

**JAMES RUSE**  
AGRICULTURAL HIGH SCHOOL

**2011**  
ACCELERATED HSC COURSE  
INTERNAL EXAMINATION

# Information Processes and Technology

HSC ASSESSMENT | TRIAL EXAMINATION

## General Instructions

- ▶ Reading time – 5 minutes
- ▶ Working time – 180 minutes
- ▶ Write using black or blue pen
- ▶ You may use a calculator
- ▶ You must provide your own writing paper
- ▶ Attach the given cover sheet to your answers
- ▶ Attempt all questions (no optional sections)
- ▶ Mark allocations are provided for each question

**Total marks: 120**

**Section A** Pages 2–6

**20 marks – Multiple Choice**

- ▶ Attempt Questions 1–20
- ▶ Allow about 25 minutes for this section

**Section B** Pages 7–10

**57 marks – Extended Response (Core Topics)**

- ▶ Attempt Questions 21–23
- ▶ Allow about 85 minutes for this section

**Section C** Pages 11–14

**43 marks – Extended Response (Option Topics)**

- ▶ Attempt Questions 24–26
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# SECTION A

## Multiple Choice

1. Non-computer tools for displaying data continue to be used due to their:
  - A. Cost and ease of use
  - B. Flexibility and widespread availability
  - C. Accessibility and higher quality
  - D. Speed and flexibility
  
2. During optical storage of data, a laser beam burns holes into the surface of a disk. These holes are known as:
  - A. Sectors
  - B. Lands
  - C. Segments
  - D. Pits
  
3. Thin clients are an example of:
  - A. Parallel processing
  - B. Centralised processing
  - C. Distributed processing
  - D. Internet processing
  
4. What would be an example of metadata?
  - A. A search engine which uses other search engines
  - B. A data dictionary
  - C. A metalanguage such as EBNF
  - D. A storyboard describing a proposed system
  
5. A small number of users in an office are to be networked so that they can all access one database simultaneously. A computer is required to control access to this database. This computer is called a:
  - A. File server
  - B. Client server
  - C. Print server
  - D. Proxy server

6. The following seven-bit ASCII character and parity bit were transmitted as:

ASCII character	Parity bit
1011010	0

They were received as:

ASCII character	Parity bit
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Which statement reflects this situation?

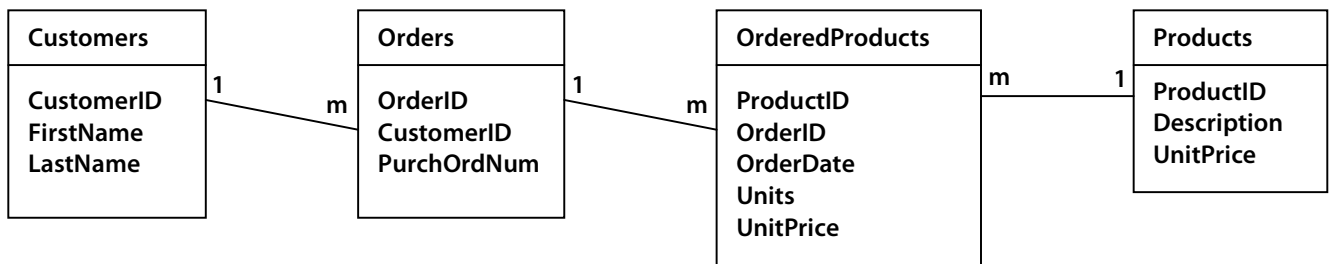
- A. The protocol is using odd parity and would be interpreted by the receiver as correct
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7. In developing an information system last year, the Australian Taxation Office used data collected by the Electoral Commissioner. This data included name, address, gender and birth date. The Solicitor-General intervened during the development of the project to prevent this information from being used.

What issue was the Solicitor-General concerned about in this situation?

- A. Acknowledgement of data sources
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  - C. Privacy principles
  - D. Reliability of data sources
8. Which of the following is the most structured situation?
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9. Inputs into disaster relief decision support systems include:
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  - C. Cooperation between relief agencies and certifying medical staff
  - D. Determining the extent of the disaster and identifying available resources

10. Choose which statements are always correct:
- I. Intelligent systems simulate the structure of the human brain
  - II. Expert systems reproduce a person's specialised knowledge in a particular area
- A. I only
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11. Which list shows transmission media from the slowest to the fastest?
- A. Twisted-pair, coaxial cable, fibre-optic cable
  - B. Coaxial cable, twisted-pair, fibre-optic cable
  - C. Fibre-optic cable, twisted-pair, coaxial cable
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12. Which of the following is NOT a characteristic of a data warehouse?
- A. Contents are usually subject-oriented
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  - C. Contents are usually historical and static
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Refer to the following database schema when answering questions 13-16.



13. What type of relationship exists between Orders and Products?
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14. In the OrderedProducts table, which field will contain redundant data?
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15. Consider the following SQL statement.

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SELECT Customers.FirstName, Customers.LastName  
FROM Customers, Orders  
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Which of the following best describes the rows returned by the above SQL?

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16. A new customer's first order is for 3 Hallows and 5 Rings. Assuming these items already exist in the Products table, within all other tables how many new records will be created?
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17. When using EFTPOS, the cardholder enters their PIN. What is the purpose of the PIN?
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19. Which of the following only lists ADVANTAGES of expert systems?
- A. Consistency, intuition, memory
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  - C. Persistence, consistency, creativity
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20. Which of the following strategies would be most helpful in an unstructured situation?
- A. Satisficing
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  - D. Algorithms

## SECTION B

Extended Answer: Core Topics

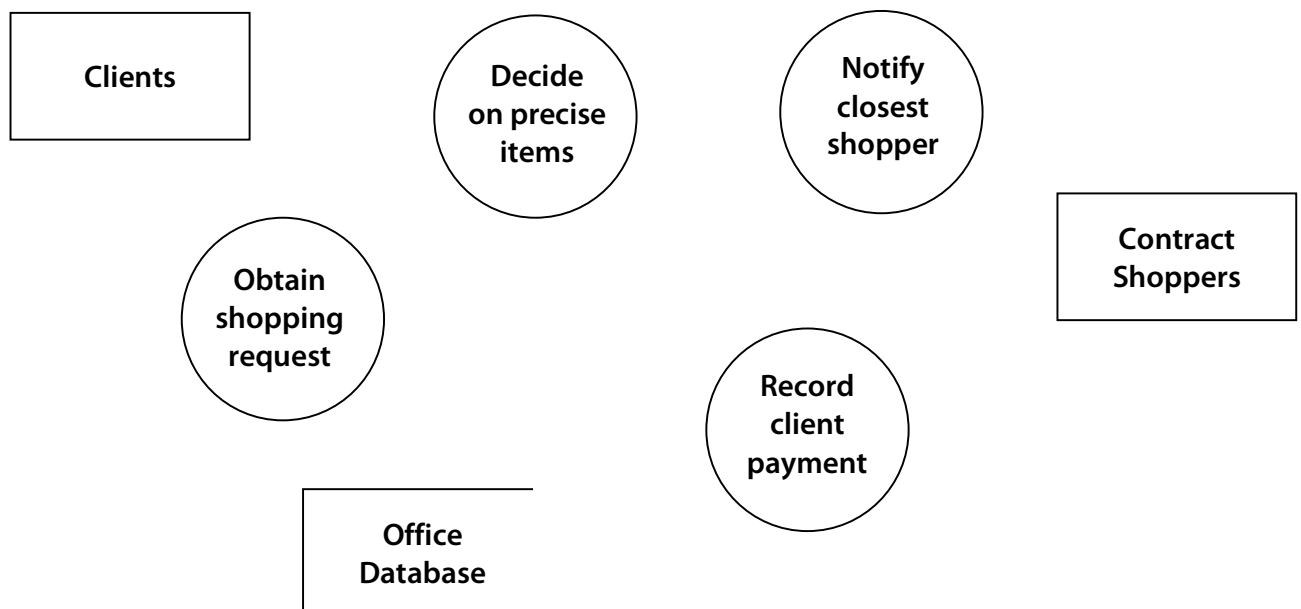
### QUESTION 21

[10 marks]

Florence has come up with a new shopping concept that she intends to develop into a business. Her concept is as follows:

- ▶ Clients request items they wish to purchase: their requests might be highly structured, such as a detailed list of specific grocery items, or unstructured, such as “a gift suitable for a young boy”. Each request, together with a delivery address, is made over the phone or by email.
- ▶ At the office, Florence and her team decide on the precise items to be purchased (if necessary). The list of items, together with the delivery address, is forwarded to a team of contract shoppers.
- ▶ The contract shoppers are employed by Florence. Each one receives SMS messages indicating the items they must purchase, together with the delivery address. They make the purchase, immediately deliver the goods and obtain payment from the client. A simple SMS is sent back to the office to confirm each delivery and that payment has been completed.
- ▶ At least one contract shopper is located within every major shopping centre. Each client request is assigned to the contract shopper closest to the client’s address. The aim is to deliver goods as soon as possible.

The following incomplete dataflow diagram is an attempt to describe the proposed information system required within the office:



- a. Copy the diagram above onto your paper, and complete it by adding labelled dataflows. [4]

- b. Copy the data dictionary below onto your paper, and complete it by including each item from every dataflow on your completed dataflow diagram. **[3]**

<b>Dataflow</b>	<b>Data type</b>	<b>Description of purpose</b>
<b>(add as many rows as are required)</b>		

- c. Construct a context diagram based on your completed dataflow diagram. **[3]**

**QUESTION 22**

**[28 marks]**

- a. Network administrators are able to assign different file access rights to different users. Identify **THREE** different levels of file access rights that can be assigned, and provide an example of where each type of access would be appropriate. **[4]**
- b. Data validation and data verification are related but distinct processes. Compare and contrast the ways these would take place for a customer attempting to order and pay for a product online that is to be delivered to their home. **[4]**
- c. In a database, the data dictionary specifically defines the data type for every field.
- i. Explain why there is more than one kind of numerical data type. **[1]**
  - ii. Identify **THREE** of these types, and provide an example of where each would be uniquely suitable. **[3]**
- d. A council library maintains a large database of its books and its borrowers, with several tables and relationships.
- i. Explain why all the three kinds of database relationships are needed in the database, and give an example of each. **[4]**



- ii. Identify the most suitable type of key for a table called “Borrowers”, justifying your response. [2]
- e. Identify and describe TWO specific examples of multimedia software/hardware platforms that incorporate touch-sensitivity. Explain why the combination of collecting and displaying into a single device is such a compelling user experience. [4]
- f. Contrast the manner in which the information processes operate differently within a client-server environment, as opposed to a network where the nodes function independently of each other. [3]
- g. Describe the procedure executed by nodes using the CSMA/CD protocol when there is the simultaneous transmission of data from multiple nodes. [3]

### QUESTION 23

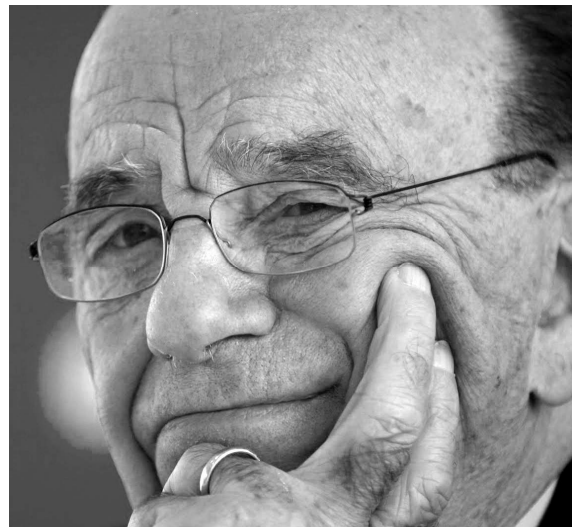
[19 marks]

## Phone hacking scandal centres on News of the World<sup>1</sup>

**A malpractice that reached far broader than anyone ever realised, now revealed to be an industry practice that seems to know no moral boundaries.**

*By Richard Gadsden  
July 6, 2011*

Mobile phones have voicemail. You can access the voicemail from any other phone by dialling the call centre and putting in the phone number of the mailbox you want and the PIN. Unless the user has positively selected a PIN when they set up the phone, the PIN defaults to 0000 or 1111, depending on the network. Most people only ever call their voicemail from their own phone, and a PIN is unnecessary to get in from their own phone, so they never discover that the PIN even exists.



**Rupert Murdoch and News Corp have been engulfed in controversy.** Photograph provided by Rex Features press agency

A Private Investigator, called Glenn Mulcaire, discovered that he could listen to the voicemails left for well-known people by calling into the call centre and putting in the right PIN. He started selling the recordings he took of the voicemails to the News of the World, a UK tabloid newspaper, owned by News International (the UK subsidiary of News Corp, which is the Murdoch media empire, including Fox in the US).

This originally came out in 2006, when it was found that he'd gained access to the voicemails of members of the Royal family; there was a police investigation at the time, Mulcaire and Clive Goodman (royal editor of the

<sup>1</sup> Reproduced by permission from Richard Gadsden, UK

News of the World at the time) were arrested and served time in prison. The editor at the time, Andy Coulson, was sacked.

In 2009, the Guardian newspaper discovered that the police had ignored evidence collected from Mulcaire that lots of other people had been "phone-hacked", and had not informed hundreds of other victims (including senior politicians and journalists at other newspapers). There was a Select Committee enquiry, and a number of out-of-court settlements between NoW and alleged phone-hacking victims. The story continued in 2010 when [the actress] Sienna Miller refused any out-of-court settlement with a confidentiality clause and insisted on extensive discovery in the courts.

On Monday, the Guardian published a heartbreaking update on the scandal. It was revealed that in 2002, Mulcaire had hacked into the voicemail of a missing 13-year-old girl named Milly Dowler, who had been, it was later discovered, murdered by a man named Levi Bellfield. Bellfield was convicted and sentenced to life last month for murdering Milly.

While she was missing, Milly's friends and parents called and left messages imploring her to get in touch with them. News of the World was listening and recording their every private word.

But the journalists at the News of the World then encountered a problem. Milly's voicemail box filled up and would accept no more messages. Apparently thirsty for more information from more voicemails, the paper intervened – and deleted the messages that had been left in the first few days after her disappearance. According to one source, this had a devastating effect: when her friends and family called again and discovered that her voicemail had been cleared, they concluded that this must have been done by Milly herself and, therefore, that she must still be alive. But she was not. The interference created false hope and extra agony for those who were misled by it.

The Dowler family then granted an exclusive interview to the News of the World in which they talked about their hope, quite unaware that it had been falsely kindled by the newspaper's own intervention.

This has now broken the story from the media pages onto the front pages of the newspapers, and much higher up the public consciousness. In rapid succession, a number of other high-profile victims of crime have been found in the Mulcaire files: the victims of the Soham murders (a pair of young abducted girls) and some of the 2005 London bombing victims too.

- 
- a. Explain how both databases and communications systems were related to the scandal. **[4]**
  
  - b. Describe the social and ethical issues raised by the article. **[5]**
  
  - c. Identify the groups of people who share responsibility for this abuse of technology, justifying your response. **[6]**
  
  - d. Propose strategies to prevent similar misuses from occurring in the future. **[4]**

## SECTION C

Extended Answer: Option Topics

### QUESTION 24

[16 marks]

## Google tracks flu outbreaks<sup>2</sup>

**Google is putting the power of the web to work in tracking the onset of influenza in the United States, tracking patterns in search queries to determine the spread of the disease.**

*Published by Agence France-Presse  
November 12, 2008*

Google Flu Trends, a new tool unveiled by the Internet giant on Tuesday, counts the number of flu-related queries on the Google search engine and provides estimates on influenza outbreaks in the 50 US states.

"We found that there's a very close relationship between the frequency of these search queries and the number of people who are experiencing flu-like symptoms each week," Google said in a posting on its official blog.

"If we tally each day's flu-related search queries, we can estimate how many people have a flu-like illness."

Google said it had shared its results with the Atlanta-based US Centers for Disease Control and Prevention (CDC), which does its own flu tracking.

"It turns out that traditional flu surveillance systems take 1-2 weeks to collect and release surveillance data, but Google search queries can be automatically counted very quickly," Google said.

"Together (with the CDC) we saw that our search-based flu estimates had a consistently strong correlation with real CDC surveillance data," it said.

The company cautioned that Google Flu Trends, which can be seen online at [google.org/flutrends](http://google.org/flutrends), is "still very experimental," but said it could possibly be a useful tool in prevent the spread of other diseases.

"By making our flu estimates available each day, Google Flu Trends may provide an early-warning system for outbreaks of influenza," the Mountain View, California-based company said.

"For epidemiologists, this is an exciting development, because early detection of a disease outbreak can reduce the number of people affected," Google said.

"Our up-to-date influenza estimates may enable public health officials and health professionals to better respond to seasonal epidemics and -- though we hope never to find out -- pandemics," it added.



**Influenza is responsible for some 500,000 deaths around the world each year.** Photograph provided by AFP

<sup>2</sup> Reproduced by permission from [http://afp.google.com/article/ALeqM5gwUrBvAxsfTEEcGdr7d\\_PWbbBB8Q](http://afp.google.com/article/ALeqM5gwUrBvAxsfTEEcGdr7d_PWbbBB8Q)

- a. Classify Google Flu Trends according to the type of decision support system that it represents, justifying your response. [2]
- b. Identify the degree of structure in the given situation, and explain the way in which this affects how the decision support system functions. [3]
- c. Contrast between the methods used by CDC and Google to conduct flu surveillance, with reference to the specific information systems used by each organisation. [4]
- d. Explain, with regard to the relevant information processes, how Google evaluated the effectiveness of the new service as a decision support system. [3]
- e. Discuss the ways in which similar search engine patterns could be applied to other situations related to trend prediction. [4]

**QUESTION 25**

**[19 marks]**

## Now amateurs can cash in on YouTube<sup>3</sup>

**YouTube hopes to convert more amateur videographers into capitalists as it strives to show more advertising on its website and reverse years of uninterrupted losses.**

*Published by Associated Press  
August 26, 2009*

The Internet's top video channel will try to widen participation in a 20-month-old advertising program by actively recruiting the makers of widely watched clips. "Now, when you upload a video to YouTube that accumulates lots of views, we may invite you to monetise that video and start earning revenue from it," said YouTube product manager Shenaz Zack.

YouTube said a user whose video is eligible would receive an email and an "Enable Revenue Sharing" message would appear next to the video. "Once you've chosen to enable revenue sharing, YouTube will sell advertising against your video and pay you a revenue share," YouTube said.



**48 hours of video are now uploaded by YouTube users every minute – and that figure continues to rise.** Image provided courtesy of YouTube

<sup>3</sup> Reproduced by permission from <http://www.smh.com.au/technology/technology-news/now-amateurs-can-cash-in-on-youtube-20090826-eyn9.html>

Google won't specify how much it pays each of its ad partners, though it typically ranges anywhere from 70 percent to 90 percent of the revenue. Individual video partnerships would only be available in the United States for now but that it hopes to extend the program internationally soon.

YouTube expects the solicitations to boost the number of advertising partners from the thousands to the tens of thousands, said Tom Pickett, the video site's director of online sales and operations. This more aggressive approach is a switch from YouTube's previous practice of waiting for video makers to apply to the ad program. That strategy hasn't been profitable for YouTube so far — something that the site's owner, Google, wants to change.

After buying YouTube for \$US1.76 billion in late 2006, Google initially focused on luring more people to the video site. As the recession squeezed Google, the emphasis this year shifted to making money, prompting YouTube to explore new ways to show ads alongside more of the millions of clips clicked on its site each day.

YouTube won't allow advertising without the consent of a video maker, largely to avoid legal fights over who has the right to profit from the work but it probably won't require much arm twisting, given that the video owners get most of the revenue from the ads accompanying their clips.

- 
- a. Compare and contrast between media consumption through YouTube and digital television (such as Freeview), from the consumer's point of view. **[5]**
  
  - b. Outline the technologies that have enabled YouTube to become a viable alternative for viewing media, rivalling well-established non-computer-based multimedia systems. **[5]**
  
  - c. Explain, with concrete examples, how the use of YouTube places additional demands on hardware related to specific information processes. **[4]**
  
  - d. Describe the social and ethical issues raised by the article. **[5]**

**QUESTION 26****[8 marks]**

A company wants to develop a more systematic approach to hiring its employees. The approach will have two stages.

Stage 1

This stage consists of a decision support system (DSS). The DSS takes data supplied by a job applicant, and produces a score. The higher the score, the more suitable is the applicant.

The DSS is being developed as a spreadsheet. Only two factors are being considered in the spreadsheet. One factor is 'travelling time'. If an applicant can travel to work within a specified time, the applicant scores 10 points, otherwise they score 0 points. The specified time should be given as data in the spreadsheet, and can be changed according to future circumstances.

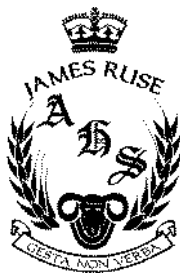
The other factor is 'experience'. Applicants score points depending on the number of years they have worked. The number of years is divided into three bands. The bands are not specified, but should be given as data in the spreadsheet. For example, the lower band might be 1–4 years of experience (scoring 10 points), the middle band might be 5–9 years of experience (scoring 20 points), and the third band might be 10 or more years of experience (scoring 50 points).

Stage 2

This stage of the hiring process involves the job applicant being interviewed. The interviewer takes the score calculated by the spreadsheet, and adds or subtracts points to reach a final score.

- a. Describe how an expert system could be used to perform the company's hiring process. **[3]**
  
- b. Analyse the proposed hiring system, taking into account both the decision support system and the interview process to determine strengths and weaknesses. **[5]**

**END OF EXAM**



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  - A. Cost and ease of use
  - B. Flexibility and widespread availability**
  - C. Accessibility and higher quality
  - D. Speed and flexibility

Note: most common answer was A. However, non-computer tools for *displaying* data are not always used because of cost (consider the high cost of printing out Yellow/White Pages, or the cost associated with printing a book and shipping it versus transmitting an electronic version).

2. During optical storage of data, a laser beam burns holes into the surface of a disk. These holes are known as:
  - A. Sectors
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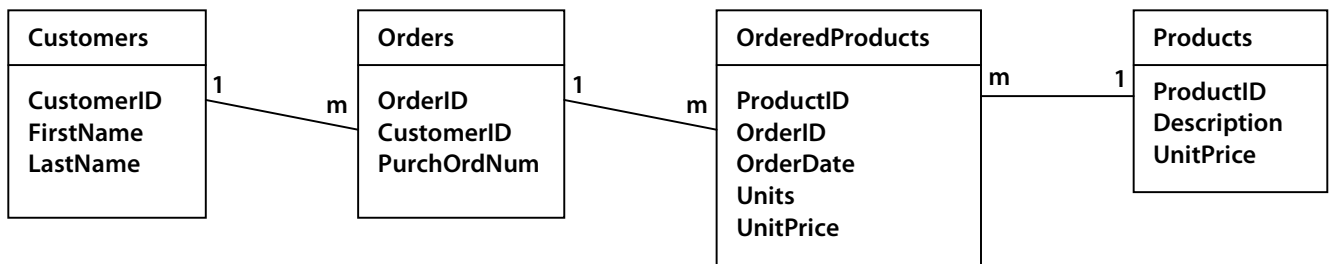
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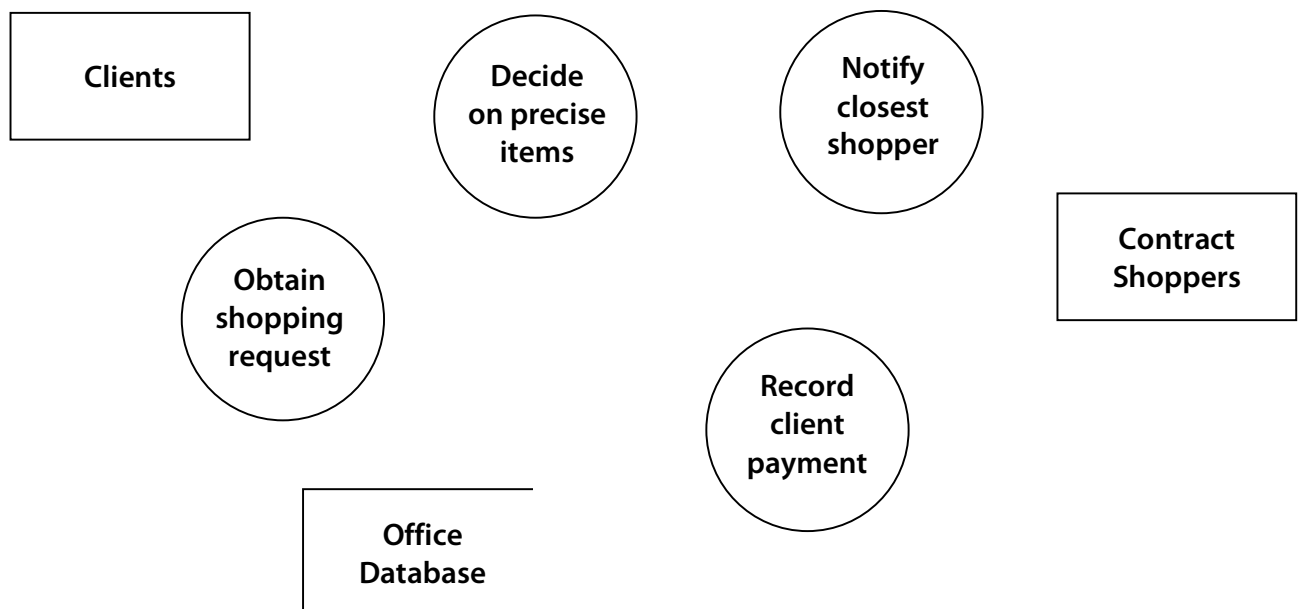
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Florence has come up with a new shopping concept that she intends to develop into a business. Her concept is as follows:

- ▶ Clients request items they wish to purchase: their requests might be highly structured, such as a detailed list of specific grocery items, or unstructured, such as “a gift suitable for a young boy”. Each request, together with a delivery address, is made over the phone or by email.
- ▶ At the office, Florence and her team decide on the precise items to be purchased (if necessary). The list of items, together with the delivery address, is forwarded to a team of contract shoppers.
- ▶ The contract shoppers are employed by Florence. Each one receives SMS messages indicating the items they must purchase, together with the delivery address. They make the purchase, immediately deliver the goods and obtain payment from the client. A simple SMS is sent back to the office to confirm each delivery and that payment has been completed.
- ▶ At least one contract shopper is located within every major shopping centre. Each client request is assigned to the contract shopper closest to the client’s address. The aim is to deliver goods as soon as possible.

The following incomplete dataflow diagram is an attempt to describe the proposed information system required within the office:

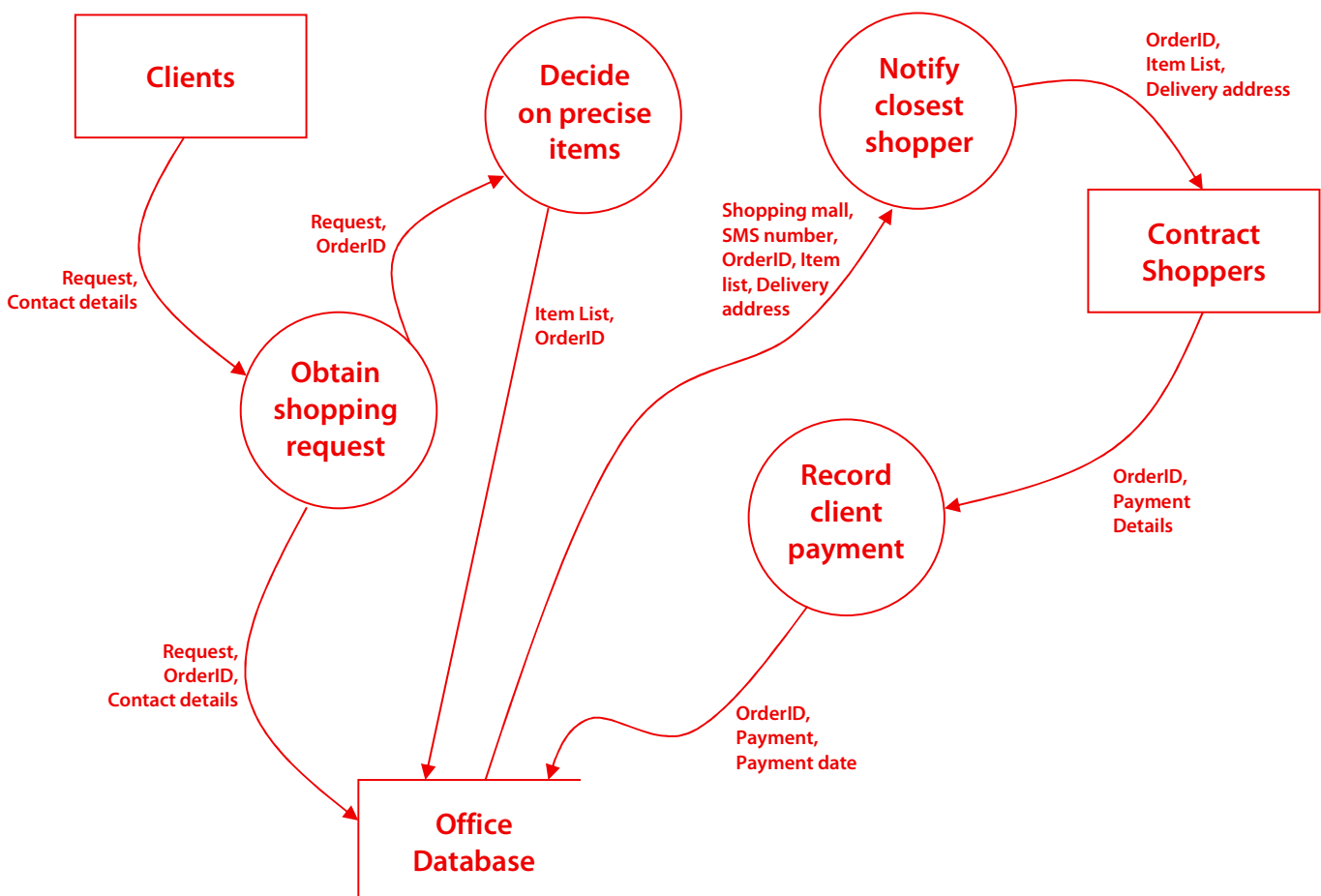


a. Copy the diagram above onto your paper, and complete it by adding labelled dataflows. [4]

Marking Criteria	Marks
ALL dataflows and labels correctly encompass the requirements outlined in the dot points of the question	4
ONE error, such as not storing the data whilst contract shoppers shop OR not storing client payments	3
TWO errors, such as not storing the data whilst contract shoppers shop AND not storing client payments	2
Solution shows some understanding of flow of data in given scenario	1

**Sample Answer**

- ▶ There are many possible logical and legitimate methods for connecting each of the entities, processes and data store.



- b. Copy the data dictionary below onto your paper, and complete it by including each item [3]  
from every dataflow on your completed dataflow diagram.

Marking Criteria	Marks
ALL dataflows from part (a) included with descriptions that coincide with the scenario. Includes at least 6 dataflows.	3
MOST dataflows from part (a) included with descriptions that coincide with the scenario. Includes at least 4 dataflows.	2
Response shows some understanding of data dictionaries and their role in describing the fields of a database.	1

### Sample Answer

- Each row should correspond to the dataflows from part (a).

Dataflow	Data type	Description of purpose
Request	Text	Structured or unstructured client request.
Contact details	Text	Client name, address and phone details.
OrderID	Number	Unique number used to identify each order within the system.
Item description	Text	A description of the item to be purchased.
Shopping mall	Text	The designated location for a contract shopper.
SMS number	Text	Contract shopper's mobile number.
Delivery address	Text	Client address for delivery.
Payment details	Text	Credit card, cheque or cash details, including the amount paid.
Payment	Currency	Amount due for remuneration.
Payment date	Date	Date that the payment was transferred.

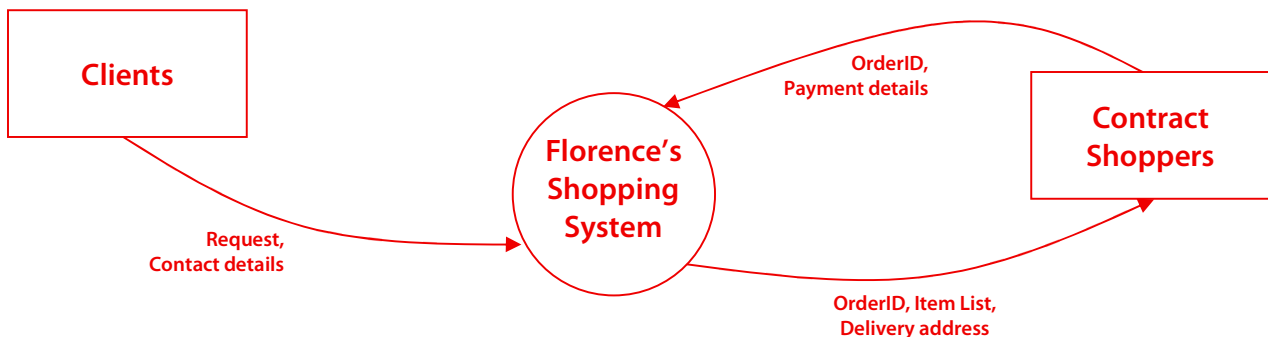
c. Construct a context diagram based on your completed dataflow diagram.

[3]

Marking Criteria	Marks
Correct context diagram that includes all external inputs and outputs.	3
Context diagram that is incomplete but accurate.	2
Response shows limited understanding of the system's context.	1

**Sample Answer**

- ▶ Labelled dataflows are optional, but helped students to demonstrate understanding.



**QUESTION 22**

[28 marks]

- a. Network administrators are able to assign different file access rights to different users. [4]  
 Identify THREE different levels of file access rights that can be assigned, and provide an example of where each type of access would be appropriate.

Marking Criteria	Marks
Demonstrates a clear understanding of file access rights by correctly providing appropriate examples of each identified level of access	2-4
Demonstrates a basic understanding of file access rights by correctly identifying three different levels of access	1

**Sample Answer**

- ▶ Full control: e.g. owner or administrator who has ability to view files made by anyone or delete any content (as well as install software); also able to adjust the permissions of others
- ▶ Modify: e.g. a newspaper editor who must have the ability to alter or update the data written by other journalists
- ▶ Write: e.g.



- ▶ **Read only:** important reference documents that can be viewed but should not be altered in any way.
- ▶ **List**
- ▶ **No access:** system files that should not be viewed or edited.

b. Data validation and data verification are related but distinct processes. Compare and contrast the ways these would take place for a customer attempting to order and pay for a product online that is to be delivered to their home. **[4]**

<b>Marking Criteria</b>	<b>Marks</b>
<p>Response demonstrates a clear understanding of a range of similarities and/or differences between data validation and verification</p> <p>Addresses a range of different aspects and provides clear explanations to show how they are the same or different</p>	4
<p>Response demonstrates an adequate understanding of the similarities and/or differences between data validation and verification</p> <p>Addresses different aspects and provides adequate explanation; better responses will address multiple aspects</p>	2-3
<p>Response demonstrates a limited understanding of the similarities and/or differences between data validation and verification</p> <p>Addresses and/or explains a small number of aspects; poorer responses may only address one aspect with no explanation</p>	1

### **Sample Answer**

- ▶ Most respondents compared and contrasted between data validation and data verification in abstract terms (i.e. according to their definitions), rather than in relation to the scenario provided in the question.
- ▶ NB. A credit card number is not necessarily 16 digits long!
- ▶ (Compare = show similarities.)
  - › Both processes aim to ensure data integrity.
  - › Data validation and verification can both occur through user interface features of the initial online form that the customer fills out, such as drop-down menus (for validation) and repeated data entry fields (for verification).
  - › For some kinds of data, both validation and verification can occur through automated processes. For instance, validation can occur through checking a postcode against a list of known postcodes, or cross-checking the postcode with the user's given suburb.
- ▶ (Contrast = show differences.)

- › Since data validation ensures that entered data is sensible or possible, an example would include checking that a plausible number of digits have been entered to represent a numerical attribute such as a credit card number or post code.
- › However, data verification ensures that entered data is accurate, which is usually impossible to carry out with a simple numerical check. For instance, to check that a customer’s address is correct, a confirmation page can display the address data previously entered by the user herself and prompt the user to check that they have entered the data they originally intended.
- › Data verification tends to require checking data against external sources (e.g. by contacting a financial institution e.g. credit card company and determining whether the credit card number and card verification code (CVC) are correct, or by prompting the user himself/herself for manual confirmation), whereas validation can often be carried out through mathematical checks (e.g. the Luhn algorithm) without involving outside intervention.

c. In a database, the data dictionary specifically defines the data type for every field.

i. Explain why there is more than one kind of numerical data type.

**[1]**

<b>Marking Criteria</b>	<b>Marks</b>
Relates different numerical data types to their intended purposes within an information system	1

**Sample Answer**

- › Several numerical data types are needed because there are many different kinds of values represented numerically that require different levels of accuracy. For instance, an item counter and a loan interest calculation are both numerical but the needs for accuracy are different. Using a numerical data type without sufficient accuracy would lead to errors in highly detailed calculations. Using high-accuracy numerical data types for fields that do not require them would result in a large amount of storage space being wasted in a database.
- › If accuracy was not specified, then response needed to refer different attributes of various numerical data types (e.g. display formats).

ii. Identify THREE of these types, and provide an example of where each would be uniquely suitable.

**[3]**

<b>Marking Criteria</b>	<b>Marks</b>
	2-3
	1

**Sample Answer**

- ▶ Boolean: binary values (e.g. on/off, true/false, yes/no)
- ▶ Date/Time
- ▶ Currency: calculating interest on monetary amounts
- ▶ Floating Point: scientific measurements on values that vary greatly in magnitude but require high degrees of accuracy
- ▶ Fixed Point: display price for items in a store
- ▶ Double
- ▶ Integer (unsigned): counting objects

- d. A council library maintains a large database of its books and its borrowers, with several tables and relationships.
- i. Explain why all the three kinds of database relationships are needed in the database, and give an example of each. **[4]**

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates strong understanding of different kinds of relationships between entities in relational databases and provides three valid examples	3-4
Demonstrates sound understanding of different kinds of relationships between entities in relational databases and provides at least one valid example	2
Demonstrates limited understanding of different kinds of relationships that are present between entities in relational databases	1

**Sample Answer**

- ▶ All three kinds of database relationships are needed due to the different kinds of entities related to a library and the variety of ways that they are linked to each other.
- ▶ Example relationships:
  - › 1/1: Borrower and borrower’s address
  - › 1/many: Borrower and titles borrowed
  - › Many/many: Authors and categories

- ii. Identify the most suitable type of key for a table called “Borrowers”, justifying your response. **[2]**

<b>Marking Criteria</b>	<b>Marks</b>
Identifies AND justifies appropriately	2
Identifies	1

**Sample Answer**

- ▶ A unique field such as a dedicated “Borrower ID” could act as a single key.
- ▶ Another practical alternative would be a composite key, as no other single field would constitute a unique identifier (multiple borrowers may have the same name, or even the same address).

- e. Identify and describe TWO specific examples of multimedia software/hardware platforms that incorporate touch-sensitivity. Explain why the combination of collecting and displaying into a single device is such a compelling user experience. **[4]**

<b>Marking Criteria</b>	<b>Marks</b>
Provides a detailed description of relevant software/hardware and strong explanation of why touch-sensitivity is an effective information technology	4
Provides a substantial description of relevant software/hardware and adequate explanation of why touch-sensitivity is an effective information technology	2-3
Provides a superficial description of relevant software/hardware and weak explanation of why touch-sensitivity is an effective information technology	1

**Sample Answer**

- ▶ Touch-sensitive information technology
  - › iPad (tablet), iPhone (smartphone)
  - › Nintendo DS, iPod Touch (multimedia / gaming platforms)
  - › Information kiosk
  - › Smartboard (interactive whiteboard)
- ▶ Compelling user experience
  - › Enables users to interact with technology and receive feedback through three senses (audio, visual, touch) instead of just two (audio, visual), and the collecting device itself responds appropriately to the user’s inputs (e.g. keys light up or increase in size as they are struck).
  - › Provides a closer imitation to non-computer-based information collecting and displaying methods (rather than separation between the two, which has only become common with the advent of computer-based systems). Users experience the computer responding directly to their actions on the keyboard, rather than mediated through other collecting devices.
  - › Simpler for users to learn and master; even the very young and the very old (e.g. in contrast to touch-typing on a QWERTY keyboard).
  - › Devices that combine both these functions into a single device are more compact and easier in principle to manipulate.
  - › Since collecting device is adaptable (e.g. adjustable keyboard), it can be adjusted to suit the particular kind of data being input.

- f. Contrast the manner in which the information processes operate differently within a client-server environment, as opposed to a network where the nodes function independently of each other. [3]

Marking Criteria	Marks
Draws out differences between information processes occurring in each of the types of networks	2-3
Demonstrates limited understanding of how nodes function within a client-server environment	1

#### Sample Answer

- ▶ Processing
- ▶ Storing and retrieving
- ▶ Transmitting and receiving

- g. Describe the procedure executed by nodes using the CSMA/CD protocol when there is the simultaneous transmission of data from multiple nodes. [3]

Marking Criteria	Marks
Demonstrates detailed understanding of how data collisions are handled by the CSMA/CD protocol	3
Demonstrates adequate understanding of how data collisions are handled by the CSMA/CD protocol	2
Demonstrates limited understanding of how data collisions are handled by the CSMA/CD protocol	1

#### Sample Answer

- ▶ Sense collision (send jamming signal)
- ▶ Start random timers
- ▶ Re-transmit data

## QUESTION 23

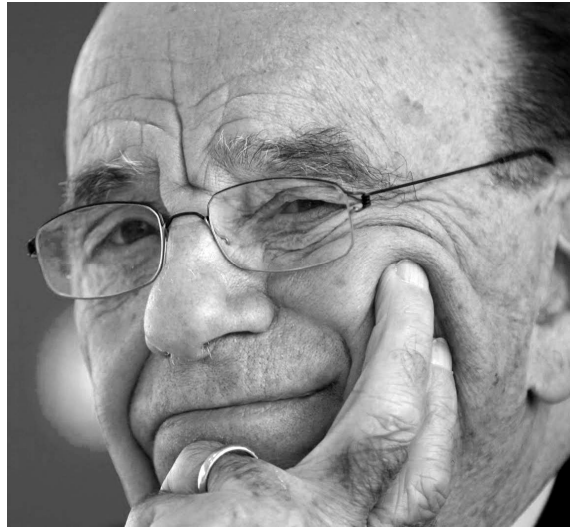
[19 marks]

## Phone hacking scandal centres on News of the World<sup>1</sup>

**A malpractice that reached far broader than anyone ever realised, now revealed to be an industry practice that seems to know no moral boundaries.**

*By Richard Gadsden  
July 6, 2011*

Mobile phones have voicemail. You can access the voicemail from any other phone by dialling the call centre and putting in the phone number of the mailbox you want and the PIN. Unless the user has positively selected a PIN when they set up the phone, the PIN defaults to 0000 or 1111, depending on the network. Most people only ever call their voicemail from their own phone, and a PIN is unnecessary to get in from their own phone, so they never discover that the PIN even exists.



**Rupert Murdoch and News Corp have been engulfed in controversy.** Photograph provided by Rex Features press agency

A Private Investigator, called Glenn Mulcaire, discovered that he could listen to the voicemails left for well-known people by calling into the call centre and putting in the right PIN. He started selling the recordings he took of the voicemails to the News of the World, a UK tabloid newspaper, owned by News International (the UK subsidiary of News Corp, which is the Murdoch media empire, including Fox in the US).

This originally came out in 2006, when it was found that he'd gained access to the voicemails of members of the Royal family; there was a police investigation at the time, Mulcaire and Clive Goodman (royal editor of the News of the World at the time) were arrested and served time in prison. The editor at the time, Andy Coulson, was sacked.

In 2009, the Guardian newspaper discovered that the police had ignored evidence collected from Mulcaire that lots of other people had been "phone-hacked", and had not informed hundreds of other victims (including senior politicians and journalists at other newspapers). There was a Select Committee enquiry, and a number of out-of-court settlements between NoW and alleged phone-hacking victims. The story continued in 2010 when [the actress] Sienna Miller refused any out-of-court settlement with a confidentiality clause and insisted on extensive discovery in the courts.

On Monday, the Guardian published a heartbreaking update on the scandal. It was revealed that in 2002, Mulcaire had hacked into the voicemail of a missing 13-year-old girl named Milly Dowler, who had been, it was later discovered, murdered by a man named Levi Bellfield. Bellfield was convicted and sentenced to life last month for murdering Milly.

While she was missing, Milly's friends and parents called and left messages imploring her to get in touch with them. News of the World was listening and recording their every private word.

But the journalists at the News of the World then encountered a problem. Milly's voicemail box filled up and would accept no more messages. Apparently thirsty for more information from more voicemails, the paper intervened – and deleted the messages that had been left in the first few days after her disappearance. According to one source, this had a devastating effect: when her friends and family called again and

<sup>1</sup> Reproduced by permission from Richard Gadsden, UK

discovered that her voicemail had been cleared, they concluded that this must have been done by Milly herself and, therefore, that she must still be alive. But she was not. The interference created false hope and extra agony for those who were misled by it.

The Dowler family then granted an exclusive interview to the News of the World in which they talked about their hope, quite unaware that it had been falsely kindled by the newspaper's own intervention.

This has now broken the story from the media pages onto the front pages of the newspapers, and much higher up the public consciousness. In rapid succession, a number of other high-profile victims of crime have been found in the Mulcaire files: the victims of the Soham murders (a pair of young abducted girls) and some of the 2005 London bombing victims too.

- a. Explain how both databases and communications systems were related to the scandal. **[4]**

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates strong understanding of both databases AND communications systems in the context of the scandal and provides concrete explanation with specific reference to the article	4
Demonstrates strong understanding of both databases AND communications systems in the context of the scandal and provides limited explanation	
Demonstrates sound understanding of both databases AND communications systems in the context of the scandal	2
Demonstrates limited understanding of either databases OR communications systems in the context of the scandal	1

### **Sample Answer**

- ▶ **Databases**
  - › Voicemails were stored in a database with inadequate security measures, allowing for unauthorised access and alteration of stored data
  - › The transfer of data out of the original database and its subsequent copying into a database owned by a private investigator enabled the sale of the illegally-procured data to media outlets
  - › The seizing of electronic databases has been an integral part of the subsequent investigation carried out by state authorities in their official enquiries
- ▶ **Communications systems**
  - › Sensitive information was accessed remotely through electronic communication systems that allowed relatively easy impersonation of authorised users
  - › The compromised data itself was created through the use of a communication system (i.e. mobile phone voicemail)

**[5]**

b. Describe the social and ethical issues raised by the article.

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates strong understanding of the social and ethical issues related to the phone hacking scandal by referring to 4-5 specific issues	4-5
Demonstrates sound understanding of the social and ethical issues related to the phone hacking scandal by referring to 2-3 specific issues	2-3
Demonstrates limited understanding of the social and ethical issues related to the phone hacking scandal	1

### **Sample Answer**

- ▶ Privacy
- ▶ Data ownership
- ▶ Data security
- ▶ Copyright
- ▶ Changing nature of work
- ▶ Appropriate use of data

c. Identify the groups of people who share responsibility for this abuse of technology, **[6]** justifying your response.

<b>Marking Criteria</b>	<b>Marks</b>
Identifies ALL relevant groups and provides strong justification for each group's involvement in the situation	6
Identifies multiple relevant groups and provides some justification for each group's involvement in the situation	2-5
Identifies 1 group responsible	1

### **Sample Answer**

- ▶ Glenn Mulcaire (directly abused the technology)
- ▶ Editors of News of the World (paid for and therefore endorsed the theft and manipulation of personal data)
- ▶ Telecommunications companies (implemented inadequate security measures that were easily undermined)
- ▶ Police (ignored evidence of prior hacking incidences)
- ▶ Voicemail account holders (failed to safeguard access to their own voicemail)



d. Propose strategies to prevent similar misuses from occurring in the future.

[4]

Marking Criteria	Marks
Proposes multiple strategies	2-4
Proposes 1 strategy	1

### Sample Answer

- ▶ Specify a PIN for accessing voicemail
- ▶ Routinely change the PIN
- ▶ Only disclose your phone number to trusted persons
- ▶ Routinely empty voicemail
- ▶ Telecommunications company
  - › Assign random PIN rather than standard PIN
  - › Force a voicemail PIN to be defined before enabling calls to be sent or received on a phone number
  - › Restrict numbers that can access voicemail
  - › Implement voice recognition to authenticate users
  - › Monitoring access to voicemail (and identifying suspicious access trends, e.g. repeated viewings at unusual times) and remotely locking down accounts suspected of being hacked
  - › Forcing PINs to be changed periodically

## SECTION C

Extended Answer: Option Topics

### QUESTION 24

[16 marks]

## Google tracks flu outbreaks<sup>2</sup>

**Google is putting the power of the web to work in tracking the onset of influenza in the United States, tracking patterns in search queries to determine the spread of the disease.**

*Published by Agence France-Presse  
November 12, 2008*

Google Flu Trends, a new tool unveiled by the Internet giant on Tuesday, counts the number of flu-related queries on the Google search engine and provides estimates on influenza outbreaks in the 50 US states.

"We found that there's a very close relationship between the frequency of these search queries and the number of people who are experiencing flu-like symptoms each week," Google said in a posting on its official blog.

"If we tally each day's flu-related search queries, we can estimate how many people have a flu-like illness."

Google said it had shared its results with the Atlanta-based US Centers for Disease Control and Prevention (CDC), which does its own flu tracking.

"It turns out that traditional flu surveillance systems take 1-2 weeks to collect and release surveillance data, but Google search queries can be automatically counted very quickly," Google said.

"Together (with the CDC) we saw that our search-based flu estimates had a consistently strong correlation with real CDC surveillance data," it said.

The company cautioned that Google Flu Trends, which can be seen online at [google.org/flutrends](http://google.org/flutrends), is "still very experimental," but said it could possibly be a useful tool in prevent the spread of other diseases.

"By making our flu estimates available each day, Google Flu Trends may provide an early-warning system for outbreaks of influenza," the Mountain View, California-based company said.

"For epidemiologists, this is an exciting development, because early detection of a disease outbreak can reduce the number of people affected," Google said.

"Our up-to-date influenza estimates may enable public health officials and health professionals to better respond to seasonal epidemics and -- though we hope never to find out -- pandemics," it added.



**Influenza is responsible for some 500,000 deaths around the world each year.** Photograph provided by AFP

<sup>2</sup> Reproduced by permission from [http://afp.google.com/article/ALeqM5gwUrBvAxsfTEEcGdr7d\\_PWbbBB8Q](http://afp.google.com/article/ALeqM5gwUrBvAxsfTEEcGdr7d_PWbbBB8Q)

- a. Classify Google Flu Trends according to the type of decision support system that it represents, justifying your response. **[2]**

<b>Marking Criteria</b>	<b>Marks</b>
Correctly identifies DSS as relational database and provides strong justification	2
Correctly identifies DSS as relational database and provides weak justification OR Identifies DSS as spreadsheet or expert system and provides strong justification	1

**Sample Answer**

- ▶ Best response: relational database
- ▶ Adequate response (with justification): spreadsheet or expert system
- ▶ Invalid response: artificial neural network

- b. Identify the degree of structure in the given situation, and explain the way in which this affects how the decision support system functions. **[3]**

<b>Marking Criteria</b>	<b>Marks</b>
Correctly identifies degree of structure and relates semi-structured nature of situation to the functions of the DSS	2-3
Demonstrates limited understanding of situation structure	1

**Sample Answer**

- ▶ Best response: semi-structured (results in a degree of uncertainty when compared to a fully structured situation)
- ▶ Adequate response: fully structured (Google's tabulation of data is a relatively straightforward mathematical process)
- ▶ Invalid response: unstructured (stated data inputs, while unpredictable, are well-defined and comprehensively known)

- c. Contrast between the methods used by CDC and Google to conduct flu surveillance, with reference to the specific information systems used by each organisation. [4]

Marking Criteria	Marks
Demonstrates strong understanding of each organisation's distinct effort to understand flu trends by providing detailed descriptions of each organisation's methods and outlining key differences between them	3-4
Demonstrates sound understanding of each organisation's distinct effort to understand flu trends by providing adequate descriptions of each organisation's methods	2
Demonstrates limited understanding of each organisation's distinct effort to understand flu trends	1

### Sample Answer

- ▶ CDC
  - › Tabulation of actual recorded influenza symptoms through medical professionals, plotted against physical source of data (e.g. hospital, medical practice, pharmacy)
  - › Takes time for results to be recorded, transported to CDC and then entered into electronic system for analysis (data is likely not collected in digital form)
  - › Highly accurate, as recorded results are directly connected to their antecedent cause
- ▶ Google
  - › Aggregation of search queries carried out through the internet, plotted against location of IP address
  - › Takes place completely automatically on a daily basis
  - › Questionable accuracy, as recorded results may have little or nothing to do with actual influenza symptoms (e.g. students carrying out a research assignment)
  - › Will not necessarily be equally accurate in areas of lower socio-economic background (and hence less access to technology and the internet)

- d. Explain, with regard to the relevant information processes, how Google evaluated the effectiveness of the new service as a decision support system. [3]

Marking Criteria	Marks
Demonstrates strong understanding of Google's evaluation process by providing detailed description of the relevant information processes	3
Demonstrates sound understanding of Google's evaluation process by providing some description of the relevant information processes	2
Demonstrates limited understanding of Google's evaluation process	1

**Sample Answer**

- ▶ Collecting: search queries in given locations through Internet
- ▶ Organising: in a format that was comparable to CDC's records
- ▶ S&R or T&R: attained CDC's electronic records of historical flu trends
- ▶ Analysing: comparison between particular search queries and known flu symptoms in given time period (or with seasonal fluctuations where historical flu records are not available)
- ▶ NB. Processing and Displaying are NOT related to Google's evaluation of the service

- e. Discuss the ways in which similar search engine patterns could be applied to other situations related to trend prediction. **[4]**

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates strong understanding of trend prediction within a DSS by referring in detail to specific examples of search engine patterns being used in concrete situations	4
Demonstrates sound understanding of trend prediction within a DSS by referring to specific examples of search engine patterns being used in concrete situations	2-3
Demonstrates limited understanding of trend prediction within a DSS	1

**Sample Answer**

- ▶ Positives/Neutral
  - › Predicting popular clothes, eating habits, people or events (e.g. Google Zeitgeist) – useful for retail or wholesale stores to update stock levels on items or tickets
  - › Advertisers can determine significant sources or destinations of traffic and tailor their placement of advertisements to maximise relevance
  - › Popular issues could be determined and presented to politicians who could devote more time and energy to matters that the population are interested in
  - › Potential terrorist activity could be identified by tagging searches related to construction of bombs, acquiring firearms, or planning attacks
- ▶ Negatives
  - › If data is not anonymous, it could be used as part of a data mining strategy to invade privacy and target users with unsolicited marketing campaigns

## QUESTION 25

[19 marks]

## Now amateurs can cash in on YouTube<sup>3</sup>

**YouTube hopes to convert more amateur videographers into capitalists as it strives to show more advertising on its website and reverse years of uninterrupted losses.**



*Published by Associated Press  
August 26, 2009*

The Internet's top video channel will try to widen participation in a 20-month-old advertising program by actively recruiting the makers of widely watched clips. "Now, when you upload a video to YouTube that accumulates lots of views, we may invite you to monetise that video and start earning revenue from it," said YouTube product manager Shenaz Zack.

YouTube said a user whose video is eligible would receive an email and an "Enable Revenue Sharing" message would appear next to the video. "Once you've chosen to enable revenue sharing, YouTube will sell advertising against your video and pay you a revenue share," YouTube said.

Google won't specify how much it pays each of its ad partners, though it typically ranges anywhere from 70 percent to 90 percent of the revenue. Individual video partnerships would only be available in the United States for now but that it hopes to extend the program internationally soon.

YouTube expects the solicitations to boost the number of advertising partners from the thousands to the tens of thousands, said Tom Pickett, the video site's director of online sales and operations. This more aggressive approach is a switch from YouTube's previous practice of waiting for video makers to apply to the ad program. That strategy hasn't been profitable for YouTube so far — something that the site's owner, Google, wants to change.

After buying YouTube for \$US1.76 billion in late 2006, Google initially focused on luring more people to the video site. As the recession squeezed Google, the emphasis this year shifted to making money, prompting YouTube to explore new ways to show ads alongside more of the millions of clips clicked on its site each day.

YouTube won't allow advertising without the consent of a video maker, largely to avoid legal fights over who has the right to profit from the work but it probably won't require much arm twisting, given that the video owners get most of the revenue from the ads accompanying their clips.

**48 hours of video are now uploaded by YouTube users every minute – and that figure continues to rise.** Image provided courtesy of YouTube

<sup>3</sup> Reproduced by permission from <http://www.smh.com.au/technology/technology-news/now-amateurs-can-cash-in-on-youtube-20090826-eyn9.html>

- a. Compare and contrast between media consumption through YouTube and digital television (such as Freeview), from the consumer's point of view. [5]

Marking Criteria	Marks
Demonstrates strong understanding of similarities and differences between online and broadcast multimedia by outlining specific points of commonality or distinction in detail	4-5
Demonstrates sound understanding of similarities and differences between online and broadcast multimedia by outlining specific points of commonality or distinction	2-3
Demonstrates limited understanding of similarities and differences between online and broadcast multimedia	1

### Sample Answer

- ▶ Compare
  - › Video quality (now both offered in high definition)
  - › Content sustained by advertisements
  - › Both offer content to view without charge
- ▶ Contrast – YouTube is different in the following characteristics:
  - › Ability to adjust playback of content (i.e. pause, rewind, replay, skip)
  - › Content is accessed asynchronously through subscriptions and searching rather than what is currently being broadcast
  - › Tends to have short-format content (e.g. <10 minutes)
  - › Interactivity (e.g. commenting, video responses) and linking to related content (both within the video itself and through sidebar links)
  - › Requires broadband internet connection
  - › Accessible across mobile devices
  - › Currently live content is unusual –only broadcast for one-off special events by specific arrangement (e.g. royal wedding)
  - › Available worldwide, not just nationwide
  - › Flagging of mature content by community, requiring authentication
  - › Content varies in quality far more broadly (much created by amateurs)

- b. Outline the technologies that have enabled YouTube to become a viable alternative for viewing media, rivalling well-established non-computer-based multimedia systems. [5]

Marking Criteria	Marks
Demonstrates strong understanding of online video-streaming services and the technology devices and infrastructure that supports them by referring to specific examples of technologies that allow them to compete with pre-existing multimedia consumption platforms	4-5
Demonstrates sound understanding of online video-streaming services and the technology devices and infrastructure that supports them by describing some examples of related technologies	2-3
Demonstrates limited understanding of online video-streaming services and the technology devices and infrastructure that supports them	1

#### Sample Answer

- ▶ Broadband internet connections
- ▶ Mobile data connections
- ▶ Effective video compression
- ▶ Affordable, high-quality displays
- ▶ Worldwide data centres that host and mirror video content
- ▶ Social networking tools that allow embedding of YouTube content, providing an organic avenue for significant levels of web traffic and unique views

- c. Explain, with concrete examples, how the use of YouTube places additional demands on hardware related to specific information processes. [4]

Marking Criteria	Marks
Demonstrates strong understanding of current trends in multimedia hardware and their basis in the information processes by making specific reference to related examples in detail	4
Demonstrates sound understanding of current trends in multimedia hardware and their basis in the information processes by making reference to related examples	2-3
Demonstrates limited understanding of current trends in multimedia hardware and their basis in the information processes	1



**Sample Answer**

Process	How hardware has advanced in response to multimedia	The specific reason that has necessitated this hardware advance
Storing & Retrieving	Greater primary and secondary storage for cached content	Increased resolution, bit depth, sampling rate and channels
Processing	Increased computing power	Higher frame rates, data compression, vector-based animation
Transmitting & Receiving	Greater bandwidth, advance of wi-fi and mobile networks	Online and over-the-air delivery, streaming content
Displaying	Larger screens, higher pixel density, more speakers, 3D screens and glasses	Closer imitation of reality (i.e. more faithful representation of source data)

d. Describe the social and ethical issues raised by the article.

[5]

Marking Criteria	Marks
Demonstrates strong understanding of related social and ethical issues and makes detailed and specific reference to multiple issues	4-5
Demonstrates sound understanding of related social and ethical issues and makes reference to multiple issues	2-3
Demonstrates limited understanding of related social and ethical issues	1

**Sample Answer**

- ▶ Changing nature of work
- ▶ Copyright and data ownership
- ▶ Convergence of technologies
- ▶ Overwhelming quantities of data
- ▶ Ergonomics
- ▶ Data accuracy (videos claiming to be one thing, but actually containing something different)
- ▶ Virtual communities / breaking down physical and spatial barriers

**QUESTION 26****[8 marks]**

A company wants to develop a more systematic approach to hiring its employees. The approach will have two stages.

Stage 1

This stage consists of a decision support system (DSS). The DSS takes data supplied by a job applicant, and produces a score. The higher the score, the more suitable is the applicant.

The DSS is being developed as a spreadsheet. Only two factors are being considered in the spreadsheet. One factor is 'travelling time'. If an applicant can travel to work within a specified time, the applicant scores 10 points, otherwise they score 0 points. The specified time should be given as data in the spreadsheet, and can be changed according to future circumstances.

The other factor is 'experience'. Applicants score points depending on the number of years they have worked. The number of years is divided into three bands. The bands are not specified, but should be given as data in the spreadsheet. For example, the lower band might be 1–4 years of experience (scoring 10 points), the middle band might be 5–9 years of experience (scoring 20 points), and the third band might be 10 or more years of experience (scoring 50 points).

Stage 2

This stage of the hiring process involves the job applicant being interviewed. The interviewer takes the score calculated by the spreadsheet, and adds or subtracts points to reach a final score.

- a. Describe how an expert system could be used to perform the company's hiring process. **[3]**

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates sound understanding of given scenario and the functionality of an expert system by making specific reference to details in the hiring process and how they relate to specific features of a potential expert system	2-3
Demonstrates limited understanding of given scenario and the functionality of an expert system	1

**Sample Answer**

- ▶ An expert's complex understanding of the factors relevant to an effective worker could be summarised and articulated in a set of rules for an expert system's knowledge base.
- ▶ The suitability of an applicant could be judged on more nuanced terms (e.g. on their precise amount of experience rather than in three separate bands), and additional qualitative factors could be introduced to moderate the importance of the other factors present.

**[5]**

- b. Analyse the proposed hiring system, taking into account both the decision support system and the interview process to determine strengths and weaknesses.

<b>Marking Criteria</b>	<b>Marks</b>
Demonstrates strong understanding of proposed hiring system by identifying components of the system, outlining the relationship between them, and drawing out implications of the system's given features	4-5
Demonstrates sound understanding of proposed hiring system by identifying components of the system and outlining the relationship between them	2-3
Demonstrates limited understanding of proposed hiring system	1

### **Sample Answer**

The proposed hiring system is composed of two inter-related stages that combine automated and manual information processes to determine an applicant's suitability in terms of a measurable quantity. This results in several implications for how the system operates and its unique advantages/disadvantages:

- ▶ **Strengths**
  - › The first stage of the hiring process aims to make judgements based on experience and travelling distance more consistent and free of personal bias (some interviewers may see professional experience as less important than others, for instance).
  - › The automation of the first stage simplifies the resultant interview process by reducing the number of questions to be asked.
- ▶ **Weaknesses**
  - › The decision support system stage of the hiring process considers only a very small set of factors, ignoring other issues that may be relevant (e.g. apart from mere quantity of experience: Was the experience varied? Was the experience marked by success or failure? Did previous employers value the applicant or not?)
  - › Simplification of experience and travelling distance into a simple numerical value does not distinguish between applicants who score highly in one and low in the other, or vice versa.

**END OF EXAM SOLUTIONS**