**School of Isolated and Distance Education**

**SEMESTER TWO EXAMINATION 2019**

**Year 11 COMPUTER SCIENCE AECSC**

**Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SIDE Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SIDE Student Coordinator: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Base School: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SUPERVISOR’S DECLARATION**

I declare that this examination paper has been completed by the student named above. The time and resource restrictions have been observed and the student has NOT accessed notes, texts, reference books, the internet, a computer, a calculator or a mobile phone unless otherwise specified. I understand that breaches of the examination rules could lead to an examination paper being cancelled or having an examination mark significantly lowered.

**Supervisor’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_**

**TIME ALLOWED FOR THIS <<PAPER/SECTION>>**

Reading Time ten minutes

Working Time three hours

**MATERIALS REQUIRED/RECOMMENDED FOR THIS PAPER**

**To be provided by the supervisor**

This Question/Answer Booklet

**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

**NO OTHER ITEMS MAY BE TAKEN INTO THE EXAMINATION ROOM**

**IMPORTANT INFORMATION FOR 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 examination |
| Section One:  Short answer | 20 | 20 | 70 | 110 | 40 |
| Section Two:  Extended answer | 5 | 5 | 110 | 103 | 60 |
|  |  |  |  | **Total** | 100 |

**Instructions to candidates**

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2019*. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in the spaces provided in this Question/Answer Booklet. A blue or black ballpoint or ink pen should be used. Wherever appropriate, fully labelled diagrams, tables and examples should be used to illustrate and support your answers.

3. 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. Where no specific instructions are given, you should feel free to use a range of formats to express your knowledge and understandings.

4. 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: Short answer 40% (110 Marks)**

This section contains **20** 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 to 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 that you are continuing to answer at the top of the page.

Suggested working time: 70 minutes.

**Question 1 (4 marks)**

Discuss the roles of the following in relation to the fetch-execute cycle:

Control Unit:

Register:

Program Counter:

Arithmetic Logic Unit:

**Question 2 (2 marks)**

Most programmers will develop software using a ‘high level’ programming language. Explain what this means.

**Question 3 (8 marks)**

1. Consider the following code and complete the trace table to test the program. (8 marks)

Main

Begin

Numbers[40,10,15,12,25,9]

i 0

x 95

for i 0 to 5

if Numbers[i] < x

x Numbers[i]

End if

Output(x)

End for

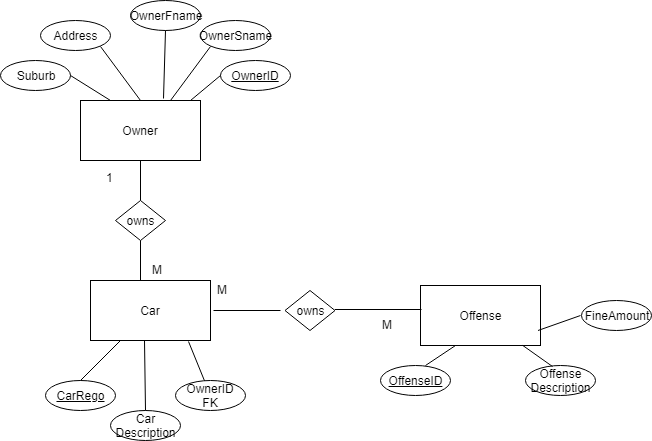
End

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | array | | | | | |  |
| i | x | 0 | 1 | 2 | 3 | 4 | 5 | Output |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
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**Question 4 (5 marks)**

Identify and fully discuss the circumstances under which a linear system development methodology (SDLC) should be used over a prototype system development methodology.

Questions 5 and 6 refer to the below diagram



**Question 5 (4 marks)**

When designing a database it is not good practise to have a many to many relationship.

1. Where does this occur in the above diagram? (1 mark)

1. Why would this unresolved many to many relationship cause issues when the database is developed? Use the example provided to illustrate your answer. (3 marks)

**Question 6 (10 marks)**

What is mailed out to owners is an infringement notice that identifies the car, it’s owner, the offense type, location and fine amount.

Each Infringement notice issued contains

* The details for only one car and one owner
* The details for one offense
* Location of offense
* Several different payment options which includes, internet, In person, by mail or by phone.

Redraw the ERD above to reflect these business rules including all attributes, primary keys and foreign keys.

**Question 7 (2 marks)**

What is the difference between source code and executable code?

**Question 8 (5 marks)**

The program below will register students into a state-wide Science competition and print out certificates based on their results. 127 students entered the competition.

If a student receives a result over 90 they will receive a Certificate of High Distinction. A result over 75 will print a Distinction certificate and a result equal to or over 50 but below 75 will print a Participation Certificate. A result below 50 receives no certificate.

Complete the code below using a CASE selection structure for the certificate printing based on result.

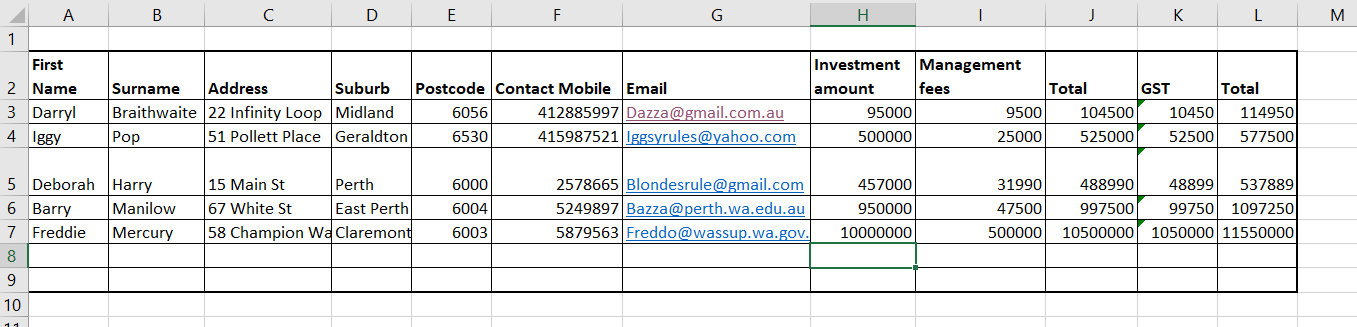
|  |  |
| --- | --- |
| 1 | **Program Print\_Certificates** |
| 2 | VAR: result;real |
| 3 | Begin |
| 4 | Input(result) |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
| 14 | End |

*Questions 9 through to 11 refer to the scenario below and the spreadsheet data*.

Tomesi Financial Planners employ four people and each is responsible for maintaining their client data within an online spreadsheet that is shared amongst them all.

They access this spreadsheet via the web address

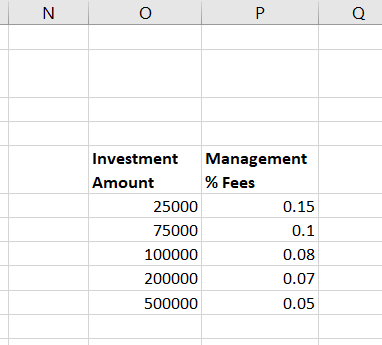
<http://www.spreadsheetzforall/tomesifinancialplanners.com.au>

A snippet of the spreadsheet is provided below.

**Question 9 (5 marks)**

1. Write the likely formula in J3? (1 mark)

The management fees are calculated using a lookup. The firm uses a decreasing scale contained in the range below.



1. Write out the vlookup formula contained in cell I3. (4 marks)

**Question 10 (5 marks)**

1. This spreadsheet does contain confidential financial information. Discuss some of the security issues associated with this online software. (3 marks)

1. How could the security of this data be improved? (2 marks)

**Question 11 (7 marks)**

The firm has been advised to develop a Relational Database Management System (RDBMS) and store the client details on a dedicated server within the store.

1. What is a Relational Database Management System (RDBMS) and how does it differ from the current spreadsheet solution being used? (3 marks)

1. How will the RDBMS provide additional security? (4 marks)

**Question 12 (2 marks)**

a) Outline the purpose of a feasibility study. (1 mark)

b) Identify the stage of the System Development Life Cycle where this study would normally occur. (1 mark)

**Question 13 (1 mark)**

Define the role of drivers in computer systems.

**Question 14 (5 marks)**

1. When in the System Development Life Cycle are Context and Data Flow Diagrams produced? (2 marks)

1. What is the purpose of a Context Diagram? (1 mark)

1. What is the purpose of a Dataflow Diagram? (2 marks)

**Question 15 (5 marks)**

A well designed user interface should allow for:

* Minimal keystrokes
* Reduced likelihood of the wrong value being input
* Reduced mouse movements.

Identify how these considerations can be incorporated into a user interface.

**Question 16 (5 marks)**

Miranda wants an added security feature for her system as she is encouraging her customers to use her system online.

To place an order, current, approved customers will be given a password. They have three attempts to correctly input the password before the system can accept the order. After three attempts, the message “Contact Office” will be displayed and Miranda will reissue a password.

A flow chart of the algorithm is represented on page 11.

False

Print

Contact Office

Password

==Password

Enter your Customer Password

Begin

End

Print “Try Again”

Set Try to 0

Try < 4

Try = Try + 1

Print

Proceed to Order

Set Try to 0

End

1. Identify the following three structures with labels (3 marks)

* Sequence
* Selection
* Loop

1. The loop in this flow chart is a Test before loop. Describe how this chart would change if it was a test last loop. (2 marks)

**Question 17 (15 marks)**

Joseph has assessed the software she requires and has found the following:

* The operating system requires
  + 4GB RAM
  + 128GB of hard drive space.
  + graphics card with a specialist driver
  + Dual-core processor
* The Computer Aided Design software company is recommending
  + 16 GB Ram (minimum 8 GB)
  + 250GB Hard Drive (installation requires 500MB). Preferable over 500GB of SSD
  + 24 inch monitor
  + Graphics card with 2GB of VRAM (Video Random Access Memory)
  + Multi-core processor preferred, dual-core minimum.
* Office software
  + 1GB RAM
  + 3GB Hard Drive

1. Identify the following terms, explain their purpose and impact on the speed of the system unit. (4 marks)

RAM:

`

Hard Drive:

Graphics Card:

Driver:

1. Joseph is deciding between these two systems (11 marks)

|  |  |
| --- | --- |
| **Computer 1** | **Computer 2** |
| Intel i7 2.8GHz  8 GB RAM  250GB Hard drive solid state drive  Graphics card 2GB VRAM   4MB cache LVL 3 | AMD Athlon Multi core 3.8GHz  16GB RAM  500GB hard drive  Graphics card 2GB VRAM  4MB cache LVL 2 |

Justify which of these systems is best suited to Miranda by referring to all the specifications of the system against user requirements.

**Question 18 (6 marks)**

1. Describe three (3) functions of an operating system using examples. (3 marks)

1. Outline the advantages and disadvantages of a Standard Operating Environment for a small business enterprise. (3 marks)

**Question 19 (3 marks)**

A supermarket has installed new hardware so that customers can check out their own groceries. Identify and describe the function of two input devices and one output device.

**Question 20 (6 marks)**

Label the below table cells in the boot process sequence (1 through to 6)

|  |  |
| --- | --- |
| **Process** | **Sequence (1 to 6)** |
| Processor/hardware checked to be in order |  |
| BIOS checks boot disk |  |
| Operating system loaded |  |
| Power on Self-Test (POST) |  |
| Power on, CPU initialises |  |
| Bootstrap (or boot loader) loaded |  |

**End of short answer section**

**Section Two: Extended answer 60% (103 Marks)**

This section has **five (5)** questions. Answer **all** questions. Write your answers in the spaces provided.

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Suggested working time: 110 minutes.

Questions 21 through to 25 are based on the scenario contained on the following information.

ProNotCakes are a local manufacture of healthy alternatives to cakes and pastries sold in Coffee Shops and Cafeterias around Perth. Currently they are using a manual system to keep track of billing and payments and are looking to upgrade to an online manual system.

At present the following has been established about data flows through the business.

* Customers apply for an account with ProNotCakes. If approved, their details are stored in the Customer file and new customers are given a username and password that they put on their orders.
* Customer’s orders are placed in an orders folder when they come through. The Office manager will check current stock to ensure they have all the ingredients to fulfil the order. If the ingredients are immediately available, a copy of the approved order is given to the bakers in the factory to fulfil.
* If the ingredients are not available, they are ordered in from local suppliers. The ingredients order is placed on the pending stock file.
* ProNotCakes has a guaranteed next day delivery arrangement with all their local suppliers and ingredients are delivered on site with the delivery confirmation and this is placed in the pending stock file.
* The stock file is then updated with the delivered ingredients and the customer’s order given to the factory to make.
* When the customer order is filled, the factory boxes up the products with a copy of the original order. ProNotCakes delivers the order. A signature on the copy order is obtained upon delivery and this is returned to the store to be placed in the completed orders file.
* At the end of each month, ProNotCakes creates an invoice for each customer which will detail all their orders completed during the month. Customers are given a receipt upon payment. The payments are recorded in the accounts store.
* ProNotCakes will also receive an invoice from their suppliers which they pay immediately and file the receipt in their accounts store.

**Question 21 (13 marks)**

You have been hired as a System’s Analyst. Using the information on the previous page, create a context diagram in the space below to represent how data flows through the ProNotCakes system.

**Question 22 (33 marks)**

You have identified that there are sixth major processes for the level 0 Data Flow Diagram. The fifth process is where invoices are created and sent to the customers.

In the space below, complete the Level 0 Data Flow Diagram.

**Question 23 (29 marks)**

1. ProNotCakes has decided to create a Relational Database Management System. How do the tables in the database relate, in general, to the Data Flow Diagram? (1 mark)

1. The following business rules have been established.

* Customers can make many orders
* Each order can contain several stock items.
* A supplier can supply many stock ingredients and there are multiple suppliers of stock ingredients.
* Each month, a customer receives one invoice detailing many orders.

Create and Entity Relationship Diagram below to reflect these rules. Show all Cardinality, Primary Keys and Foreign Keys using Chen’s notation. (28 marks)

**Question 24 (6 marks)**

Realising that their business is now growing too large for his home, ProNotCakes is planning to build a purpose office. It will require a Local Area Network in the new offices. The existing equipment it has consists of:

* 4 desktop PCs
* 2 wireless notebooks
* 1 network multifunction centre (machine that can print, copy, scan and fax)
* 1 file server.

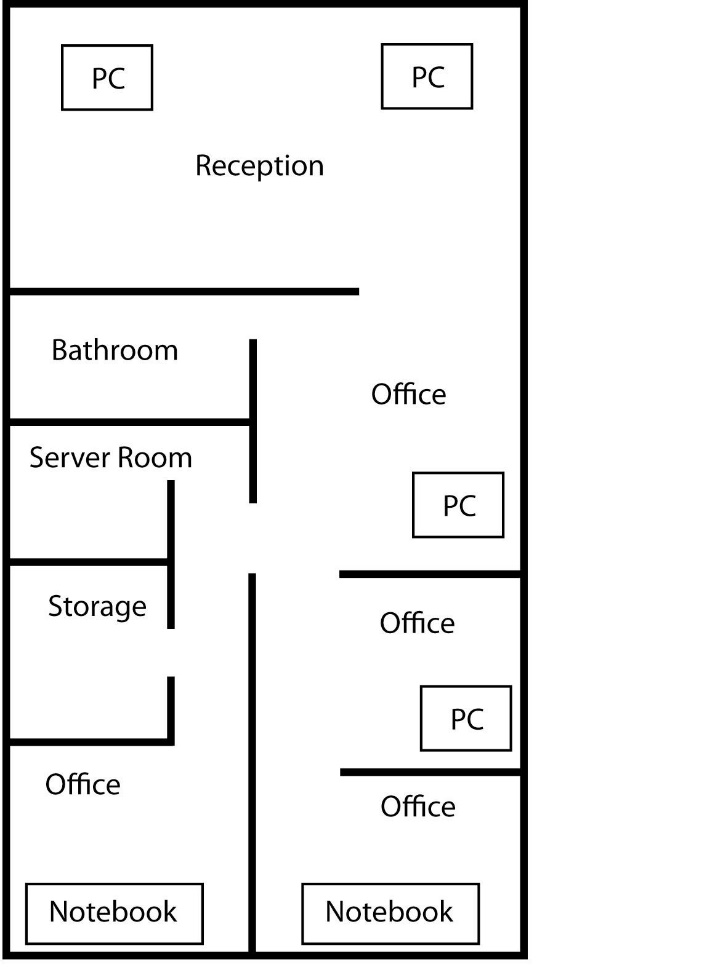
(a) List **two** other network devices that would need to be purchased in order to set up the network. (2 marks)

(i)

(ii)

(b) What type of cabling would be most suitable? Justify your choice. (2 marks)

(c) Complete the office layout diagram below by indicating the location of your two devices from (a) above, as shown in the legend. Annotate your justification regarding the location of these devices onto the diagram. (2 marks)

Legend:

|  |  |
| --- | --- |
| Location | Network device |
| **1** | Multifunction Centre |
| **2** | Server |
| **3** | (i) |
| **4** | (ii) |

**1**

**2**

**End of questions**

Question No:

Question No:

Question No: