



Western Australian Certificate of Education Examination, 2010

Question/Answer Booklet

COMPUTER SCIENCE

Stage 2

Please place your student identification label in this box

Student Number: In figures

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In words

Time allowed for this paper

Reading time before commencing work: ten minutes

Working time for paper: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer Booklet

Multiple-choice Answer Sheet

To be provided by the candidate

Standard items: pens, pencils, eraser, correction fluid/tape, ruler, highlighters

Special items: non-programmable calculators, MATHOMAT and/or Mathaid and/or any system flowchart template

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of exam
Section One: Multiple-choice	20	20	25	20	10
Section Two: Short answer	16	16	65	60	35
Section Three: Extended answer	4	4	90	80	55
Total					100

Instructions to candidates

- The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2010*. Sitting this examination implies that you agree to abide by these rules.
- Answer the questions according to the following instructions.

Section One: Answer all questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, do not erase or use correction fluid, and shade your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Sections Two and Three: Write answers in this Question/Answer Booklet.

- You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
- Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
 - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
 - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question(s) that you are continuing to answer at the top of the page.

Section One: Multiple-choice

10% (20 Marks)

This section has **20** questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, do not erase or use correction fluid, and shade your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 25 minutes.

1. Which of the following is not an output device in a computer system?
 - (a) monitor
 - (b) scanner
 - (c) printer
 - (d) speaker

2. 'ROM' stands for which of the following?
 - (a) Random Open Memory
 - (b) Real-time Only Memory
 - (c) Right Once Memory
 - (d) Read Only Memory

3. Which of the following types of networking medium is **not** subject to electrical interference?
 - (a) fibre optic cable
 - (b) cellular
 - (c) coaxial cable
 - (d) twisted pair cable (UTP/STP)

4. Choose the option below that matches the correct order of development of computer languages from oldest to most recent.
 - (a) machine code, high level languages, object-oriented languages, assembler
 - (b) object-oriented languages, high level languages, machine code, assembler
 - (c) machine code, assembler, high level languages, object-oriented languages
 - (d) assembler, high level languages, object-oriented languages, machine code

5. What type of software is specifically designed to allow companies to manage and schedule tasks?
 - (a) database
 - (b) spreadsheet
 - (c) project management
 - (d) accounting

See next page

6. Choose the option below that is **not** a specific feature of a network operating system.
- (a) Print queue management
 - (b) User authentication
 - (c) Internet sharing
 - (d) File sharing security
7. The preliminary investigation stage in the development of a system involves
- (a) a feasibility study.
 - (b) a Gantt chart.
 - (c) data gathering.
 - (d) a context diagram.
8. Programming and testing are elements of which phase of the Systems Development Life Cycle (SDLC)?
- (a) systems analysis
 - (b) systems design
 - (c) systems planning
 - (d) systems development
9. What type of program control structure is represented in the pseudocode below?
- ```
If X = 5 then
 Y ← X + 4
End If
```
- (a) repetition
  - (b) array
  - (c) selection
  - (d) sequence
10. The following IF statement needs to be tested in a desk check.
- ```
If (X > 12) and (X < 18) then
  Output (X)
End If
```
- The best set of test data for **x**, to adequately test this algorithm, is:
- (a) 12, 13, 15, 19, 20
 - (b) 12, 13, 14, 16, 18
 - (c) 11, 12, 15, 18, 19
 - (d) 14, 15, 16, 17, 18
11. The following number, 11001100_2 , is an example of a
- (a) decimal number.
 - (b) octal number.
 - (c) hexadecimal number.
 - (d) binary number.

12. Which one of the following is **not** the purpose of a trace table?
- (a) ensures that any logic errors in the pseudocode are located
 - (b) checks for syntax errors prior to coding
 - (c) checks that the output from the algorithm is correct
 - (d) uses test data to fully test each path in an algorithm

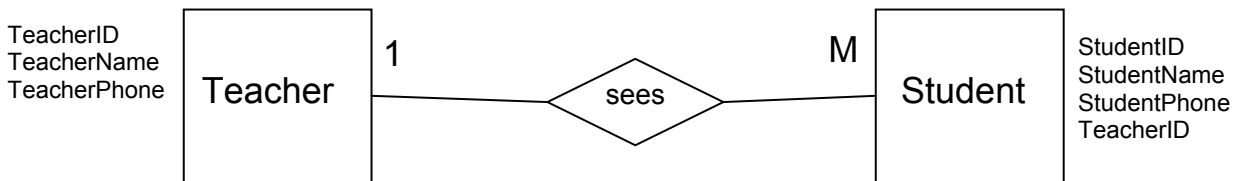
13. This is a sample record from an enrolment database.

Student ID	Subject Number	Date Commenced	Result	Fees Paid
BA78635	6542	29/02/2010	98	Y

In a data dictionary, how would each field in this table be best defined?

- (a) text, numeric, date, numeric, boolean
- (b) text, text, numeric, numeric, boolean
- (c) numeric, text, date, numeric, text
- (d) numeric, numeric, date, text, boolean

Use this Entity-Relationship diagram to answer questions 14 and 15.




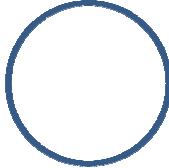


14. What would be the Foreign Key in the Student Entity?
- (a) StudentID
 - (b) StudentName
 - (c) StudentPhone
 - (d) TeacherID
15. What would be the Primary Key in the Student Entity?
- (a) StudentID
 - (b) StudentName
 - (c) StudentPhone
 - (d) TeacherID
16. Which of the following is best used to display output from a database on a printed page?
- (a) record
 - (b) report
 - (c) query
 - (d) table





17. In Australia, simply altering the background and colours of any work other than your own and then selling it without permission is illegal according to the

- (a) Copyright Act 1968.
- (b) Privacy Act 1988.
- (c) Trade Practices Act 1972.
- (d) Freedom of Information Act 1998.

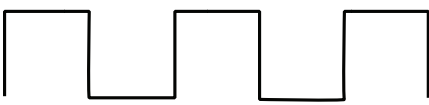
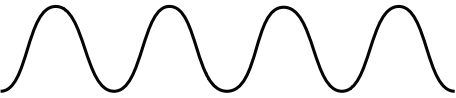


18. Which of the following symbols represents an External Entity (source/sink) in a Data Flow Diagram?

- (a) 
- (b) 
- (c) 
- (d) 

19. Network diagrams are used by designers and engineers to show the layout of a communications infrastructure. Which symbol below is often used in these diagrams to represent the internet?

- (a) 
- (b) 
- (c) 
- (d) 

20. Which of the following diagrams represents a digital transmission of data?

- (a) 
- (b) 
- (c) 
- (d) 

End of Section One

See next page

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See next page

Section Two: Short answer

35% (60 Marks)

This section has **16** questions. Answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
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Suggested working time: 65 minutes.

Question 21

(2 marks)

There are different storage mediums that are typically used for certain purposes because of their capacity and physical characteristics.

Storage medium	Approximate capacity	Physical characteristics
USB/Thumb drive	8 GB	Removable
DAT (tape)	40 GB	Removable
magnetic hard disk	250 GB	Non removable
DVD	4.7 GB	Removable

- (a) A software company would like to distribute its training manuals to its clients. From the table above, select the storage medium that would be the **most** suitable for this purpose. (1 mark)

- (b) Give **one** reason for your choice in (a). (1 mark)

Question 22

(2 marks)

The Central Processing Unit (CPU) is made up of a number of components, which include the Control Unit, the Arithmetic Logic Unit and Registers. Choose **one** of these components and describe what it does.

Name of Component: _____

Description: _____

Question 23

(2 marks)

Complete the table below using the most appropriate terms from the following list.

Spreadsheet
Word processing
Shareware
e-mail

Computer Aided Design
Defragmenter
Project management
Internet browser

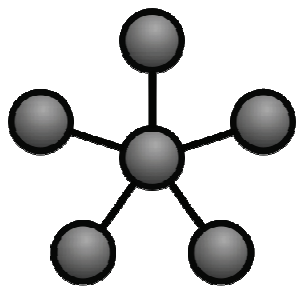
Open source software
Graphics
Presentation
Operating system

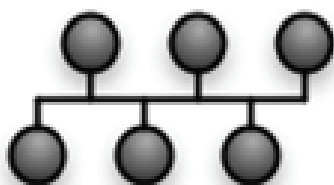
TERM	DESCRIPTION
	A set of computer programs that controls the hardware and acts as an interface with application programs.
Word processing	Allows users to create and manipulate documents containing mostly text and sometimes graphics.
	Software downloaded at no cost that requires some payment to be registered for continued use. Users are encouraged to pass the unregistered version on to their friends.
e-mail	Allows the exchange of computer-stored messages via the internet.

Question 24

(2 marks)

Most organisations will network their computers using a particular LAN topology. Name each of the **two** topologies in the spaces provided.





Question 25

(2 marks)

Using an example, explain how an intranet is different to an extranet.

Question 26

(3 marks)

Describe what happens in each of the following activities undertaken during the system development life cycle.

(a) User training (1 mark)

(b) Feasibility study (1 mark)

(c) Testing (1 mark)

Question 27

(2 marks)

Choose **two** of the types of business systems listed below. Name and briefly describe each one in the spaces provided.

Transaction processing system
Decision support system
Expert system
Groupware

(a) System type One: _____ (1 mark)

(b) System type Two: _____ (1 mark)

Question 28

(4 marks)

There are four different approaches to implementing a new computer system. In the table below, fill in the missing descriptions and names.

Name	Description
Direct	
	A conversion strategy used by larger systems with multiple sites in which each location converts at a different time.
Parallel	
	A conversion strategy in which only one location in an organisation tests the new system.

Question 29

(3 marks)

Web designers should design their sites in a way that is inclusive of people with various disabilities and people from differing cultural backgrounds.

Outline **three** design elements a web designer should include to maximise usability for a wide and inclusive audience.

(a) Element One: _____
_____ (1 mark)

(b) Element Two: _____
_____ (1 mark)

(c) Element Three: _____
_____ (1 mark)

Question 30

(4 marks)

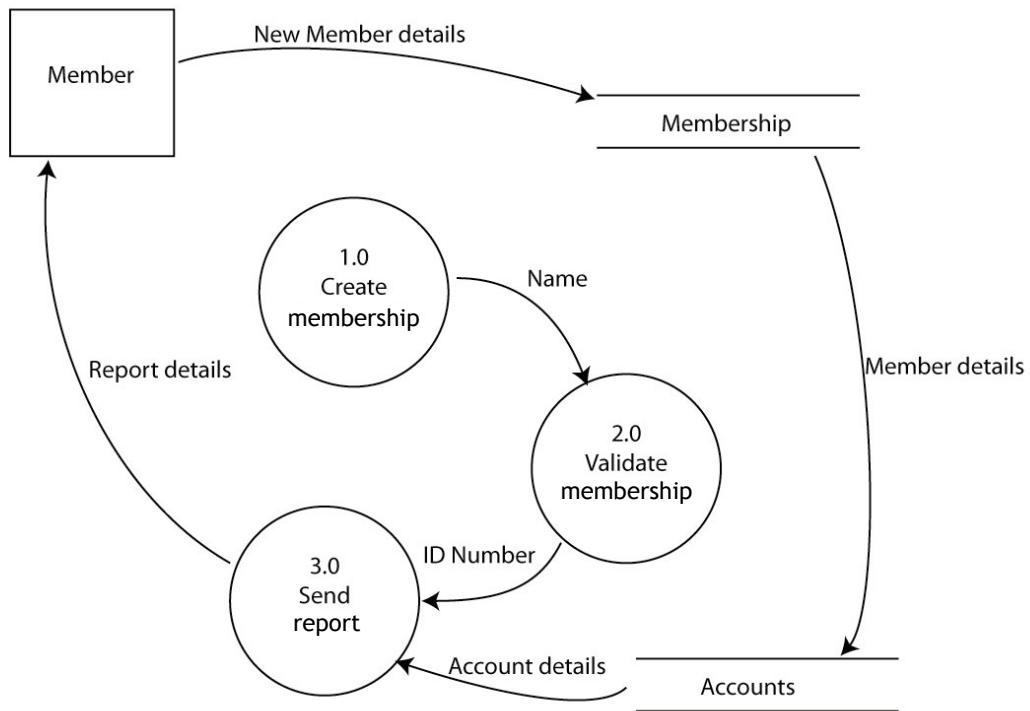
(a) Convert the decimal number 132 into its binary equivalent. Show all your workings. (2 marks)

(b) Convert the binary number 01011110 into its decimal equivalent. Show all your workings. (2 marks)

Question 31

(4 marks)

Look at the following data flow diagram. Identify **two** errors and explain why they are incorrect.



(a) First error: (2 marks)

(b) Second error: (2 marks)

Question 32

(8 marks)

EyeTones is a small music café where customers buy music credits and then log on to any of the computers in the café to browse and download music.

The café has the following equipment:

- six wireless notebook computers (for customer access)
- one inkjet printer
- one server computer with a Network operating system.

(a) The café has been told it needs the following communications equipment to complete its network. Explain the purpose of each component. (4 marks)

Router: _____

Switch: _____

Wireless access point: _____

Network Interface Card (NIC): _____

(b) Customers and Artists are two database tables needed to store data in the EyeTones system. Suggest a primary key for each. (2 marks)

Customers: _____

Artists: _____

(c) Identify **two** precautions that the owners of EyeTones café have to take with the customer data held on their systems to ensure that they do not break the law. (2 marks)

One: _____

Two: _____

Question 33

(5 marks)

A petrol station is running a competition to reward the motorist who buys the 5000th litre of unleaded petrol each day.

Read the following pseudocode and answer the following questions.

```
Determine_petrol_winner
Begin
  WinLevel ← 5000
  total ← 0
  Repeat
    Input(litres)
    total ← total + litres
  Until total >= WinLevel
  Output ('You are the winner')
End
```

- (a) Give an example of a variable used in the algorithm above. (1 mark)

- (b) How is a variable different from a constant? (1 mark)

- (c) Name the type of repetition structure (test first or test last) that the Repeat...Until loop statement represents and describe **two** of its features. (3 marks)

Type of structure: _____

Feature One: _____

Feature Two: _____

Question 34

(4 marks)

Use the enrolment data in the following table to answer the questions below.

Student No.	Subject No.	Student Name	Student Age	Subject Name
2152	351	John Jones	16	Computer Science
2152	246	John Jones	16	Chemistry
2152	879	John Jones	16	English
5498	120	Kim Koot	16	Mathematics
5498	246	Kim Koot	16	Chemistry
8795	351	May Reed	17	Computer Science
8795	879	May Reed	17	English
8795	246	May Reed	17	Chemistry
7475	120	John Clark	16	Mathematics
7475	351	John Clark	16	Computer Science
7475	879	John Clark	16	English

- (a) Update anomalies can occur in databases that are not sufficiently normalised. Using data from the table, explain the term 'update anomaly'. (2 marks)

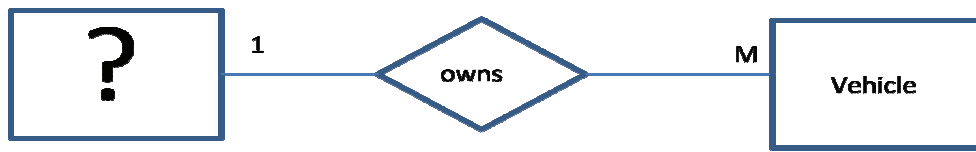
- (b) The Student Name field contains both the given names and surnames of students. Give **two** advantages of storing students names in two fields, such as GivenName and Surname. (2 marks)

One: _____

Two: _____

Question 35

(6 marks)



With reference to the Entity-Relationship diagram above for a vehicle licensing system, answer the following:

- (a) What do the '1' and the 'M' indicate in the diagram? (1 mark)

- (b) Draw the symbol that represents the relationship in the diagram. (1 mark)

- (c) What entity name could replace the large '?' in the diagram. (1 mark)

- (d) Identify the Primary key for the Vehicle entity and list **two** other possible attributes. (3 marks)

Primary key: _____

Attribute One: _____

Attribute Two: _____

Question 36

(7 marks)

(a) Explain the following database terms:

(5 marks)

Data integrity: _____

Data redundancy: _____

Normalisation: _____

Relation: _____

Record: _____

(b) A backup of a database file is stored on a tape drive. Describe how record number 482 out of 1000 records would be retrieved. (1 mark)

(c) What name is given to this file access method?

(1 mark)

End of Section Two

See next page

Section Three: Extended answer

55% (80 Marks)

This section has **(four) 4** questions. You must answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

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Suggested working time: 90 minutes.

Read the case study below as background to all the questions in this section.

Case Study

Gold Coast Sporting Club is developing a new electronic ticket transaction system to sell tickets for seats for its home games. The home ground has a normal seating capacity of 10 000 people and all tickets have the same price.

The Event Details are stored in the Events' file. This information is entered the day before the game by the Event Administrator.

Tickets are only sold at the four ticket vending machines located at the north, south, east and west gates. A spectator enters the ticket quantity required into the vending machine.

If there are enough tickets remaining, the system displays a ticket availability message PROCEED WITH PURCHASE; otherwise the system displays NOT ENOUGH TICKETS REMAIN.

The system calculates the total transaction cost. The vending machine displays the amount owed. The spectator pays for the tickets, either by cash or credit card, and the system calculates any change owed.

The data is stored in the Ticket transactions file.

Once the transaction has taken place, the system prints out the correct number of tickets and a tax receipt.

SAMPLE TAX RECEIPT

NORTH ENTRY Time of Sale 11:30:21 AM	GOLD COAST SPORTING CLUB			
	GENERAL ADMISSION			
	TAX RECEIPT			
	FOR			
	Saturday, 23 April 2011			
	Transaction	Ticket Quantity	Ticket Price	Transaction Cost
	7	2	\$16.50	\$33.00
				GST included in Sale
				\$3.00
				Amount Tendered
			\$50.00	
			Change Owed	
			\$17.00	

SAMPLE TICKET

NORTH ENTRY Time of Sale 11:30:21 AM	GOLD COAST SPORTING CLUB		
	GENERAL ADMISSION		
	SEAT TICKET		
	FOR		
	GOLD COAST vs FREMANTLE		
	Saturday, 23 April 2011		
	Valid only on the day of the game as specified above		
	Transaction	Start Time	Ticket Price
	7	2:10 PM	\$16.50

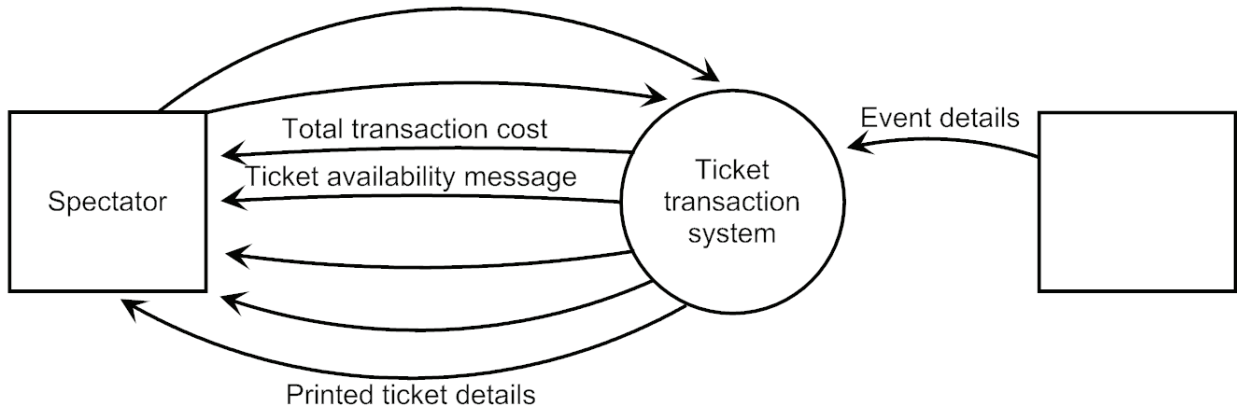
Question 37

(20 marks)

(a) Using all the terms listed below, complete the Context Diagram.

(5 marks)

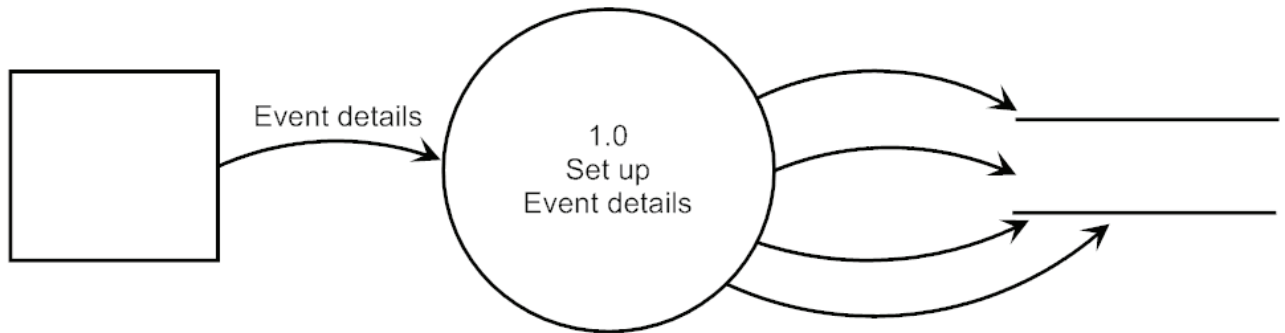
- Event administrator
- Ticket quantity
- Money owed
- Change owed
- Tax receipt



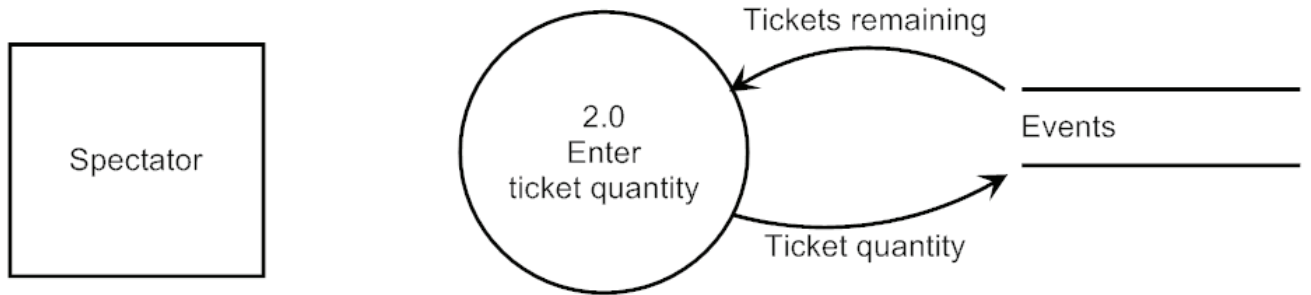
- (b) Use the case study and the data shown in the Events table below to complete the first process of a Level 0 Data Flow Diagram of the system. (6 marks)

Events Table

EventDate	EventStartTime	SeatingCapacity	TicketPrice
23 /4/2011	2:10 PM	10 000	\$16.50



- (c) Use the case study to complete the Level 0 Data Flow Diagram (DFD) below. You do not need to repeat the part in (b). (9 marks)



Question 38

(15 marks)

The design of the Ticket Transaction table as originally proposed is shown below. A larger example of these tables is repeated on page 25.

Ticket Transaction Table 38A

TransactionID	TransactionDate	TransactionTime	VendingMachineLocation	TicketQuantity	TicketPrice	TransactionCost	GSTamount	AmountTendered	ChangeAmount
1	23/04/2011	10:58:52 AM	NORTH ENTRY	2	\$16.50	\$33.00	\$3.00	\$40.00	\$7.00
2	23/04/2011	10:59:44 AM	NORTH ENTRY	2	\$16.50	\$33.00	\$3.00	\$40.00	\$7.00
3	23/04/2011	11:00:06 AM	EAST ENTRY	1	\$16.50	\$16.50	\$1.50	\$20.00	\$3.50
4	23/04/2011	11:00:22 AM	SOUTH ENTRY	8	\$16.50	\$132.00	\$12.00	\$150.00	\$18.00
5	23/04/2011	11:00:40 AM	SOUTH ENTRY	4	\$16.50	\$66.00	\$6.00	\$70.00	\$4.00
6	23/04/2011	11:00:50 AM	NORTH ENTRY	6	\$16.50	\$99.00	\$9.00	\$100.00	\$1.00

- (a) Does the structure of the Ticket Transaction table satisfy the definition of a database relation? Briefly explain your answer. (2 marks)

After further thought, the ticket price attribute has been moved into the Events table, as shown below.

Ticket Transaction Table 38B

TransactionID	TransactionDate	TransactionTime	VendingMachineLocation	TicketQuantity	TransactionCost	GSTAmount	AmountTendered	ChangeAmount
1	23/04/2011	10:58:52 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
2	23/04/2011	10:59:44 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
3	23/04/2011	11:00:06 AM	EAST ENTRY	1	\$16.50	\$1.50	\$20.00	\$3.50
4	23/04/2011	11:00:22 AM	SOUTH ENTRY	8	\$132.00	\$12.00	\$150.00	\$18.00
5	23/04/2011	11:00:40 AM	SOUTH ENTRY	4	\$66.00	\$6.00	\$70.00	\$4.00
6	23/04/2011	11:00:50 AM	NORTH ENTRY	6	\$99.00	\$9.00	\$100.00	\$1.00

Events Table 38B

EventDate	EventStartTime	SeatingCapacity	TicketPrice	TicketsRemaining	TotalTicketsSold
23/4/2011	2:10 PM	10 000	\$16.50	9977	23

- (b) How is this an improvement on the original Ticket Transaction table design? (1 mark)

- (c) What data types are best for the following fields? (2 marks)

Transaction ID: _____

Tickets remaining: _____

Tables from Question 38

Ticket Transaction Table 38A

TransactionID	TransactionDate	TransactionTime	VendingMachineLocation	TicketQuantity	TicketPrice	TransactionCost	GSTamount	AmountTendered	ChangeAmount
1	23/04/2011	10:58:52 AM	NORTH ENTRY	2	\$16.50	\$33.00	\$3.00	\$40.00	\$7.00
2	23/04/2011	10:59:44 AM	NORTH ENTRY	2	\$16.50	\$33.00	\$3.00	\$40.00	\$7.00
3	23/04/2011	11:00:06 AM	EAST ENTRY	1	\$16.50	\$16.50	\$1.50	\$20.00	\$3.50
4	23/04/2011	11:00:22 AM	SOUTH ENTRY	8	\$16.50	\$132.00	\$12.00	\$150.00	\$18.00
5	23/04/2011	11:00:40 AM	SOUTH ENTRY	4	\$16.50	\$66.00	\$6.00	\$70.00	\$4.00
6	23/04/2011	11:00:50 AM	NORTH ENTRY	6	\$16.50	\$99.00	\$9.00	\$100.00	\$1.00

Ticket Transaction Table 38B

TransactionID	TransactionDate	TransactionTime	VendingMachineLocation	TicketQuantity	TransactionCost	GSTamount	AmountTendered	ChangeAmount
1	23/04/2011	10:58:52 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
2	23/04/2011	10:59:44 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
3	23/04/2011	11:00:06 AM	EAST ENTRY	1	\$16.50	\$1.50	\$20.00	\$3.50
4	23/04/2011	11:00:22 AM	SOUTH ENTRY	8	\$132.00	\$12.00	\$150.00	\$18.00
5	23/04/2011	11:00:40 AM	SOUTH ENTRY	4	\$66.00	\$6.00	\$70.00	\$4.00
6	23/04/2011	11:00:50 AM	NORTH ENTRY	6	\$99.00	\$9.00	\$100.00	\$1.00

Events Table 38B

EventDate	EventStartTime	SeatingCapacity	TicketPrice	TicketsRemaining	TotalTicketsSold
23/4/2011	2:10 PM	10,000	\$16.50	9977	23

See next page

- (d) Draw an Entity-Relationship (E-R) diagram for the database tables shown below, indicating the correct cardinality of the relationship. You do not need to include attributes. (4 marks)

Ticket Transaction Table 38B

TransactionID	TransactionDate	TransactionTime	VendingMachineLocation	TicketQuantity	TransactionCost	GSTamount	AmountTendered	ChangeAmount
1	23/04/2011	10:58:52 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
2	23/04/2011	10:59:44 AM	NORTH ENTRY	2	\$33.00	\$3.00	\$40.00	\$7.00
3	23/04/2011	11:00:06 AM	EAST ENTRY	1	\$16.50	\$1.50	\$20.00	\$3.50
4	23/04/2011	11:00:22 AM	SOUTH ENTRY	8	\$132.00	\$12.00	\$150.00	\$18.00
5	23/04/2011	11:00:40 AM	SOUTH ENTRY	4	\$66.00	\$6.00	\$70.00	\$4.00
6	23/04/2011	11:00:50 AM	NORTH ENTRY	6	\$99.00	\$9.00	\$100.00	\$1.00

Events Table 38B

EventDate	EventStartTime	SeatingCapacity	TicketPrice	TicketsRemaining	TotalTicketsSold
23/4/2011	2:10 PM	10 000	\$16.50	9977	23

- (e) Using the database tables shown for (d), fill in the details for the Transaction and Events entities. (6 marks)

Entity Name: TRANSACTION
Primary Key (if any)
Foreign Key (if any)
Other Attributes (list them all)

Entity Name: EVENTS
Primary Key (if any)
Foreign Key (if any)
Other Attributes (list them all)

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See next page

Question 39

(28 marks)

Consider the algorithm written in pseudocode below.

```

Begin
  Input (TicketQuantity)
  Input (TicketsRemaining)
  If TicketsRemaining >= TicketQuantity then
    Output ('PROCEED WITH PURCHASE')
  Else
    Output ('NOT ENOUGH TICKETS REMAIN')
  End If
End
    
```

(a) Use the pseudocode to answer the following:

(i) What is the purpose of an Output statement? (1 mark)


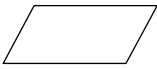

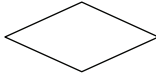
(ii) What sort of programming construct is the IF statement? (1 mark)

(iii) Using the following test data, complete the trace table below. (6 marks)

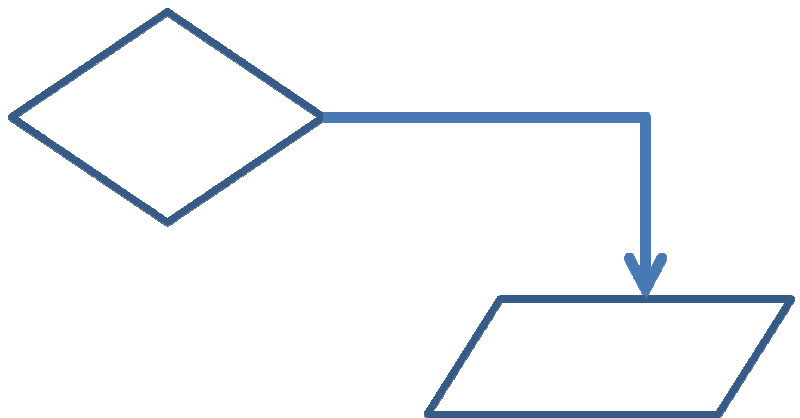
Ticket Quantity 15, 52, 16
 Tickets Remaining 25, 49, 28

Ticket quantity	Ticketsremaining	Ticketsremaining>= Ticket quantity	Output

(b) Complete a program flowchart for the algorithm above in the space provided on page 29. Some of the symbols have already been drawn for you. The following is a guide to the symbols required. (8 marks)

Symbol	Meaning
	Terminal: begin and end
	Input or output
	Process: the description of an action or process
	Decision: one line comes in at the top and two lines leave it

39 (b) continued



See next page

(c) The system calculates the total transaction cost. The program has the following features:

- All tickets cost \$16.50
- Accepts the number of tickets required by the user (Note: only a valid number of tickets should be accepted, i.e. >0)
- Calculates the Total Transaction Cost based on the Ticket Price multiplied by the Ticket Quantity
- Accepts the Amount Tendered by the spectator
- Calculates the Change Owed
- Calculates the GST Amount (Total Transaction Cost divided by 11)
- Outputs the Change Owed

In the space below use pseudocode to write an algorithm to incorporate the above features. (12 marks)

Question 40**(17 marks)**

You have been employed by the Gold Coast Sporting Club as a technology consultant. This role involves specifying the requirements for the computer and communications equipment to be used.

- (a) The Ticket Transaction System needs to be accessed by all vending machines at the four gates as well as by the Event Administrator.

What recommendation would you make on each of the following aspects of the database server that will hold the Ticket Transaction System?

Ensure you state why you have recommended a certain size or type. (4 marks)

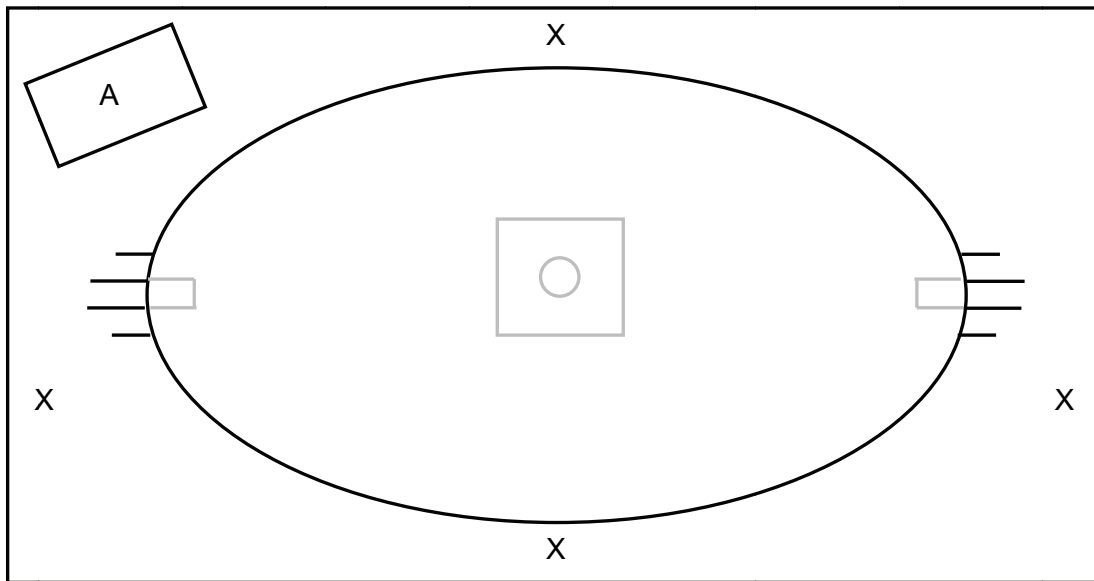
Processor: _____

RAM: _____

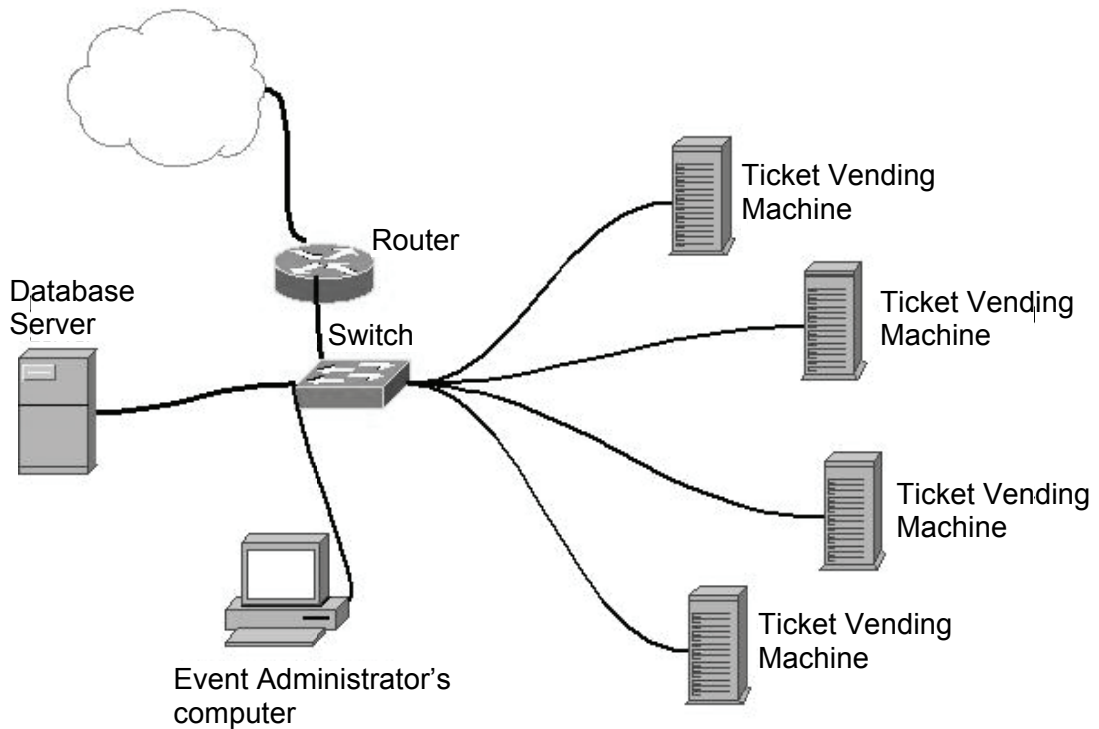
Disk storage: _____

Operating system: _____

The sports ground where the events are held is approximately 165 metres long and 135 metres wide. The diagram below shows the location of the Event Administrator's office (marked A) and the four ticket vending machines (each marked X).



The network diagram below shows the physical design of the network.



(b) On the network diagram indicate where a firewall would be located. (1 mark)

(c) Identify which topology the network is using. (1 mark)

- (d) Considering that the average distance between the switch and each vending machine is approximately 200m, what transmission media would you recommend between the switch and each ticket vending machine? Give **two** reasons to justify your choice. (3 marks)

- (e) What transmission media would you recommend between the switch and all other devices in the event administrator's office? Give **two** reasons to justify your choice. (3 marks)

- (f) Why would a firewall be necessary? (1 mark)

- (g) When a spectator pays for their tickets using a credit card, encryption is used to protect the credit card number from being viewed by unauthorised people. Explain how encryption works. (2 marks)

- (h) The network design is a client/server network. Explain the difference between a client/server network and a peer-to-peer network. (2 marks)

End of questions

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