Write your name here

Surname	Other names

Pearson
Edexcel GCE

Centre Number | Candidate Number

Applied Information and Communication Technology

Unit 3: The Knowledge Worker

COVER SHEET

23–27 May 2016

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 ▶

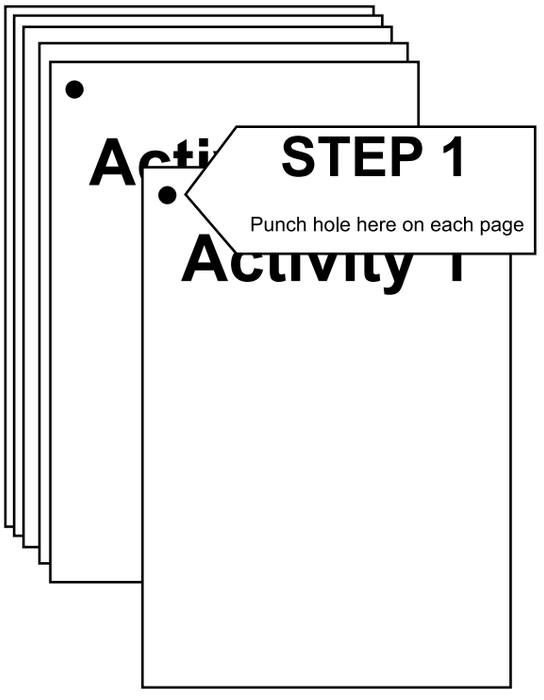
P46574A

1/1/1/1/1/1/1/1

P 4 6 5 7 4 A 0 1 0 4

PEARSON

Put 'treasury tag' through this hole



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

Activity 1			
(a)	1		
	2		
	3		
	4		
	5		
	6		
	7		
(b)	1		
	2		
	3		
	4		
	5		
	6		
	7		
(c)	1		
	2		
	3		
	4		
Total			

Activity 2			
(a)	1		
(b)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
(c)	1		
	2		
	3		
	4		
	5		
	6		
	7		
(d)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
(e)	1		
	2		
	3		
	4		
	5		
	6		
(f)	1		
	2		
	3		
Total			

Activity 3			
(a)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
(b)	1		
	2		
	3		
	4		
	5		
	6		
(c)	1		
Total			

SWW		
1		
2		
Total		

A1		
A2		
A3		
A4		
A5		
SWW		
Total		

Activity 4		
MB1		
MB2		
MB3		
Total		

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Pearson Edexcel GCE

Applied Information and Communication Technology

Unit 3: The Knowledge Worker

23–27 May 2016
Time: 2 hours 30 minutes

Paper Reference
6953/01

You must have:
Cover sheet, short treasury tag, LML_exam.xlsx, july_tides_exam.txt

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

- The total mark for this paper is **90**.
- There are **four** activities within the examination totalling **88** marks. **Two** further marks are allocated to Standard Ways of Working.
- The marks for **each** question 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 ▶

P46574A

1/1/1/1/1/1/1/1

P 4 6 5 7 4 A

PEARSON

Scenario

Last Minute Laura

Tommy Baker spent most of his working life at sea. He left school at 15 to work on his father's fishing boat. This was at a time when fish stocks were thought to be plentiful and the idea of fishing quotas had not occurred to anyone. The boat Tommy worked on was one of a fleet of over 50 fishing vessels that left Warburton Harbour every day.

In 1976 Tommy retired and, as was the tradition, his eldest son, Sam, took over as Skipper. Fish quotas had been in force for a number of years when Sam took over and had started to have an impact. Several skippers had called it a day as it was getting more and more difficult to eke out a living as a fisherman whilst maintaining sustainable fish stocks.

Sam continued for as long as he could because he knew it would break his father's heart to end the family tradition. Eventually, however, Sam had to bow to the inevitable and in 2006 he retired his boat from the fleet. For several years Sam (and his son Tommy Jr.) made a living by chartering his boat out for pole fishing. He took groups of anglers out to catch herring and sea bass. There was, however, a lot of competition and there were long periods when they had no work at all.

Last year Tommy Jr. took over the boat. He decided the business needed a new direction. His younger sister, Tilly, had just left sixth form college where she had successfully studied GCE Applied ICT and a BTEC in Leisure and Tourism. Tommy's idea was to run boat trips for tourists. He sold the fishing boat and used the money to buy a second-hand passenger cruiser called 'Last Minute Laura'. Although the demand would be seasonal, Tilly identified a number of attractions in the local area that would ensure that the trips were popular.

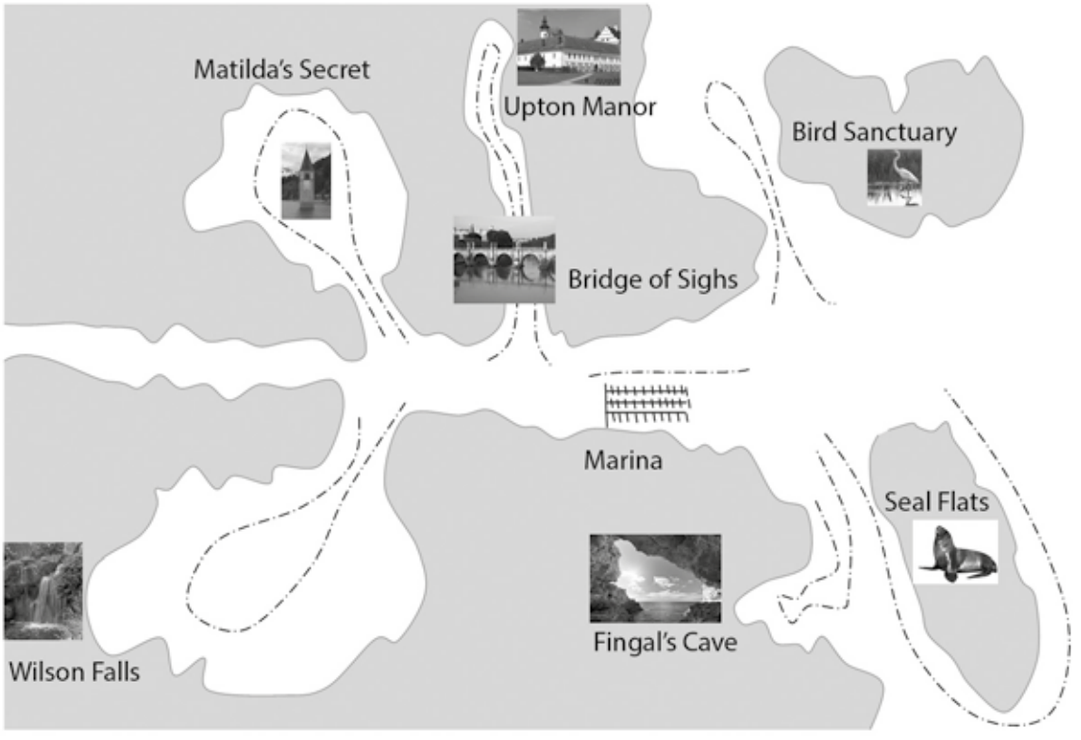
After discussions, Tilly and Tommy Jr. chose these attractions to build their boat trips around.

Attraction	Description	Passage Requirements
Bird Sanctuary	On the north-west side of Cooper's Island there is a bird sanctuary that provides the habitat for many species of marine bird. There is no public access to Cooper's Island but the bird sanctuary is visible from the channel between the island and the mainland.	There is a channel on the west side of Cooper's Island that provides a good view of the sanctuary. The channel is navigable by 'Last Minute Laura' if there is at least 1.8 m of tidal water.
Seal Flats	At high tide, the eastern sandbanks are below the surface of the water; however at low tide large areas of the sandbanks are exposed. During this time a large number of seals come out of the water to bask in the sun.	The sandbanks at Seal Flats are only visible when there is 3.8 m of tidal water or less. Any more than this would submerge the entire sandbanks and the seals would take to the water.

Bridge of Sighs	The Bridge of Sighs spans the River Ewe and used to connect the two halves of the medieval village of Colme. It is called the Bridge of Sighs as it connected the magistrate's court to the scaffold where hangings took place.	The Bridge of Sighs is viewed on the way to Upton Manor and also on the way back. To pass under the bridge, 'Last Minute Laura' requires at least 2.5 m of tidal water to avoid running aground. There must be no more than 6 m of tidal water otherwise the boat's superstructure will hit the bridge.
Upton Manor	Thanks to a long-running Elizabethan themed soap opera, Upton Manor is famous throughout the country as 'Priory House', the home of the fictional family of Lord Colme. In actual fact it was built in the 1960s by a self-made millionaire who made his money from greetings cards. Upton Manor stands upriver from the Bridge of Sighs.	There are no tidal requirements for Upton Manor but the Bridge of Sighs has to be passed both on the way there and back.
Matilda's Secret	In the 1950s Colme Valley was flooded as part of an ill-conceived hydroelectric project. Unfortunately the village of Colme had to be evacuated to do this. There is a rumour that all the valuables from the local church (St Matilda's) were hidden in the spire. At low tide the spire is visible and is known locally as Matilda's Secret.	Colme Valley itself has no tidal requirements for navigation, however the spire can only be seen if there is 4 m or less of tidal water.
Wilson Falls	Wilson Falls is 80 m in height. The view at the bottom looking up is spectacular.	The Wilson Falls basin is quite shallow so to get near enough to view the falls there has to be at least 1.6 m of tidal water.
Fingal's Cave	Named after the Hebridean cave, which was the inspiration for Mendelssohn's famous piece of music, this Fingal's Cave is a navigable channel under the cliffs. A medium-sized boat can be driven through the cave for about half a mile with the cliffs above you.	For 'Last Minute Laura' to pass through Fingal's Cave there must be between 2.5 m and 6 m of tidal water.

Tommy Jr. and Tilly want every boat trip to visit all of the attractions. The viewing routes past the attractions are indicated by the dotted lines on the diagram.

When travelling on the viewing routes the boat sails at a constant speed of 8 knots. All trips start and finish at the marina. When passing the marina there is a speed limit of 8 knots. Elsewhere the speed of the boat will be 15 knots.



The initial plan is to run trips on Mondays, Wednesdays and Fridays. The times and order of the visits will depend on the height of tidal water at the time of the visit. Each day decisions have to be made as to when to start the trip (09:00, 10:00, 11:00 or 12:00) and in which order to visit the attractions.

Tilly has prepared a model and has employed you to make it easier to use. She also wants you to decide the order and timings of trips. The model needs the tides in the area on the day. These are worked out using the sine (SIN) and cosine (COS) of the angle the Moon (and to a lesser extent the Sun) makes with the Earth. This is known as the phase angle. The harbour master has worked out the tide figures for July.

The model is a spreadsheet with these worksheets.

Worksheet	**Description**
Selection	In this worksheet the start times and order of visits are set for a week's trips. You can select the week you are planning for. There are areas for Monday, Wednesday and Friday. For each day you can select a start time and an order of visits. There is an area to show if the trip is viable.
Data	This worksheet calculates the height of tidal water at the time an attraction is visited.

Week Tide	This worksheet calculates the times and heights of tidal water at high tides and low tides for the week selected in the 'Selection' worksheet.
Base Times	This worksheet contains the times it would take to sail between attractions. These have been worked out by Tommy Jr. by sailing between them six times each and taking an average.
Marina	This worksheet indicates whether the marina has to be passed when sailing between two of the attractions.
Sights	This worksheet contains a list of the attractions and the amount of tidal water that constrains the times at which they can be visited. It also contains how long Tommy Jr. has said it will take to pass the attraction.
July Tides	This worksheet contains the tide data for July.

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.

Your Task

You have been employed to complete the model and to decide on the start times and orders of visits for the trips. Initially you will do this for the week beginning 25th July 2016.

Instructions 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 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 25 minutes)

Read the scenario carefully.

You will be using the model to organise boat trips.

On **one** sheet of A4:

(a) List, in a table, the attractions that will be visited during the trip. For each attraction, state the minimum and maximum amounts of tidal water needed for the visit to take place.

(7)

(b) List **seven** points from the scenario you consider relevant to the model or to the problem you have to solve.

NOTE: Use a numbered list for your answer.

(7)

(c) List **two** data sources and the data that these provide.

(4)

Save and print your work.

(Total for Activity 1 = 18 marks)

Activity 2 – Completing the model (suggested time 40 minutes)

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

The model is stored as **LML_exam.xlsx**

Open the spreadsheet model and familiarise yourself with it.

(a) **July Tides**

The harbour master has supplied the July tides information in the form of a text file called **july_tides_exam.txt**

- ❑ Import the July tides information into cells A14:AF27 of the 'July Tides' worksheet.

  Note: You may need to unprotect the worksheet. The password is *edexcel*.

- ❑ Print off columns A-C, AC-AF and rows 13-27 of the 'July Tides' worksheet showing **data**.

(1)

(b) **Selection (Statistics Monday) 1**

Cells I14:O19 of the 'Selection' worksheet contain checks that the proposed order of visits shown in A13:A20 conform to the criteria. There is conditional formatting to show at a glance if the trip is viable.

- ❑ Enter a formula into cell I14 to count the number of times the Bird Sanctuary will be visited in the proposed Monday boat trip.
- ❑ Replicate this formula down to cell I19.
- ❑ Enter a formula into cell J14 to look up the height of tidal water at the start of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula down to J19.
- ❑ Enter a formula into cell K14 to look up the height of tidal water at the end of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula down to K19.
- ❑ Print off columns I to K and rows 13 to 19 of the 'Selection' worksheet showing **formulae**.

(12)

Column D of the 'Sights' worksheet contains the minimum height of tidal water required to sail past the attraction. Column E of the 'Sights' worksheet contains the maximum height of tidal water required to sail past the attraction. A value of "-20" or "20" is used if a criterion is not applicable for an attraction so that formulae can be replicated.

(c) **Selection (Statistics Monday) 2**

- ❑ Enter a formula into cell L14 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to L19.
- ❑ Enter a formula into cell M14 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to M19.
- ❑ Enter a formula into cell N14 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to N19.
- ❑ Enter a formula into cell O14 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to O19.
- ❑ Print off columns L to O and rows 13 to 19 of the 'Selection' worksheet showing **formulae**.

(7)

(d) **Selection (Statistics Wednesday and Friday)**

Cells I25:O30 of the 'Selection' worksheet contain checks that the proposed order of visits shown in A24:A31 conform to the criteria. There is conditional formatting to show at a glance if the trip is viable.

- ❑ Enter a formula into cell I25 to count the number of times the Bird Sanctuary will be visited in the proposed Wednesday boat trip.
- ❑ Replicate this formula to cell I30.
- ❑ Enter a formula into cell J25 to look up the height of tidal water at the start of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula to cell J30.
- ❑ Enter a formula into cell K25 to look up the height of tidal water at the end of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula down to K30.

- ❑ Enter a formula into cell L25 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to L30.
- ❑ Enter a formula into cell M25 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to M30.
- ❑ Enter a formula into cell N25 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to N30.
- ❑ Enter a formula into cell O25 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to O30.

Cells I36:O41 of the 'Selection' worksheet contain checks that the proposed order of visits shown in A35:A42 conform to the criteria. There is conditional formatting to show at a glance if the trip is viable.

- ❑ Enter a formula into cell I36 to count the number of times the Bird Sanctuary will be visited in the proposed Friday boat trip.
- ❑ Replicate this formula down to I41.
- ❑ Enter a formula into cell J36 to look up the height of tidal water at the start of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula down to J41.
- ❑ Enter a formula into cell K36 to look up the height of tidal water at the end of the proposed visit to the Bird Sanctuary.
- ❑ Replicate this formula down to K41.
- ❑ Enter a formula into cell L36 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to L41.
- ❑ Enter a formula into cell M36 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is high enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to M41.
- ❑ Enter a formula into cell N36 so that the cell will contain "Y" if the height of tidal water at the start of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.

- ❑ Replicate this formula down to N41.
- ❑ Enter a formula into cell O36 so that the cell will contain "Y" if the height of tidal water at the end of the visit to the Bird Sanctuary is low enough for the visit to be viable and "N" if it is not.
- ❑ Replicate this formula down to O41.
- ❑ Print off columns I to K and rows 24 to 31, 35 to 41 of the 'Selection' worksheet showing **formulae**.
- ❑ Print off columns L to O and rows 24 to 31, 35 to 41 of the 'Selection' worksheet showing **formulae**.

(8)

(e) **Using the model**

There are three areas on the 'Selection' worksheet for you to design trips for Monday, Wednesday and Friday. To design a trip, first select a start time (D11, D22, D33) then choose the order of the visits (A14:A19, A25:A30, A36:A41).

Use your model to design trips for the week beginning 25th July 2016.

- ❑ Set the week beginning date in cell B11.
- ❑ Design trips for Monday, Wednesday and Friday.
- ❑ Print off columns A to C, H to O and rows 11 to 20, 22 to 31, 33 to 42 showing **Data**.

(6)

(f) **Printouts**

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

(3)

(Total for Activity 2 = 37 marks)

Activity 3 – August Tides (suggested time 40 minutes)

Tommy Jr. has asked you to design trips for the week commencing 1st August 2016. As this week is in August an 'August Tides' worksheet is needed. The harbour master is unable to provide the data for this as he is busy. The 'August Tides' worksheet will have to be completed using formulae.

In this activity you will use a much simplified formula to calculate the height of tidal water.

(a) The height of tidal water is based on the phase angle measured in radians. Cell B16 contains the phase number for the first of August. To calculate the phase angle you multiply the phase number by 4π (pi) and then divide it by 30.

- ❑ Enter a formula into cell B19 to calculate the phase angle for 1st August 2016.
- ❑ Replicate this formula across to cell AF19.

Rows 21 and 25 contain the heights of tidal water at high tide for each day in August.

If the **In Line** (row 17) value is "Y" then this value is calculated by multiplying the sine (SIN) of the phase angle by 1.5 and adding 6

Otherwise this value is calculated by multiplying the sine (SIN) of the phase angle by 1.2 and adding 6

- ❑ Enter formulae into cells B21 and B25 to calculate the height of tidal water at high tide.
- ❑ Replicate these formulae across to cells AF21 and AF25 respectively.

Rows 23 and 27 contain the heights of tidal water at low tide for each day in August.

If the **Out Line** (row 18) value is "Y" then this value is calculated by multiplying the cosine (COS) of the phase angle by 0.7 and adding 1.5

Otherwise this value is calculated by adding 1.2 to the cosine (COS) of the phase angle.

- ❑ Enter formulae into cells B23 and B27 to calculate the height of tidal water at low tide.
- ❑ Replicate these formulae across to cells AF23 and AF27 respectively.
- ❑ Print off columns A, B, AF and rows 19, 21, 23, 25 and 27 of the 'August Tides' worksheet showing **formulae**.

(11)

(b) **Using the model**

There are three areas on the 'Selection' worksheet for you to design trips for Monday, Wednesday and Friday. To design a trip, first select a start time (D11, D22, D33) then choose the order of the visits (A14:A19, A25:A30, A36:A41).

Use your model to design trips for the week beginning 1st August 2016.

- ❑ Set the week beginning date in cell B11.
- ❑ Design trips for Monday, Wednesday and Friday.
- ❑ Print off columns A to C, H to O and rows 11 to 20, 22 to 31, 33 to 42 showing **Data**.

(6)

(c) **Printouts**

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

(1)

(Total for Activity 3 = 18 marks)

***Activity 4 – Handover Document (suggested time 35 minutes)**

You are coming towards the end of your contract and have been asked to create a handover document.

The handover document should include:

- ❑ suitable titles and section headers
- ❑ instructions with diagrams and screen shots of how to use the model
- ❑ a strategy section giving tips on how to speed up the process of creating three days of viable trips for a week
- ❑ an evaluation of the model and suggestions on how to improve it.

Proof read your handover document.

Marks will be awarded for the quality of your written communication.

Save and print your work.

(Total for Activity 4 = 15 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.

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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