Semester 2 2022

A picture containing text, graphics, font, graphic design

Description automatically generatedATAR course examination

Question/Answer booklet

**Year 11 ATAR COMPUTER SCIENCE AECSC**

Surname:

Other names:

WA student number (if known)

SIDE Teacher: Mark Rotondella

SIDE Student Coordinator:

**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**

Reading time before commencing work: 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 (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: up to three calculators, which do not have the capacity to create or store programmes or text, are permitted in this ATAR course examination, 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 unauthorised material. 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:  Short Answer | 20 | 20 | 70 | 93 | 40 |
| Section Two:  Extended Answer | 5 | 5 | 110 | 111 | 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 2022: Part II Examinations*. 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 1: Short answer**

This section contains **20** questions. You must answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

**Question 1 (8 marks)**

Discuss the purpose of the following networks. Illustrate with examples.

1

|  |  |
| --- | --- |
| **Description** | Mark |
| Discusses the purpose and uses an example | 2 |
| Discusses purpose – no example | 1 |
| **Possible** **answer (below)** |  |

|  |  |
| --- | --- |
| **Network** | **Purpose** |
| Personal Area Network (PAN) | Personal area network comprises devices communicating across or around the body. An exampled would include the phone and a watch communicating or a heart rate monitor and a phone communicating. |
| Local Area Network (LAN) | A LAN is established to enable communication within an area. Usually created with a switch, it enables devices to communicate and transfer data. An example could include an office area with all computers and printers connected into the switch to create a LAN. |
| Wider Area Network (WAN) | A WAN covers a larger geographical area and is used to establish communication between different local users. The internet could be considered a WAN and many users, including LAN’s are about to connect via a router. |
| Worldwide Interoperability for microwave access (WiMaAX) | WiMax is a communication standard that enables a wireless signal to cover a large area due to a range of frequencies if offers. It could be used in remote areas and MAN applications but never really took off as the hardware was expensive. WiFi became the more popular standard. |

**Question 2 (3 marks)**

Discuss the different purposes of random-access memory, cache memory and read only memory.

|  |  |
| --- | --- |
| **Description** | Mark |
| Discusses the purposes of all three | 3 |
| Discusses purpose of two | 2 |
| Discuses purpose of one. | 1 |
| **Possible Answer** |  |
| Random Access Memory is located on the motherboard and all programs and data currently being used are loaded into this with results written to it (read/write). It is a large size memory unit. Cache memory resides on the CPU. It is small and fast and holds frequently used instructions that the CPU can very quickly access when required Read Only Memory is read only memory that cannot be overwritten. It will contain very important instructions, such as start up instructions. It is small. |  |

**Question 3 (3 marks)**

Identify the purpose of the following protocols.

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies the purpose of the protocol | 1 |
|  |  |
| **Possible Answer**  https: used to secure the transfer of data using http from a web browser to a website on the internet. The data becomes encrypted with this protocol.  SMTP: This is a protocol used by mail servers to send/receive emails.  FTP: used to transfer files from a server to a client over a computer network |  |

HTTPS:

SMTP:

FTP:

**Question 4 (3 marks)**

Explain the difference between a router and a switch.

|  |  |
| --- | --- |
| **Description** | Mark |
| Explains fully the difference between a router and a switch. | 3 |
| Explains a difference | 2 |
| States a difference. | 1 |
| **Possible answer**  A switch switches packets of data to a destination address within a LAN that uses the same protocol. It is used to create a LAN. A router routes packets of data over multiple networks and is used to create a larger network that comprises often of multiple switches and LANs. |  |
|  |  |

**Question 5 (1 mark)**

The technical and communications standards required to operate services over a network and the internet are known as?

|  |  |
| --- | --- |
| **Description** | Mark |
| States protocols | 1 |
| **Possible Answer**  Protocols. |  |

protocols

**Question 6 (3 marks)**

Explain the difference between source code and executable code?

|  |  |
| --- | --- |
| **Description** | Mark |
| States protocols | 1 |
| **Possible Answer**  Protocols. |  |

**Questions 7 to 10 refer to the following information.**

LocalCollege runs short courses to help develop skills within the community. Each class has the following details stored.

|  |  |  |
| --- | --- | --- |
| ClassID | ClassName | Subject |

Students enrol in the classes. The data stored about students includes

|  |  |  |  |
| --- | --- | --- | --- |
| StudentID | StudentName | StudentAddress | StudentAge |

The following rules apply to students and their enrolment in the classes.

* A class can have many students enrolled.
* Students can be enrolled in many classes

**Question 7 (11 marks)**

Create the entity relationship diagram that would represent this database structure. Include all primary and foreign keys.

|  |  |
| --- | --- |
| **Description** | Mark |
| 3 entities | 3 |
| 5 primary/foreign keys | 5 |
| Correct cardinality and relationship | 3 |
|  |  |
|  |  |
|  |  |
| **Possible Answer** |  |

**Question 8 (3 marks)**

1. Identify which attribute does not display atomicity of data. (1 mark)

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies attribute | 1 |
| **Possible Answer**  StudentAddress. |  |

1. Describe how will this impact use of your database? (2 marks)

|  |  |
| --- | --- |
| **Description** | Mark |
| Describes how this will impact the use of database linked to context | 2 |
| Brief statement no link to context | 1 |
| **Possible Answer**  Having a field that is not atomic impacts how the data is queried. In this case, the database will not differentiate by postcode or city so querying around these aspects of the data will be limited and not likely to produce good information to make decisions about. |  |

**Question 9 (2 marks)**

Discuss how data integrity can be improved within your relational database design?

|  |  |
| --- | --- |
| **Description** | Mark |
| Discusses how data integrity can be improved with a clear understanding of what this means | 2 |
| Brief statement | 1 |
| **Possible Answer**  To improve data integrity, some validation rules can be put on input. For instance, StudentAge could have a range or autoselect to minimise chances of incorrect data being input. Drop down boxes listing classes per enrolment could also help improve the integrity of data. |  |

**Question 10 (6 marks)**

Create the query that will print out an over 65 years of age list of student names.

|  |  |
| --- | --- |
| **Description** | Mark |
| SELECT | 1 |
| FROM | 1 |
| WHERE | 1 |
| StudentName | 1 |
| Student | 1 |
| .StudentAge > 65 | 1 |
| **Possible answer**  SELECT StudentName  FROM Student  WHERE StudentAge>65 |  |

**Question 11 (8 marks)**

Identify a characteristic of each of the following types of malware and their impact on a network.

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies characteristic | 1 |
| Identifies impact | 1 |
| **Possible Answer**  **Below** |  |

|  |  |  |
| --- | --- | --- |
| **Malware** | **Characteristic** | **Network impact** |
| Viruses | Code that infects a computer by attaching to pop up windows or email attachments. It lays dormant until a trigger action occurs | A virus can infect a network once it is in a single computer. It may corrupt data and/or destroy files or steal important data. |
| Worms | Are stand along programs that replicate themselves. A virus needs a host. A work is stand alone | The work continuously replicates itself. They will also come in on phishing scams. They are looking for backdoors or vulnerabilities within a system and if they contain a botnet, can be controlled remotely. |
| Trojans | Looks like a legitimate program but is actually malicious code | It will settle into a system and is often used in conjunction with other malware to keylog and detect passwords. Backdoor and banking trojans exploit the user and the systems vulnerabilities. |
| Spyware | It is code or a program designed to send data to third parties without consent | Often monitoring your online behaviour and sending it on.This type of code can use the system resources to spy on users. |

**Question 12 (3 marks)**

Explain how a firewall secures information sent and received over the internet?

|  |  |
| --- | --- |
| **Description** | Mark |
| Fully explains the send and receive actions of a firewall | 3 |
| Explains send and receive | 2 |
| Brief statement only |  |
| **Possible Answer**  The firewall inspects packets of data entering and leaving a network according to rules around IP addresses and content. It will filter out packets of data that do not conform to these rules that may include banned IP addresses or banned content type. |  |

**Question 13 (5 marks)**

Convert the number 38 into the following number systems. Show all workings.

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies decimal | 1 |
| Correct Hex and working out | 2 |
| Correct binary and working out | 2 |
| **Possible Answer**  **below** |  |

|  |  |
| --- | --- |
| 1. Decimal | 38 |
| 1. Hexadecimal | 38/16 = 2 rem 6  6/16 = 0  Hex number is 26 |
| 1. Binary | 38/2 = 19, remainder is 0 19/2 = 9, remainder is 1 9/2 = 4, remainder is 1 4/2 = 2, remainder is 0 2/2 = 1, remainder is 0 1/2 = 0, remainder is 1  011001 |

**Question 14 (4 marks)**

Consider the following pseudocode snippet.

|  |  |
| --- | --- |
| 1 | score 0 |
| 2 | TotalScore 15 |
| 3 | i 0 |
| 4 | For i > 4 |
| 5 | Input(Score) |
| 6 | TotalScore TotalScore - Score |
| 7 | End for |
| 8 | Output(TotalScore) |
|  |  |

1. Identify a line a syntax error occurs and provide a brief explanation why this is a syntax error. (1 mark)

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies syntax with brief explanation | 1 |
| Points to syntax only |  |
| **Possible Answer**  Line 1 or 6. Variable needs to be named consistently Score v score |  |

1. Identify a logic error by referring to line number(s) explaining the likely impact of this logic error. (1 mark)

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies logic with brief explanation | 1 |
| Points to logic only |  |
| **Possible Answer**  Line 3 to 4. The loop never commences as i is set to 0 and will not reach 4. |  |

1. What can you do to ensure neither occurs in your code? (2 marks)

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies interpreter syntax and trace or deskcheck for logic | 2 |
| Mentions one technique only | 1 |
| **Possible Answer.**  Identifies interpreter syntax and trace or deskcheck for logic. Breakpoints in code |  |

**Question 15 (6 marks)**

Iris is developing software that asks the user to input their height and then output whether they should buy tall, petite or regular sized clothing.

|  |  |
| --- | --- |
| 0-160cm | Petite |
| 161 – 175 | Regular |
| >176 | Tall |

1. Create a flowchart or pseudocode that represents a programming solution to this scenario.

(4 marks)

|  |  |
| --- | --- |
| **Description** | Mark |
| Begin/end | 1 |
| Case | 2 |
| Output | 1 |
|  |  |
|  |  |
|  |  |
| **Possible Answer**  Below |  |

Enter

height

CASE

height

Begin

End

<1611

Size=Petite

Output: Size

Size = Regular

Size = Tall

>=161 <=175

>176

1. To test this algorithm fully, discuss what data Iris should use? (2 marks)

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies all data points | 2 |
| Identifies a data point | 1 |
| **Possible Answer**  The boundary data should be checked so 140, 161, 175 and 190 |  |

**Question 16 (6 marks)**

Match up the following advantages by drawing a line to the correct network.

|  |  |
| --- | --- |
| **Description** | Mark |
| Correctly identifies characteristic to correct network | 1 mark each |
|  |  |
| **Possible Answer**  below |  |

|  |  |  |
| --- | --- | --- |
| **Advantage** |  | **Network** |
| Reliable data transmission | **Wired** |
| Less expensive set up costs |
| Increased data security |
| **Wireless** |
| Increased mobility |
| Increased speeds |
| Easier to add more devices |

**Question 17 (3 marks)**

Discuss why fibre optic cable would be used for the backbone of the network

|  |  |
| --- | --- |
| **Description** | Mark |
| Discusses why fibre optic good for backbone referring to two characteristics of fibre optic | 3 |
| Discusses with reference to a characteristic | 2 |
| States a characteristic ie fast | 1 |
| **Possible Answer**  Fibre optic provides high speeds due to a lack of noise/attentuation or interference in the signal and its ability to provide greater bandwidth. These characteristics make it ideal to carry the larger data requirements associated with a backbone in a network |  |

**Question 18 (6 marks)**

1. Identify and discuss the different purposes of a peer to peer network and client/server network using examples. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identify and discuss the different purposes of a peer to peer network and client/server network using 2 examples. | 4 |
| Discusses different purposes – 1 example | 3 |
| Discusses different purpose | 2 |
| States a purpose | 1 |
| **Possible answer**  A peer to peer network is created for connectivity purposes. Each peer has it’s own storage and can respond and receive requests. An example would be setting up network for printing. Each computer can use the resource on the peer to peer network directly. In a client server, resources are located on a server. In the print situation above, the client will request access to the printer via a server and the server will respond. |  |

1. Identify an advantage of implementing a client/server network? (1 mark)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies an advantage | 1 |
| Possible answer  A client server allows for improved scaleability over a peer to peer which is designed and suitable for small networks only. |  |
|  |  |
|  |  |

1. Identify a disadvantage of implementing a client/server network. (1 mark)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies a disadvantage | 1 |
| Possible answer  They can be expensive to set up due to costs of servers and upskilling someone to manage. |  |
|  |  |
|  |  |

**Question 19 (3 marks)**

Identify the technologies appropriate for the implementation of a client/server and peer-to-peer network.

|  |  |
| --- | --- |
| **Description** | Mark |
| Identifies at least two technologies used to create a client server network | 3 |
| Identifies 2 technologies used to create a client server network. | 2 |
| Identifies 1 technology required to create a client server network | 1 |
| **Possible Answer**  In a client server network, the client requests services from the server so a server is required. A network operating system software is also required to manage the requests. In addition, the network will have routers and each client will have software that request services from the servers such as print/web/email etc using protocols such as TCP/IP, FTP, SMTP etc |  |

**Question 20 (6 marks)**

Consider the following code:

1 Begin

2 Read x

3 WHILE x > 6

4 Output x + 3

5 x = x – 1

6 ENDWHILE

7 End

Complete a trace table for x = 8 below

|  |  |
| --- | --- |
| **Description** | Marks |
| Trace table contains variable, condition and output | 3 |
| Correctly traces variable | 2 |
| Outputs correctly | 1 |
| Condition passes correct | 2 |
| **Possible answer below**  Condensed form ok as well |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Line** | **x** | **x>6** | **Output x + 3** |
| 1 |  |  |  |
| 2 | 8 |  |  |
| 3 |  | Y |  |
| 4 |  |  | 11 |
| 5 | 7 |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| 1 |  |  |  |
| 2 | 7 |  |  |
| 3 |  | y |  |
| 4 |  |  | 10 |
| 5 | 6 |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  | n |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
|  |  |  |  |

**Section21: Extended answer**

This section contains **5** questions. You must answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 110 minutes.

Questions 21 through 25 refer to pages 1-2 in your Source Booklet.

**Question 21 (20 marks)**

1. The System Analyst Domenico has hired requested all invoices, orders and other documentation the business produces or uses.

Discuss the importance of providing this documentation, referencing stages in the System Development Life Cycle. (3 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Discusses fully why this documentation is important and which stage of the SDLC it is likely to correspond to | 3 |
| States why documentation used, correct stage of SDLC | 2 |
| States the correct stage or discusses importance of documentation | 1 |
| **Possible answer**  This is a document analysis method of data collection. It would be important in the Analysis stage of the SDLC and will help the analyst determine the data being used, how it is being used and by who. Establishing this would be useful to help create Context and DFDs |  |

1. The SDLC is one system development methodology. Discuss another, outlining the advantages and disadvantages related to Domenico’s business. (3 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies and discusses another life cycle model | 3 |
| Identifies another life cycle and briefly states a characteristic suited to business | 2 |
| States a life cycle methodology | 1 |
| **Possible answer**  This is a document analysis method of data collection. It would be important in the Analysis stage of the SDLC and will help the analyst determine the data being used, how it is being used and by who. Establishing this would be useful to help create Context and DFDs |  |
| **Possible answer**  Prototyping is another system development methodology. In a small business with knowledgeable users that require a smaller development team, this would be ideal as there can be a system in place very quickly that will get continually refined. However, it does not sound like Domenico is knowledgeable so the traditional method might be better. |  |

1. Domenico has been told he will need a router, application software and an open source operating system.
2. At which stage of the SDLC will these be obtained? (1 mark)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies stage correctly | 1 |
| **Possible answer**  Development stage |  |
|  |  |
|  |  |

1. Explain the following terms in this context by considering what each will do for the new system. (10 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Explains each term and reference the context | 2 |
| Explains the term | 1 |
| **Possible answer – see below** |  |
|  |  |

Router: The router will connect networks together. In this situation, the business might need a router to connect the factory IT to the office IT.

Application Software: is software that offers user efficiency. Stand alone software In this situation might be database software such as Access or word processing software such as Word might be used.

Switch: A switch can be used to create a local area network so that devices can communicate with each other within the network. In this situation a switch might be used to create a LAN for the office staff so that they can access printers and communicate with each other.

Open Source: Is software whose license for use permits access to the source code for modification. In this instance, Domenico may want to save money by installing a network operating system like Linux which is cheaper and can be modified to suit his context.

Standard Operating System: An SOE will mean all employees have the same hardware and software installed on their devices. This might allow Domenico to purchase on bulk and receive discounts. It will make for easier deployment and troubleshooting.

1. Explain an advantage and a disadvantage of using open source software for the network operating system. Refer to two popular operating Systems for comparison purposes.

(3 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Explains an advantage and disadvantage and refers to two examples. | 3 |
| Explains and advantage and disadvantage and refers to one | 1 |
| Provides a disadvantage/advantage. |  |
| **Possible answer – see below** |  |
| An open source system would be linux which allows the user to access the source code. In comparison to a Microsoft Windows operating it would be cheaper and potentially more customisable. However, it requires the employment of someone knowledgeable. Windows would offer potentially a less complex solution. |  |

**Question 22 (12 marks)**

Managing the GST is a very important part of Domenico’s business. Calculated at 10% of the purchase and then added into every purchase, the business must keep track of all the GST it has charged its customers.

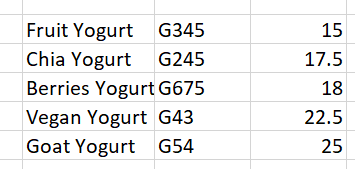
1. What is the likely formula for the GST column cells range (I2:I6)? (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| H2 | 2 |
| X 0.1 | 1 |
| Copied down relative |  |
| **Possible answer – see below**  **= H2 x 0.1 copied down to H6** |  |

1. At the end of each month, the total GST value needs to be calculated. What function would be used to do this? (1 mark)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies function | 1 |
| **Possible answer**  Sum in I7 |  |
|  |  |
|  |  |

1. The product code ( F2:F6) contains a lookup that refers to the range (K19:M24) and the data in this range below.



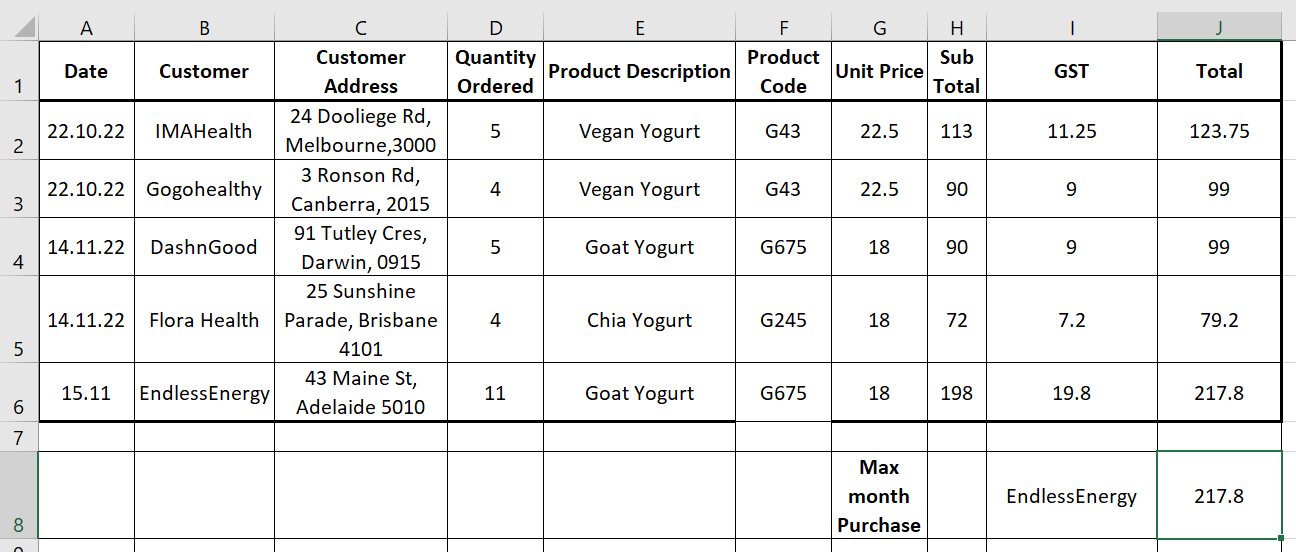
1. Write the likely formula for the lookup. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| vlookup | 1 |
| Cell | 1 |
| Range with absolute referencing | 1 |
| Correct column return | 1 |
| Possible answer  **Vlookup(E2, K$20:M$23,2)** |  |

1. The lookup contains an absolute reference on the row. What does this mean and why is it only on the row? (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies absolute referencing definition and fully explains why the lookup is only an absolute on the row. | 4 |
| Identifies absolute reference definition and explains why only on the row | 3 |
| Identifies absolute reference definition and some attempt to explain | 2 |
| Identifies absolute reference definition only | 1 |
| **Possible answer**  When the formula in a cell refers to the value another cell and then the formula is copied to another cell, the value cell will move in reference to the original valued cell. To ensure it stays the same, absolute referencing is needed. So the lookup range refers to a range. Given the formula is being copied in the same column the referenced value range won’t change columns but copying down will mean the value range will move down a row. So you need to pin this range so that the row will not change |  |

1. Domenico has been asked to find the maximum purchase amount for the month as follows:



* 1. What formula will be in J8? (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies function | 1 |
| Identifies the range | 1 |
| **Possible answer**  **=MAX(J2:J6)** |  |
|  |  |

* 1. What formula will be used to identify the client who purchased the maximum amount in I8? (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| vlookup | 1 |
| Cell | 1 |
| Range | 1 |
| Correct column return | 1 |
| Possible answer  **=VLOOKUP(J8,A2:J6,2)** |  |

**Question 23 (18 marks)**

Domenico has been advised that the business needs to move away from a spreadsheet and toward a Relational Database Management System (RDBMS)

1. Describe in detail two advantages of moving to an RDBMS. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Describes in detail two advantages related to scenario | 4 |
| Describes in detail two advantages | 3 |
| Describes in detail one advantage related to scenario | 2 |
| Describes in detail one advantage | 1 |
| **Possible answer**  For Domenico, moving to a RDBMS will allow him to query the data fully and discover patterns within the data that will allow him to make informed business decisions. It would also allow him to automate invoicing and ordering through reports and queries**.** |  |

1. Identify and describe a disadvantage of moving to an RDBMS. (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies and describes | 2 |
| Identifies | 1 |
| **Possible answer**  A disadvantage for Domenico would be the expertise required to run and administer a database. Domenico may need to do additional training himself or hire someone in to do the work. This could be costly and time consuming. |  |
|  |  |

1. Domenico has been advised to develop an Entity Relationship Diagram (ERD) before developing the database. What is an ERD and why is it important? (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Defines what an ERD is and identifies why it is important | 2 |
| Defines only | 1 |
| **Possible answer**  The ERD provides a model of the data in the database. This helps more accurately develop a database suited to the business rules of the client.. |  |
|  |  |

1. Domenico has sketched a partial ERD below. Identify some issues with this diagram.

(2 marks)

Orders

Customer

requests

1

M

M

M

1. .

requests

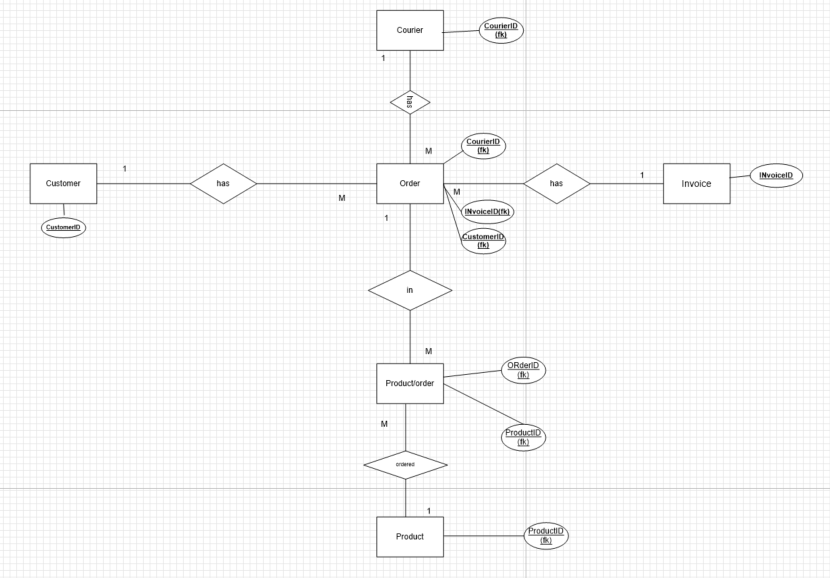
M

Products

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies 2 errors | 2 |
| Identifies 1 error | 1 |
| **Possible answer**  A many to many between products and orders cannot be implemented within a RDBMS and the primary key on the Orders table is incorrect |  |
|  |  |

1. Referring to your figures 1 through 3 in your source booklet, create an ERD that represents the tables required to develop a relational database management system for customer invoicing. Include primary and foreign keys only. (10 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Courier table with primary key | 2 |
| Correct cardinality between courier and orders | 1 |
| Invoice table with primary key | 2 |
| Primary and foreign keys on orders | 3 |
| Cardinality correct | 2 |
|  |  |
| **Possible answer**  See below |  |



1. Domenico is unsure what to do with the fields ‘Sub Total’; ‘GST’ and ‘Total’. Why would they not be included in the ERD? (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Correctly states they are calculated | 2 |
| States they can be obtained from queries and reports to avoid redundancy | 1 |
| **Possible answer**  All three are calculated fields and to include them in the database as fields would be introducing redundancy. Their value can be obtained through queries and reports. |  |
|  |  |

**Question 24 (22 marks)**

1. The Analyst has told Domenico that they will develop both a Context and Data Flow Diagram.

Discuss why these diagrams are helpful in modelling data by referring to the source booklet business context and to the System Development Life Cycle. (5 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Discusses fully the usefulness of both context and dfd and which stage/s of the sdlc they will occur in | 5 |
| Discusses the use of context and dfd and identifies stages they occur in | 4 |
| Discusses context/and or dfd. Mentions stage they occur in | 3 |
| Brief statements – mentions stage | 2 |
| **Brief statement only** | 1 |
| **Possible answer**  The context establishes the boundaries of either the current or the new system. This is generally done in the analysis stage but can also be done in the design stage. It is useful to know the limits of the system and how it interacts with the other stakeholders in the environment. The DFD shows how the data coming through from the environment is processed and then stored. It can also be done in the analysis or design stages. Helps model the tables in a database and is useful to show how the data is acted upon and used within the system. |  |

1. The following is a Context Diagram that Domenico received from the Systems Analyst. He is unsure if it is entirely accurate. Locate three(3) errors in this Context Diagram.

(3 marks)

**Customers**

**Customer**

CustomerApplication\_Details

Approvedcust\_details

**Customer**

CustomerAccount\_details

Invoice\_details

Product

CustomerInvoice\_details

**Couriers**

confirmation\_details

**Process Plant**

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies 3 errors | 3 |
| Identifies 2 errors | 2 |
| Identifies 1 error | 1 |
| **Possible answer**  Below: |  |

Error 1:a store should not be in a context

Error 2: Product is a thing – not data

Error 3:Cultured invoice is not a system – it needs to say system

1. Now that the errors have been located, Domenica is keen to develop a Level 0 Data Flow Diagram. Complete the DFD to reflect the business rules as outlined in your Source Booklet.Some parts have already been completed for you. (14 marks)

CourierCharges\_Details

OrderDelivery\_Details



**Customer**

**Customers**

CustomerApplicaton\_details

ApprovedCustomer\_details

CustomerAccount\_Details

Order\_details

ApprovedCustomer\_Details

**Customers**

ProcessedOrder\_details

ProcessedOrder\_details

ProducedGoods\_Details

**Courier**

Invoice\_details

Invoice\_details

Invoice\_Details

ProcessedOrder\_details

CourierCharges\_details

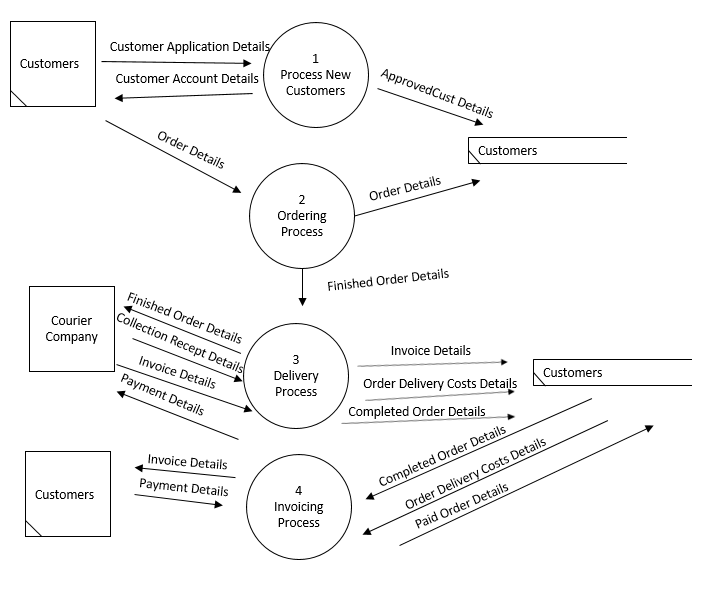
product\_Details

Invoicepaymentr\_details

**Customer**

**Customers**

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Process 1: Store and vectors | 2 |
| Process 2: vectors and store | 3 |
|  | 2 |
| Process 4: Entities(2) store and vectors | 4 |
| Process 5: Store and vectors | 3 |
| **Possible answer**  **above** |  |



**Question 25 (32 marks)**

1. Domenico is keen to move ahead with the new system. The analyst has mentioned the Software Development Life Cycle (SDC) and has confused Domenico. Explain the difference between the SDC and the SDLC. (2 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Fully explains difference between the two | 2 |
| Makes a statement about difference | 1 |
|  | 1 |
| **Possible answer**  The SDLC is the entire system including all hardware and software design and implementation. The SDC is only about the development of software |  |

1. Domenico and his staff haven’t been exposed to an online system before and are quite nervous about taking orders from clients via an online form.

Discuss how would considering their user needs impact the design features of the user interface they will be working with. (5 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Explains fully linking two user needs and at least two design features of the interface | 5 |
| Explains fully linking a user need with at least two design features | 4 |
| Explains fully linking a user need with a design feature | 3 |
| Statement about user need and a design feature | 2 |
| Brief statement only | 1 |
| **Possible answer**  The users in this situation are inexperienced and have been used to using a manual system. They will therefore likely need access to training as well as an interface design that seems both familiar and is easy to follow. Ensuring the interface is not cluttered and mimics software that they may be familiar with would help ease their nerves. In this situation, the most commonly used features should be very obvious to make things easier. |  |

False

Print

Contact Domenico

Password ==Password

Enter your customer Password

Begin

End

Print: try again

Try Again

Set Try to 0

Try < 3

Try = Try + 1

Print

Proceed to Order

Set Try to 0

End

selection

loop

selection

True

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

* Sequence
* Selection
* Loop

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies the structure correctly | 1 |
| **Possible answer**  As noted in diagram |  |

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)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Describes what would change if test last loop occurs | 2 |
| Makes brief statement only | 1 |
| **Possible answer**  As a test first, the loop is not entered when Try becomes 3 and the program will go straight to print. But this would actually mean the customer has had the 3 attempts at the password.  If it were a test last, the loop will be entered and depending on the constraint (until try>2 ), the loop will be completed before the variable is tested so the user will get one more try. |  |

1. Domenico is keen to change this algorithm to a ‘for’ loop with a count. Complete the

|  |  |
| --- | --- |
| **Description** | **Mark** |
|  |  |
| For Try <3 | 1 |
| If statement with correct else | 3 |
| Try = Try + 1 | 1 |
| Begin/end for all structures | 2 |
| Correct indenting | 1 |
| **Possible answer**  Begin  Try 0  For Try < 3  Print (enter your password)  Read password  If password == password  Print(“proceed to order”)  Else  Print (“try again)  Try = Try + 1  end if  end for  Print (“contact admin”)  end |  |

1. Domenico may decide to sell the business in the future. He has been told that it is important that all software solutions contain internal documentation. Discuss what is meant by the term internal documentation and why is it important?

(3 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Discusses internal documentation and fully explains why it is important | 3 |
| Discusses internal documentation and attempts to explain importance | 2 |
| Makes brief statement only | 1 |
| **Possible answer**  Internal documentation refers to the comments and indenting that occurs within a program. The comments will be developer comments which help explain the purpose of a section or control structure. The indenting or laying out of a code also helps establish order/hierarchy and logic. This is important in the event that the code has produced faulty data or needs to be adjusted to suit changing business needs. |  |

1. The new software solution for customers ordering online is working well. Domenico is concerned that someone may intercept the financial data being exchanged. Describe how public/private key encryption can help in this situation. (4 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Student describes fully how public and private key encryption might help in online ordering | 4 |
| describes how public and private key encryption would help | 3 |
| Explains what public and private key encryption is | 2 |
| Makes brief statement only | 1 |
| **Possible answer**  Public and private key encryption would be useful here as the online ordering may be transferring sensitive financial and personal data associated with the clients. Using encryption would secure this data by downloading the form with a public key but securing the completed form with a private key that only the correct receiver of the message would hold. |  |

1. Domenico realises that communication over the internet with her customers must be done in an extremely professional manner. He is conscious of ensuring his employees are also aware of this and she has heard of the term Netiquette.

Identify three things he may wish to include when developing a staff policy on etiquette specifically covering electronic communication with customers. (3 marks)

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Identifies three etiquette items that could be included in the policy | 3 |
| Identifies 2 etiquette items that could be included in the policy | 2 |
| Identifies 1 etiquette item that could be included in the policy | 1 |
| **Possible answer**   1. Don’t use caps lock 2. Don’t use text speak 3. Don’t be sarcastic 4. Always use respectful language   *There are many more* |  |

Supplementary page

Question number:

Supplementary page

Question number:

Supplementary page

Question number:

Supplementary page

Question number: