Write your name here

Surname

Other names

Edexcel GCE

Centre Number

Candidate Number

Applied Information and Communication Technology
Unit 3: The Knowledge Worker

COVER SHEET

7–11 January 2013
Time: 2 hours 30 minutes

Paper Reference
6953/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Punch a hole in the top left corner of each printout.
- Ensure your printouts are in the correct order and attach them to page 2 of this cover sheet using a treasury tag.
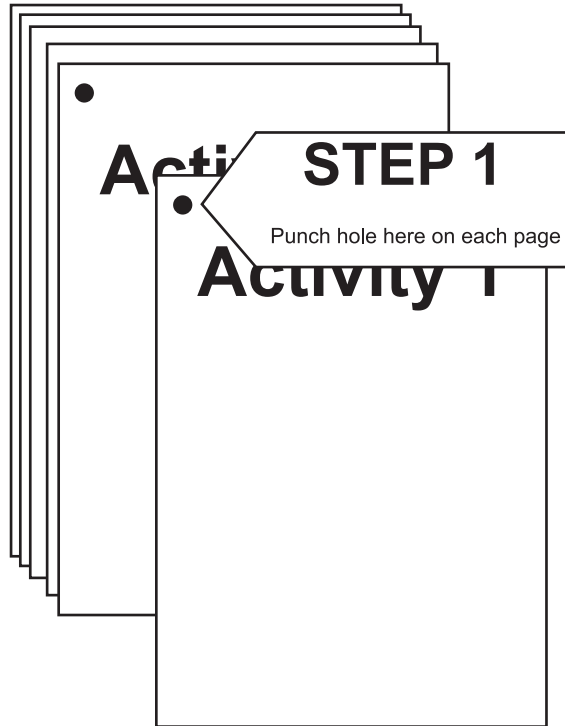
Turn over ▶

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PEARSON

Put 'treasury tag' through this hole

Activity 1

STEP 1

Punch hole here on each page

STEP 2 **Arrange your pages in this order, face up.**

Activity 1
Activity 2
Activity 3
Activity 4

STEP 3 Put a 'treasury tag' through all your pages

STEP 4 (last)

FOR EXAMINER'S USE ONLY

BLANK PAGE

You must have:
Cover sheet, short treasury tag, fixtures_exam.txt, haway_exam.txt, whitecaps_exam.xls

Instructions

- Complete your candidate details on the cover sheet provided.
- All printouts must contain your name, candidate number, centre number and activity number.
- At the end of the examination:
  - all printouts should be placed in the correct order
  - use a treasury tag to attach your printouts (**as shown**) to page 2 of the cover sheet.

Information

- There are **four** activities in this examination totalling **88** marks. **2** further marks are allocated to Standard Ways of Working.
- The marks for **each** question in each activity are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read through the scenario carefully.
- Work through the activities in order.
- Attempt **ALL** activities.
- Label your printouts clearly as instructed.
- Printing must be undertaken within the examination time.

Turn over ▶

P41048A

PEARSON

Scenario

Havering Whitecaps

Maddy Wright and Katy Parrish have supported Havering Whitecaps since their boyfriends played for the team. Their boyfriends' careers and the teenage romances are now very much in the past but their support of the team remains as strong as ever.

Until 15 years ago the Whitecaps were a struggling non-league team with little support. There were times, on wet and cold November afternoons, when Maddy and Katy were the only supporters.

In 1999 a magical thing happened to the Whitecaps. At that time the team's position, both in football terms and financially, was perilous to say the least. However, a financial backer appeared in the form of Harold Adenyi.

Harold had studied at the local college and even played a few games for the Whitecaps. His progress as a footballer was hampered by a lack of ability. He gave up on a career as a footballer to concentrate on what he was good at, which was IT and mathematics. He made a large amount of money by creating an online accountancy website called lesstax.com.

Harold was looking for things he could offset against a huge tax bill and a loss-making football club seemed to be a good start. He bought the Whitecaps from the previous owners for £1 and immediately started to spend money on it. Harold's flair for business meant that the loss-making football club did not stay loss-making for long.

Harold signed a talented former football league manager and with his advice, spent money on players who all turned out to be good investments. The way the manager had the team playing soon started to increase its fan base, so Harold built a new stadium. The team continued to be successful and the new stadium was soon filled at every match, putting the club on a healthy financial footing.

Financial success and playing success went hand-in-hand and, in 2001, Havering Whitecaps was elected to the Football League. After a few seasons, when the Whitecaps struggled to establish themselves, there followed a period of gradual success including promotion to the 1st Division and two years later the Championship.

Last season the Whitecaps won the Championship and are currently looking forward to their first season in the Premier League.

Throughout this period of development, Maddy and Katy have been screaming encouraging words to their team (and the occasional discouraging one to the opposition) and they have hardly missed a match. It was inevitable that as the Whitecaps' two most dedicated supporters they would become the chairman and secretary of the supporters' club.

One of their main tasks is to organise away trips for fans. This involves buying the tickets, booking the coaches and deciding what to charge for the ticket and transport packages.

With 14,678 registered supporters, organising the away trips is not an easy task. With the possibility of over 400 coaches travelling to an away match, the number of transport firms the pair could use was limited.

Since the Whitecaps were promoted to the Championship Maddy and Katy have used 'Rubicon Transport' whose rates are reasonable and who can supply enough coaches on a match day.

Rubicon charge a fixed sum of £350 per coach, plus a £1.50 fuel surcharge for every 100 miles travelled. In addition, Rubicon's regulations state that a driver cannot be in charge of the coach for more than 9 hours a day. Should the whole trip last more than 9 hours (including the match time) a second driver would be required. There is a charge of £75 for the second driver.

Premier League ticket prices vary greatly and Maddy has been quoted a range of prices varying between £30 and £54 by the Premier League clubs.

Maddy and Katy do not need to make an overall profit. Their main aim is to get as many fans as possible to away matches. Although they can afford to make a loss on individual trips, they cannot afford to make a loss overall. Therefore an accurate prediction of the number of people who will want to go to a particular match is vital. They are also aware that more people will want to go to some matches than others. To help find out how many people are likely to go to each match they ran an online survey. This was completed by 94% of their registered supporters.

To make data analysis easier, Katy has classified the teams as shown in the table.

EG	Teams fighting for European glory
MT	Mid-table teams
RD	Teams likely to be involved in the relegation dogfight
PR	Newly promoted teams

In addition to the classification of the team, she found that other things affect the number of people likely to go to away matches. Fewer people would go if the match was played on a weekday rather than a Saturday (or Sunday). The longer the travelling time, the fewer supporters were prepared to travel. Finally, the overall cost of the package would discourage some from attending certain matches.

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Description of the model

Maddy and Katy have to be as accurate as they can when setting the prices as they don't need to make a profit but cannot afford to make a loss. Maddy and Katy need a model to help them decide on prices. Therefore, Maddy has persuaded her brother Kieran, who works in IT, to create a model. Kieran wanted to make the model reusable so that he could sell it to other supporters' clubs. Unfortunately, before he could finish the model, the company Kieran worked for sent him to Dubai on a three-year contract. Maddy has asked you to complete the model and use it to suggest prices for the next season's away matches. Kieran has left you these notes.

Worksheet	Description
Teams	This is the worksheet that will be used to set the package prices. I have listed the teams in the Premier League along with Katy's classifications. For ease of viewing I have included information from other worksheets and have calculated the total costs, revenue and profit. There is a profit for each trip and a total profit for the season. The worksheet will also calculate the total number of supporters going to away matches. Cell B2 contains a drop-down box to choose the team you support.
Fixtures	This worksheet is a calculated page which lists the dates of the home and away fixtures.
Lookups	This worksheet contains a number of lookup tables. There are two blank areas, these will contain the fixture information provided by the Premier League. There are other tables to look up the day of the week, the likely support based on the teams' classification, the number of registered supporters and the ticket costs for the various clubs.
Distances, Times	These worksheets contain the distances between the grounds and the average times it would take a coach to travel those journeys. I got these from a very helpful man at the RAC.
Customer	This worksheet is incomplete. Once completed it will predict the number of supporters who would travel to each away match. This is based on the number of registered supporters and then adjusted according to the home team classification, then package price and finally the travel time. I haven't finished the analysis of the survey yet so I cannot put in formulae to take into account the travelling time and the overall cost. A friend of mine is doing the analysis for me and he will forward the results to you as soon as he has them.
Transport	In this worksheet I calculate how many coaches are needed, the cost per coach and the overall transport cost for the trip.
Transport Rates	In this worksheet I have entered the transport rates as quoted by Rubicon Transport.
I hope you find it easy to understand my notes. Good luck completing it. Kieran Wright	

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.

Please note that the Football League and Premier League referred to in this scenario are fictitious.

Your Task

You have been asked by Maddy and Katy to complete the model, started by Kieran.
You are then to recommend prices for the 'Ticket and Transport' package for every
Havering Whitecaps away match.

The Data

You have received two data files from the Premier League.

