑ what else you would like it to do, why this would help and how you would achieve it.

Save and print.

(Total 7 marks)

(Standard ways of working: 2 marks)
TOTAL FOR PAPER: 90 MARKS

END

BLANK PAGE

BLANK PAGE