Write your name here

Surname	Other names

Edexcel GCE

Centre Number	Candidate Number

Applied Information and Communication Technology

Unit 9: Communications and Networks

COVER SHEET

7 – 25 January 2013	Paper Reference **6959/01**

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 ▶

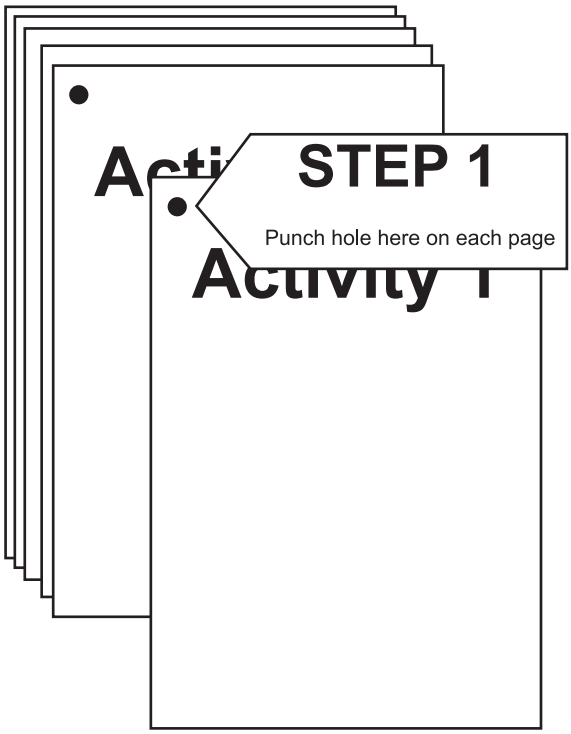
P41039A

1/1/1/1/1

P 4 1 0 3 9 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
Activity 5

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

STEP 4 (last)

FOR EXAMINER'S USE ONLY

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

Activity 2		
MB1		
MB2		
MB3		
Total		

Activity 3			
(a)	1		
	2		
	3		
	4		
	5		
	6		
	7		
(b)(i)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
(b)(ii)	1		
Total			

Activity 4			
(a)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
(b)	1		
	2		
	3		
	4		
	5		
	6		
Total			

Activity 5			
(a)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
(b)(i)	1		
	2		
(b)(ii)	1		
	2		
(b)(iii)	1		
	2		
Total			

SWW		
1		
2		
Total		

A1		
A2		
A3		
A4		
A5		
SWW		
Total		

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Edexcel GCE

Applied Information and Communication Technology

Unit 9: Communications and Networks

7 – 25 January 2013
Assessment window: 3 weeks
Time: 10 hours

Paper Reference
6959/01

You must have:
Short treasury tag, cover sheet

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 **five** activities in this examination totalling 88 marks. **2** further marks are allocated to Standard Ways of Working.
- The marks for **each** question, within an 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 period.

Turn over ▶

P41039A

1/1/1/1/1

P 4 1 0 3 9 A

PEARSON

Scenario

The Toys and Games Museum

The Toys and Games Museum is situated near to your centre. It is run by a non-profit group.

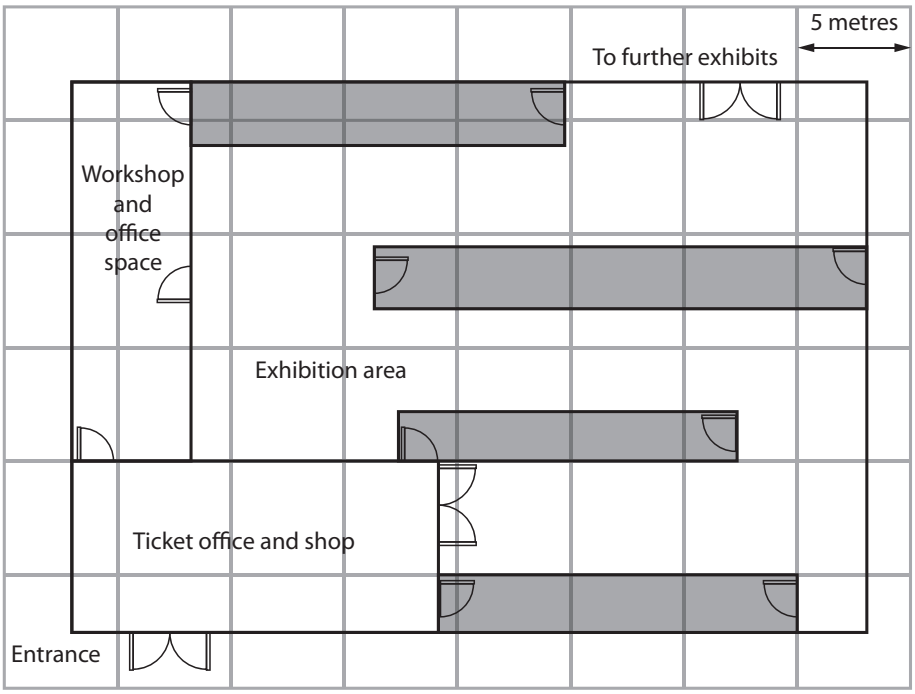
The aims of the museum are to:

- collect, conserve and display toys and games
- educate people about the history of toys and games
- encourage museum visitors to play with the toys and games, or replicas of them.

The museum has established links with your centre and offers placements for work experience and community service. You are due to start a placement after the exams have finished.

In 2012 the museum successfully applied for a National Lottery grant. It has recently received a payment of £7000. It will use the grant to introduce a new interactive exhibit. The exhibit will allow visitors to play games written for early home computers such as the ZX Spectrum, Atari ST and Amiga 500.

The museum is housed in a modern, single-storey industrial-style building. The building has ample power outlets and has a false ceiling, which hides a service grid of walkways and conduits. This is used to supply services to all parts of the exhibition area. The part of the building that will house the early computer exhibit is shown on the sketch map.



The areas shaded in grey are for staff only and are used for setting up and servicing the exhibits. These areas are open at the top and have internal ladders to allow access to the service grid.

The museum's curator is Alan Sinclair. He has a degree in museum management and organises the day-to-day running of the museum. He is also responsible for the care and display of the museum's collections. He is an experienced computer user but his only networking experience has been to set up a simple peer-to-peer network in the museum.

The peer-to-peer network consists of:

- two PCs in the workshop and office space, with a shared laser printer
- a WiFi router with a built-in five-port switch
- a point of sale system in the ticket office and shop.

There are two assistant curators who help Alan to run the museum. These three people are the only full-time employees of the museum. The rest of the staff are part-time volunteers. They run the shop and ticket office, provide guides for the exhibits and help with conservation work.

One of the assistant curators specialises in electronic toys and will be restoring and maintaining the early computers. The museum does not have an expert in networking or modern systems. Alan knows that you have been taking an Applied ICT course and has asked you to help him.

The museum has a display of early computers running demonstration programs. Alan is worried that these machines may be damaged if they are used in the planned interactive exhibit. He knows that many of these computers can be emulated on modern PCs and thinks that some sort of virtualisation that makes use of emulation might be the answer.

Instructions to Candidates

All documents 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.

A minimum font size of 10 should be used in all word processed documents, using a font type suitable for business purposes.

Diagrams should be large enough for the detail to be read.

Activity 1 – Network management tasks (suggested time 1 hour and 40 minutes)

Alan is worried that the early computers may be damaged if they are used in the planned interactive exhibit. He thinks that some sort of virtualisation that makes use of emulation might be the answer.

(a) Produce a document for Alan that explains the role of virtualisation in creating multiple emulations on one computer.

(3)

The museum has collected some original games for the early computers. Many of these games are stored on media such as audio cassette tapes and floppy disks. The floppy disks are formatted in a way that is not recognised by modern operating systems.

(b) Produce a document that explains how to get the games from audio cassette tapes and floppy disks on to a PC hard drive.

(6)

(c) Alan has been told that some of the games are available for download from abandonware sites but he does not know the legal position of doing this.

Prepare a briefing document for Alan that advises him on the legal implications of downloading abandonware files when he has the:

- original media
- original media but the original file is corrupted
- packaging and documentation but the original media has been lost.

(6)

Evidence to be submitted for (a), (b) and (c)

On no more than **two** word processed A4 pages:

- ❑ A document for Alan giving appropriate information on virtualisation, file recovery and legal issues. The explanation and information must be set in the context of the scenario.

(Total for Activity 1 = 15 marks)

***Activity 2 – Network architecture (suggested time 1 hour and 40 minutes)**

For financial reasons, Alan wishes to use Linux rather than a commercial operating system. He asks you to look into three possible solutions that would give 30 game stations for visitors to use.

Solution 1 – a small client-server network of 30 PCs, with each PC emulating a single early computer.

Solution 2 – a server and thin client network, with the server providing emulation of 30 early computers.

Solution 3 – a smaller client-server network of 6 PCs, with each PC emulating five early computers by means of a splitter box (sometimes called *reverse KVM*) and software. Each emulated computer has its own keyboard and monitor.

You need to produce a set of notes for Alan to help him understand the proposed solutions.

Research the issues and produce a briefing document for Alan.

For each solution the document must:

- describe, with the aid of a diagram, the network architecture used
- discuss the benefits and drawbacks.

The descriptions and discussions must be set in the context of the scenario.

Pay particular attention to the quality of your written communication.

Evidence to be submitted

On **two** pages of A4:

- ❑ A document for Alan about the architecture, benefits and drawbacks of each solution.

(Total for Activity 2 = 12 marks)

Activity 3 – Components of a network (suggested time 1 hour and 40 minutes)

During a meeting with Alan you agree these points.

1. There will be 30 game stations which visitors may use.
2. There will be two new network connections in the workshop and office space for maintenance and testing purposes.
3. The existing PCs and printer in the workshop and office space will be retained. One of the PCs will be used to control the server.
4. The existing Internet connection will be retained. It is located in the workshop and office space and uses the WiFi router with a built-in five-port switch.
5. The existing point of sale system in the ticket office and shop will be retained. It must remain connected to the Internet so that credit cards can be processed.
6. At present, the only data sockets in the workshop and office space are on the router / switch.
7. There are adequate power outlets and cable conduits in the area shown on the sketch map.
8. There are no data cables or data sockets other than those already stated.

Alan is concerned that the budget of £7000 for the project may not be adequate to buy completely new equipment.

He is aware that the proposed exhibit is likely to be changed or replaced in a few years time and is therefore happy to save money by using old or refurbished stock for the game stations. He thinks that the server should be new and capable of running an expanded network of up to 60 machines in the future.

Alan wants to reserve £1000 for network infrastructure, leaving £6000 for the server and game stations. He asks you to prepare estimates for the costs of the server and 30 game stations for each of the three solutions from Activity 2.

(a) Produce estimates for the hardware costs of the server and 30 game stations in each solution. The cost of software that comes bundled with hardware should be counted as part of hardware costs.

(7)

Alan decides to use solution 1; a small client-server network of 30 PCs, with each PC emulating a single early computer. The PCs will be laid out as six groups of five.

(b) (i) Produce a table for Alan which identifies the hardware, software and cabling components to be used in the museum. The table must include the purpose, quantity and cost of each component. Do not include pre-existing hardware, cable conduit, power sockets or power cables.

(8)

(ii) The table must also include the total cost of the project. Do not include labour costs.

(1)

Evidence to be submitted for (a)

On **one** A4 page:

- ❑ Estimates for the hardware costs of the server and 30 game stations for each solution.

Evidence to be submitted for (b)

On **one** A4 page:

- ❑ A table which identifies the hardware, software and cabling components.

(Total for Activity 3 = 16 marks)

Activity 4 – Network design (suggested time 2 hours)

Having agreed with Alan's requirements for the museum (Activities 2 and 3), you now need to design an appropriate network solution.

(a) Use network design software to produce a labelled network design for the complete project.

The design must show:

- the exhibition area
- the workshop and office space
- the ticket office and shop.

You need only show detail for **one** group of five game stations. Each of the other five groups may be shown as a label and connection.

(13)

(b) Explain and justify any decisions that you have made regarding the selection, use and positioning of network devices and equipment.

(6)

Evidence to be submitted for (a)

On **one** A4 page of computer output:

- ❑ Your network design.

Evidence to be submitted for (b)

On **one** word processed A4 page:

- ❑ Notes justifying each decision made with regard to selection, use and positioning of network devices and equipment.

(Total for Activity 4 = 19 marks)

Activity 5 – Network addressing and protocols (suggested time 3 hours)

(a) Alan has decided that he would like to use the interactive exhibit as a basis for explaining the Internet Protocol model, TCP/IP, to museum visitors.

He wants **five** A4 landscape cards. **One** to give an overview of what the Internet Protocol model is and **one for each** of the four layers.

The cards must show how a name typed into a high score table on a game station can be posted to an external website.

Produce a set of explanatory cards to accompany the interactive exhibit.

(20)

(b) The museum's original network, consisting of the point of sale system, the two office PCs, the printer and the router, was working correctly.

The new network was connected and the server configured as a DHCP server with a scope of 192.168.1.2 to 192.168.1.254

At this point the new network worked correctly.

After a few days, when trying to log on, some of the PCs are unable to join the network. They display an error message saying that they cannot obtain an IP address. Alan has asked for your help. You suspect that something has gone wrong with DHCP.

(i) Describe the most likely cause of the problem.

(2)

(ii) Explain why the problem did not become apparent for a few days.

(2)

(iii) Describe the steps that you must take to fix the problem.

(2)

Evidence to be submitted for (a)

- ❑ On **five** A4 pages, a set of five cards explaining the Internet Protocol model.

Evidence to be submitted for (b)

- ❑ On **one** A4 page, advice for Alan on the cause of and solution to the DHCP problem.

(Total for Activity 5 = 26 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