The first data file **fixtures_exam.txt** contains the fixture numbers of each match in the
first half of the season. The team names are not included but the numbers in the first row
and the first column correspond to the team numbers shown in the fixtures worksheet.

The second data file **haway_exam.txt** shows whether these fixtures are at home (h) or
away (a).

Instruction to Candidates

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 **must** be used throughout.

All spreadsheet printouts **must** 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 have been asked to complete a model and use it to provide Maddy Wright and Katy Parrish with recommended prices for the 'Ticket and Transport' package for all Havering Whitecaps away games. You should look at all the information available and make sure that you understand the situation.

On **one** sheet of A4:

(a) List the **12** points from the scenario most relevant to the problem you have to solve.

(12)

(b) List the data sources to be used by the model **and** state the information each data source provides.

(10)

Note: Bullet point or number your answers.

Save and print your work.

(Total for Activity 1 = 22 marks)

Activity 2 – Computer modelling (suggested time 50 minutes)

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

Open the spreadsheet model and familiarise yourself with it.

Please remember that a minimum font size of 10 must be used for all printouts. This includes spreadsheet printouts, which must also show gridlines and row and column headers.

You must ensure that each printout is on **one** sheet of A4 only.

(a) **Lookups**

❑ Import into the spreadsheet the data contained in the file **fixtures_exam.txt** This data should be imported into cells C2:W22 of the 'Lookups' worksheet.
Note: You may have to unprotect the worksheet to do this.

❑ Import into the spreadsheet the data contained in the file **haway_exam.txt** This data should be imported into cells X23:AR43 of the 'Lookups' worksheet.

❑ Print off columns C-AR and rows 19-27 of the 'Lookups' worksheet showing **data**.

(2)

(b) **Customer**

❑ Enter a formula into cell D3 of the 'Customer' worksheet which if the match is played on a Saturday or Sunday will store the value 2 in this cell and if the match is played on any other day will store the value 3.
Hint: The cells in column B contain the first letter of the day the match is played.

❑ Replicate this formula down to cell D22.

❑ Enter a formula into cell G3 of the 'Customer' worksheet to get the suggested package price for the Amersham Rangers match from the 'Teams' worksheet.

❑ Replicate this formula down to G22.

Kieran's friend has analysed the survey. He has found that for every £5 the package costs over £10, there would be a reduction of 1% in the number of people prepared to buy the package.

For example, if the package costs £24 then that is two **whole** £5s over £10 so the reduction would be 2%.

$$(24-10)/5=\textbf{2}.8$$

However, if the suggested price was £25 then the reduction would be 3%.

$$(25-10)/5=\textbf{3}.0$$

❑ Enter a formula into cell H3 of the 'Customer' worksheet to calculate the percentage reduction based on the package price you copied into cell G3.

❑ Replicate this formula down to cell H22.

- ❑ Enter a formula into cell I3 of the 'Customer' worksheet to apply the percentage **reduction** you have just calculated on the support adjusted by class in cell F3.
  Note: Answer must be a whole number.

- ❑ Replicate this formula down to cell I22.

  Having analysed the responses to the travel time questions in the survey, Kieran's friend has told you that for every 15 minutes of travel time over an hour there would be a reduction of 6% in the number of people prepared to buy the package.

  For example, if the travel time was 2 hours and 10 minutes then that is four **full** 15-minute intervals over an hour, giving a percentage decrease of 24%.

  $$(130-60)/15=\textbf{4}.667$$

  $$\textbf{4}*6\%=24\%$$

  If the suggested travel time was 2 hours and 15 minutes then that would be five **full** 15-minute intervals over an hour, giving a percentage decrease of 30%.

  $$(135-60)/15=\textbf{5}.0$$

  $$\textbf{5}*6\%=30\%$$

- ❑ Enter a formula into cell K3 of the 'Customer' worksheet to calculate the percentage reduction in the travel time in minutes value in J3.

- ❑ Replicate the formula down to cell K22.

  If the travel time in minutes is less than 60 you will end up with a negative value in column K. This would lead to an increase in the support adjusted for travel time. This does not make sense as it could lead to a predicted value greater than the number of registered supporters.

  For negative values assume a reduction of 0%.

- ❑ Enter a formula into cell L3 of the 'Customer' worksheet, which will copy the value in K3 if it is greater than or equal to zero, but store 0 if K3 is less than zero.

- ❑ Replicate this formula down to cell L22.

- ❑ Enter a formula into cell M3 of the 'Customer' worksheet to apply the adjusted reduction you have just calculated to the value in cell I3.
  Note: Answer must be a whole number.

- ❑ Replicate this formula down to cell M22.

- ❑ Print off columns A, D, G-I, K-M and rows 2-8 of the 'Customer' worksheet showing **formulae**.
  Note: This printout will fit on one page but to ensure that **your formulae** can be read you should make the columns containing your formulae wide enough to avoid truncation and reduce other columns to a minimum.

  (19)

(c) **Use the Model**

The model is used by entering the proposed package prices into column H of the 'Teams' worksheet. Last year Maddy made a small profit of £1,500. This year Maddy would like to make less than that if it is possible.

❑ Investigate the situation by entering different prices into the model in order to find a good solution to the problem.
Note: Remember that it doesn't matter if you make a loss for a particular trip as long as you are in profit or break even for the whole year.

❑ With your best solution showing, print off the 'Teams' worksheet columns B, H, Q-S and rows 3-24 showing **data**.

(6)

(d) **Printouts**

❑ Collect your printouts together, ensuring you have printed them correctly and that they are in the order you have been asked to print them.

(3)

(Total for Activity 2 = 30 marks)

*Activity 3 – Report and Evaluation (suggested time 25 minutes)

Joe Southern (a Stafford Sharks supporter) has heard about your model and has asked if he could use it for his supporters' club.

Write a report for Joe that:

- explains how to use the model

- explains how to change the model so it will work for his club

- evaluates the relevance of the data sources you identified in Activity 1 to Stafford Sharks supporters' club

- identifies the data sources to change and how to replace them.

The report should also include:

❑ a suitable title

❑ an introduction explaining what the report is about

❑ a concluding statement.

Proof read your report.

Marks will be awarded for the Quality of your Written Communication (QWC).

Save and print your work.

(Total for Activity 3 = 15 marks)

Activity 4 – Changing the model (suggested time 40 minutes)

You should ensure that each printout is on **one** sheet of A4 only.

Katy has received three quotes from other transport companies capable of supplying the capacity required. She would like you to incorporate this into the model.

The table shows the new quotes.

	Denman Coaches	Coleman Coaches	Joe Stobart
Basic Cost /Coach	£410	£366	£380
Coach Capacity	52	35	40
Fuel Surcharge/100 miles	£1	£0	£1.50
Extra Driver Supplement	£50	£22	£32

(a) **Transport Rates**

❑ Unhide columns C-E of the 'Transport Rates' worksheet. To do this you will have to unprotect the worksheet. Remember, the password is *edexcel*.

❑ Enter the values for the new quotes into these columns.

❑ Print off columns A-E rows 2-6 of the 'Transport Rates' worksheet showing **data**.

(1)

(b) **Transport**

Column C of the 'Transport' worksheet calculates the number of coaches required for the away matches with the teams in column A.

❑ Unhide columns D-I of the 'Transport' worksheet and enter formulae into the range D4:F23 to calculate the number of coaches required should the other companies be used.
Warning: The formulae in column C cannot be replicated into this range of cells as they stand.

Column K of the 'Transport' worksheet calculates the cost per coach, including extra driver supplement and the fuel surcharge, for the away matches with the teams in column A.

❑ Unhide columns L-Q of the 'Transport' worksheet.

❑ Unhide columns S-W of the 'Transport' worksheet.

Column R of the 'Transport' worksheet calculates the total cost of transport when Rubicon Transport is used for the away matches with the teams in column A.

❑ Enter formulae into the range S4:U23 of the 'Transport' worksheet to calculate the cost of transport should the other companies be used.

❑ Change the formulae in the range X4 to X23 of the 'Transport' worksheet to look for the smallest total cost of transport for the corresponding match.

❑ Print off columns A, D, F rows 4-23 of the 'Transport' worksheet showing **formulae**.

❑ Print off columns S-U, X rows 4-23 of the 'Transport' worksheet showing **formulae**.

(10)

(c) **Reuse the Model**

The new formulae have altered the model.

❑ Investigate the enhanced model by entering different prices into the model in order to find a better solution to the problem than you found in Activity 2.

❑ With your best solution showing, print off the 'Teams' worksheet columns B, H, Q-S and rows 3-24 showing **data**.

(7)

(d) **Printouts**

❑ Collect your printouts together, ensuring you have printed them correctly and that they are in the order you have been asked to print them.

(3)

(Total for Activity 4 = 21 marks)

Standard Ways of Working.

All printouts must contain the activity number, your name, candidate number and centre number.

Pages must be securely fastened to the cover sheet and in the correct order.

A minimum font size of 10 should be used for all word processed documents.

(Standard Ways of Working = 2 marks)

TOTAL FOR PAPER = 90 MARKS

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