Semester 2 2020

ATAR course examinations 2020

Question/Answer booklet

**Year 11 ATAR COMPUTER SCIENCE AECSC**

Surname:

Other names:

WA student number (if known)

SIDE Teacher:

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

Source 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 programs or text (any brands or models of these calculators are permitted)

**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 | 118 | 40 |
| Section Two:  Extended answer | 5 | 5 | 110 | 102 | 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 2020*. 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 40%()**

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.

Questions 1 refers to information contained in the following scenario.

Melanie needs inputs a years’ worth of daily temperatures in degrees Fahrenheit as this is what the thermometers output. Each day she writes down the daily temperature and adds it to the previous days temperature. At the end of the year she calculates the average daily temperature.

Unfortunately, the area manager requires the temperatures to be in Celsius. The formula to convert is (C is reading in Celsius and F is for reading in Fahrenheit)

**C = (F-32) x 5/9**

**Question 1 (10 marks)**

Complete the algorithm required to enter and total all the Fahrenheit readings. Find the average in Fahrenheit and then convert it to Celsius. Assume 365 days in the year.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Initialize counter | 1 |
| For counter in range or below an integer value | 2 |
| Correct application of formula for total temp | 2 |
| Average Fahrenheit | 2 |
| Average celsius | 2 |
| Begin/end | 1 |
| **Total** | **10** |
| **Possible answer**  Begin  Day 0  For Day <365  Input (temp)  TotalTemp TotalTemp+temp  end for  Average TotalTemp/365  AverageCelsius (Average-32)x5/9  end |  |

**Question 2 (4 marks)**

Explain the following programming terms.

Logic error:

Syntax error:

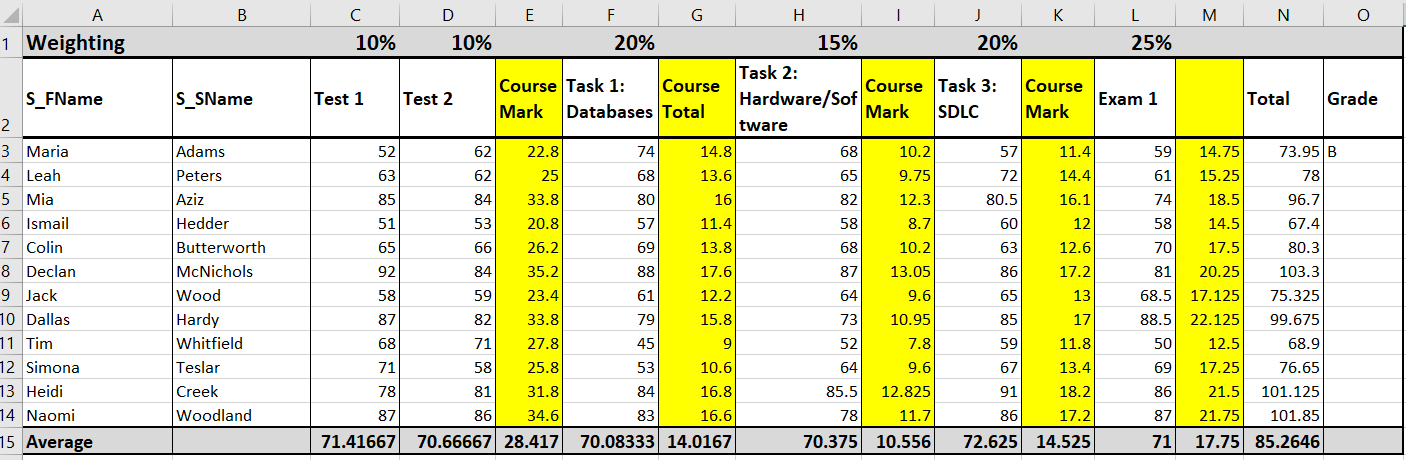
|  |  |
| --- | --- |
| **Key** | **Marks** |
| Explains logic error | 2 |
| Explains Syntax error | 2 |
|  | **4** |
| **Possible Answer**  A logic answer occurs when the program runs but produces an unexpected output. An example is dividing by 0.  A syntax error is an error in the grammatical structure of the code according to the rules of that programming language. It is not likely to run at all |  |

**Question 3 (4 marks)**

Complete the following table

|  |  |
| --- | --- |
| **Binary** | **Decimal** |
| 01010000 |  |
|  | 71 |
| 11000010 |  |
|  | 45 |

|  |  |
| --- | --- |
| **Key** |  |
| **Binary** | **Decimal** |
| 01010000 | **80** |
| **01000111** | 71 |
| 11000010 | **196** |
| **00101101** | 45 |

Questions 4 through to 6 refer to this spreadsheet data from Ms Gunther’s marksbook

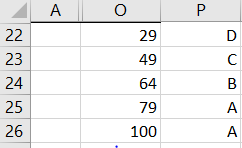
**Question 4 (9 marks)**

1. Write the formula contained in Cell C15:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Write the formula contained in Cell N15:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Write the formula contained in Cell I3: :\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **Key** | **Marks** |
| 1. Sum C1:C15 | 3 |
| 1. Sum N1:N15 | 3 |
| 1. **H3 \* H$1** | 3 |
| **Total** | **9** |

**Question 5 (4 marks)**

Using the following additional detail



Write a VLookup to calculate the Grade to go in Column O

|  |  |
| --- | --- |
| **Key** | **Marks** |
| =VLOOKUP(N3,O22:P26,2) | 4 |
|  |  |
|  | **4** |

**Question 5 (8 marks)**

A program is required to read three numbers, add them together and then print their total. Discuss what is the most appropriate data control structure for this problem? (2 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and discusses sequence – may identify with discussion loop | 2 |
| States only | 1 |
| **Total** | **2** |

1. Create the pseudocode for this problem below. (6 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Begin/end | 1 mark |
| Input 3 numbers – assign to 3 variables | 3 |
| Add the 3 variables | 2 |
| Output total | 1 |
| **Total** | **6** |
| **Possible Answer**  Begin  Enter(Num1,Num2,Num3)  Total Num1+Num2+Num3  Output(Total)  End |  |

**Question 6 (4 marks)**

Discuss two functions a router can have within a home environment.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies two and discusses | 3-4 marks |
| Identifies and discusses 1 | 0-2 |
| **Total** | 4 |
|  |  |
| **Possible Answer**  Within in the home environment, the router needs to connect home devices directly to the internet so will have a modem built in or attached to the router. The router will also have the ports required to attach wired devicese to the internet and therefore acts as a switch to create the LAN in the first instance. Because this is the entry point into a home and a security vulnerability, a router will often have a firewall function built in. Also a home router will act as a wireless access point to distribute access to the internet for wireless devices being used within the home. A home router can also act as a DHCP server and store as well as allocate IP addresses to devices accessing the network. |  |

**Question 7 (3 marks)**

Discuss the differences between router and a bridge.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and discusses over two differences | 3 marks |
| Identifies and discusses a difference | 2 |
| Identifies a difference – little discussion | 1 |
| **Total** |  |
| **Possible Answer**  A router routes packets of data along the most efficient route and may send different packets associated with same file along different pathways. A bridge connects two networks that operate differently. A bridge is concerned with the MAC address whist the router concerned with the IP address. |  |

**Question 8 (4 marks)**

Which of the following segments of code were planned to produce the output;

**2 4 6 8 10** ?

Explain your choice by discussing the output of all options.

|  |  |
| --- | --- |
| a) count = 2  repeat  count = count + 2  write(count)  until count = 10 | c) count = 2  repeat  write(count)  count = count + 2  until count = 10 |
| b) count = 2  repeat  write(count)  until count = 10 | d) count = 0  repeat  count = count + 2  write(count)  until count = 10 |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| **Correctly identifies that D would produce the correct sequence** | **1** |
| Discusses all options and correctly predicts output of each to justify choice of d | 3 |
| Discusses some or one of the options and correctly predicts the output of each. | 1-2 |
| **Total** | **4** |
| **Possible Answer**  Option A count will immediately enter the loop with a value of 2 and therefore the first printout would be 4. Option b count does not increment so it will stay as 2 and likely produce a logic or runtime error. Option c count enters the loop as 2 but will exit the loop as 10 without printing 10. Option D initializes the count at 0 and enters the loop as this value. Because the write is after the calculation, it will print 10 and then exit. |  |

**Question 9 (1 mark)**

What sort of errors are identified in a trace table?

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies that a trace table can help identify logic errors | 1 mark |

**Question 10 (15 marks)**

Complete a trace table for the following code for numbers 16, 40 and then 15, 41.

Begin

Num1 Input

Num2 Input

While Num1 != Num2

If Num1 > Num2 then

Num1 Num1-Num2

Else

Num2 Num2-Num1

End if

End while

Output Num1,Num2

End

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Completes the trace for the variables and  Enters both sets correctly (line 2 and 3) | 4 marks |
| Correctly traces condition | 1 mark |
| Correctly traces if and else  First set (correctly traces to 8 and exits)  Second set (correctly traces to 1 and exits)  Output | 2 marks  6 marks  2 |
| **Total** | **15 Marks** |
| **Possible Answer**  **First numbers**   |  |  |  |  | | --- | --- | --- | --- | | **Num1** | **Num2** | **Num1!=Num2** | **output** | | 16 | 40 | Y |  | |  | 24 | Y |  | |  | 8 | Y |  | | 8 |  | n | 8,8 | |  |  |  |  | | 15 | 41 | Y |  | |  | 26 | Y |  | |  | 11 | Y |  | | 4 |  | Y |  | |  | 7 | Y |  | |  | 3 | Y |  | | 1 |  | Y |  | |  | 2 | Y |  | |  | 1 | N | 1,1 | |  |

**Question 11 (4 marks)**

Referring to components within a system unit, discuss the fetch-execute cycle.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Fully discusses the fetch execute cycle referring to 4 components used within the system | 4 |
| Discusses the fetch execute cycle referring to 3 components within the system | 3 |
| Discusses the fetch execute cycle referring to 2 components | 2 |
| Superficial statement | 1 |
|  | **4 marks** |
| **Possible Answer**  The fetch execute cycle has four stages  During fetch – the program counter dictates which instruction is next and the Control unit dictates which data is fetched from RAM.  The instruction is decoded using the CPU which will then also execute the instruction.  The instructions results will be stored temporarily into a register. |  |

**Question 12 (5 marks)**

Complete the following table by writing in which protocol/standard best matches the description provided.

**TCP/IP**; **SMTP**; **HTTP**; **WAP**; and **FTP**.

|  |  |
| --- | --- |
| **Protocol/Standard** | **Description of Purpose/Definition** |
|  | Data transfer protocol used on the World Wide Web |
|  | Set of standards for implementing wireless local area network (WLAN) |
|  | Standard [network protocol](http://en.wikipedia.org/wiki/Network_protocol) used to copy a file from one host to another over a [TCP](http://en.wikipedia.org/wiki/Transmission_Control_Protocol)-based network |
|  | Basic Communication Protocol of the Internet. |
|  | An internet standard for electronic mail. |

**Marking Key – 1 mark each correct**

|  |  |
| --- | --- |
| **Protocol/Standard** | **Description of Purpose/Definition** |
| HTTP | Data transfer protocol used on the World Wide Web |
| WAP | Set of standards for implementing wireless local area network (WLAN) |
| FTP | Standard [network protocol](http://en.wikipedia.org/wiki/Network_protocol) used to copy a file from one host to another over a [TCP](http://en.wikipedia.org/wiki/Transmission_Control_Protocol)-based network |
| TCP/IP | Basic Communication Protocol of the Internet. |
| SMTP | An internet standard for electronic mail. |

**Question 13 (9 marks)**

Anthony is a medical specialist and has concerns that some of his sensitive electronic communication about his patients has been compromised. Discuss

1. the legal obligations to ensure the security of his data. (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses fully referring to x 2 legal obligations | 3 |
| Discusses fully referring to 1 obligation | 2 |
| Refers to an obligation with little discussion | 1 |
| **Possible Answer**  Anthony should be securing his data given that it is so sensitive in nature. This should be happening when he stores the data anywhere and when he transmits the data by email or using FTP protocols. The Privacy Act of 1988 does set out 13 principles that businesses should abide by. Given this is medical information, Anthony should take all precautions to secure his data | **3 marks** |

1. Discuss three (3) measures he can implement to secure the data on his network and when using the internet. (6 marks)

1:

2:

3:

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses x 3 measures | 5-6 |
| Discusses x 2 measures | 3-4 |
| Discusses x 1 measure | 1-2 |
| **Possible Answer** |  |
| 1. Private/public key encryption could be deployed to ensure that messages are sent and received only when parties have the correct cypher. This will protect his emails during transmission if they contain sensitive data. |  |
| 1. Encryption of the data in its storage location. This will ensure that if the data is stolen, it is unreadable and the sensitivity of the data protected. |  |
| 1. Installing a Firewall will help to minimize malicious intrusions that impact data security. The Firewall will restrict messages from getting into the network by blocking known malicious sites. |  |
| 1. Physical security of the server and any storage device using authentication to enter locked room. This will prevent physical theft of the data and ensure unauthorized access is minimized. |  |

**Question 14 (6 marks)**

Identify in which stage the following activities will occur in the System Development Life will occur:

|  |  |
| --- | --- |
| **Activity** | **Stage** |
| Data Flow Diagrams |  |
| Hardware Purchase |  |
| Entity Relationship Diagrams |  |
| Software coding |  |
| Work shadowing |  |
| Feasibility Study |  |
| System Documentation |  |

|  |  |
| --- | --- |
| **Activity** | **Stage** |
| Data Flow Diagrams | Analysis or Design stage |
| Hardware Purchase | Development stage |
| Entity Relationship Diagrams | Analysis or Design |
| Software coding | Development |
| Work shadowing | Analysis |
| Feasibility Study | Preliminary Analysis |
| System Documentation | Design |

**Question 15 (4 marks)**

Discuss two advantages and two disadvantages of a Standard Operating System.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses 2 advantages and 2 disadvantages | 4 |
| Discusses 3 of (both included though) | 3 |
| Discusses an advantage and a disadvantage | 2 |
| Discusses either 1 advantage or 1 disadvantage | **1** |
|  | **4 marks** |
| **Possible Answer**  An SOE has the advantages associated with efficiency and potentially decreased costs due to buying in bulk. Efficiency is accomplished when rolling out the SOE as it can be deployed in the same way on the same type of machines. Businesses can also benefit from the potential of buying in bulk and technical issues are the same system wide so predictability in problems arising and proficiency in solving these problems.  Disadvantages include the inability to incorporate either power users or users who do not use the entire capability of the minimum software and hardware specifications. Another disadvantage is that there needs to be specifically trained administrators to manage the SOE. |  |

**Question 16 (3 marks)**

Complete the following table identifying key features of software licensing types.

|  |  |
| --- | --- |
| **License Type** | **Features** |
| Freeware |  |
| Shareware |  |
| Open Source |  |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies a key feature of each software type | 3 |
| Identifies a key feature of 2 software types | 2 |
| Identifies a key feature of 1 software type | 1 |
|  | **3 marks** |
| **Possible Answer** |  |

**Question 17 (7 marks)**

Draw an Entity Relationship Diagram (ERD) to represent the following scenarios. Show Primary keys and Foreign keys.

1. Angelo visits a clinic and to see his Doctor at a scheduled appointment time. He has complex needs so will see his Doctor several times. (5 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| 3 primary keys and 2 foreign keys | 5 |
| Cardinality correct and relationships | 2 |
|  | **7 marks** |
| **Possible Answer** |  |

Doctor

1

Has

Appointment

Patient

Has

M

1

M

**Question 18 (3 marks)**

Identify the features of WiMax and discuss the advantages and disadvantages of using WiMax as a communication medium.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses an advantage and a disadvantage fully and identifies its features | 3 |
| Identify a feature and an advantage and disadvantage | 2 |
| States an advantage or disadvantage and a feature | 1 |
|  | **3 marks** |
| **Possible Answer**  WiMax stands for the Worldwide Operability for Microwave Access and it is a series of standards set up so that this wireless medium can deliver high bandwidth and secure transfer of data. It was used in the 4G mobile phone network but was superceded by other protocols that provided more reliable line of sight performance and high latency levels. |  |
|  |  |

**Question 19 (7 marks)**

In order to keep track of the new software development, Fred has listed the following activities.

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Task** | **Duration** | **Dependency** |
| 1 | Discuss needs to client | 1 day |  |
| 2 | Develop Requirements Analysis | 2 days | 1 |
| 3 | Seek feedback from client | 1 day | 2 |
| 4 | Analyse detailed requirements | 1 | 3 |
| 5 | Design the data and algorithms | 4 | 4 |
| 6 | Code data structures and instructions | 3 | 5 |
| 7 | Debug syntax and logic errors | 2 | 6 |
| 8 | Test to meet specifications | 1 | 6,7 |
| 9 | Document internally and externally | 3 |  |
| 10 | Implement and test with live data | 2 | 8,9 |
| 11 | Evaluate performance | 2 | 10 |

Complete a GANTT chart for the project below. (7 marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correct duration for tasks (some, most all) | 1-3 |
| Correct dependencies indicated (some, most, all) | 1-3 |
| Correct duration | 1 |
|  | **7 marks** |
| **Possible Answer** |  |

**Question 20 (8 marks)**

1. Identify the characteristics of variable data types in the table below. Provide an example to illustrate when they are used.

|  |  |  |
| --- | --- | --- |
| **Variable Data Type** | **Variable Data Characteristics** | **Example** |
| Real |  |  |
| Char |  |  |
| Boolean |  |  |
| Integer |  |  |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies a key characteristic and provides an example for each data type x 4 | 5-8 |
| Correctly identifies a key characteristic | 0-4 |
|  | **8** |
| **Possible Answer**   |  |  |  | | --- | --- | --- | | **Variable Data Type** | **Variable Data Characteristics** | **Example** | | Real | Used for numbers that are decimals or negative. | 1.021 would be a real as it is a decimal | | Char | Used for when only a few characters are being used. | For instance the variable required to assign gender might be a char F or M or O | | Boolean | Used when there is often only 2 choices | Radio buttons are often set up as Boolean- on or off | | Integer | Whole numbers | 1,2,3, useful when using a counter. | |  |

1. Discuss the difference between machine programming languages and procedural programming languages. (2 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies a difference between machine and procedural languages | 2 |
| States a characteristic of machine and/or procedural languages | 1 |
|  | **2** |
| **Possible Answer**  A machine programming language is comprised of 0’s and 1’s. It is low level and used to directly control the machine. Procedural programming languages are much more high level and need to be compiled into a machine language. They use English like statements. |  |

End of section

**Section Two: Extended answer 60% (102 Marks)**

This section has **five (5)** 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 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: 110 minutes.

Questions 21 through to 25 refer to the Source Booklet

Trand Pty Ltd have decided to automate their Administration system

**Question 21 (17 Marks)**

Create a context diagram for Trand Pty Ltd’s Administration System .

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities 1-4 (Departments, Employees, Job Agency*)* | 4 marks |
| **Vectors:**  Departments  Employees  Job Agency | 1-7  1-5  1-2 |
| Total | 17 |
| **Possible Answer**  A picture containing text, map  Description generated with very high confidence |  |

**Question 22 (26 Marks)**

Create a Level 0 Data Flow Diagram for the Centro City Waves reception area.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities 1-3*must balance with Context* | 3 marks |
| **Processes and Vectors (must balance with Context)**   1. Job Advertisement Process (1 + 3) 2. Resume Vetting (1 + 4) 3. Selection process (1 + 2) 4. Start Induction (1+4) 5. Agency Payment process (1 + 2) | 4  5  3  5  4 |
| **Datastore**  **With appropriate data stored and used by processes** | 2 |
| Total | 26 |
|  |  |
| Possible Answer  A close up of a map  Description generated with very high confidence |  |

**Question 23 (23 Marks)**

The analyst has strongly recommended a Relational Database system be created to manage the Reception System.

1. Discuss why a Relational Database Management system would be recommend referring to specific examples within the data. (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses with reference to 2-3 characteristics of a RDBMS | 3 |
| States with reference to only 1 characteristic | 2 |
| Little discussion | 1 |
| **Possible Answer**  An RDBMS is likely to reduce the number of copies of data such as the Induction certificates and the personal details. Putting all this in one area means it is more easily secured. Management would also be able to run reports on the data to see patterns in the way they are using the data. So they can make better decisions. |  |

1. Create an Entity Relationship Diagram to represent the data shown in the spreadsheet on page 2 of the Source Booklet (Figure 1). Show Primary/Foreign keys and all attributes. (12 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities with correct cardinality | 2 |
| Foreign keys | 1 |
| Primary keys | 2 |
| Attributes | 7 |
| **Possible Answer**  **A close up of a map  Description generated with high confidence** |  |

1. When the analyst was checking, it was found that Erick Blasst and Olaf Morgan worked in two departments.

Draw the new Entity Relationship Diagram to represent this change in business rules. Show only Primary and Foreign keys on the entities. (9 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| All entities | 3 |
| Correct cardinality | 2 |
| Primary and foreign keys | 4 |
| **Total** | **9** |
|  |  |
| **Possible Answer**  **A close up of a map  Description generated with very high confidence** |  |

**Question 24 (26 Marks)**

1. Trand Pty Ltd have decided to award a pay 4% payrise for all employees except manufacturing who will receive a 4.5% payrise. There are 100 employees in total.

Write the algorithm below required to implement this increase. You will use the variables Department, Salary, NewSalary, and Staffname. Your algorithm will output “Staffname, your new salary is NewSalary”.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Begin/end  Inputs | 2  2 |
| If statement  Correct Total calculation  Output | 3  2  3 |
|  |  |
| **Total** | **12** |
|  |  |
| **Possible Answer**  Begin  Input(Staffname)  Input(Department)  If Department = ‘Manufacturing’  NewSalary Salary + 0.045(Salary)  Else  NewSalary Salary + 0.040(Salary)  End if  Output(Staffname, “your new salary is”, NewSalary)  End |  |
|  |  |

1. Write a case statement that will calculate the tax payable for the NewSalary’s.

Your algorithm will output the TaxRate and the TaxPayable on their NewSalary.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Begin/end | 2 |
| Case statement – Tax begin/end  Shelves | 2  7 |
| Output | 3 |
| **Total** | **14** |
|  |  |
| **Possible Answer**  Begin  Input(Staffname)  Input(NewSalary)  Case of Tax  NewSalary>95000: TaxRate 0.4  94999> NewSalary>65000: TaxRate 0.3  64999> NewSalary>55000: TaxRate 0.28  45999> NewSalary>45000: TaxRate 0.25  44999> NewSalary>35000: TaxRate 0.20  34999> NewSalary>25000: TaxRate 0.15  54999> NewSalary>5000: TaxRate 0.00  End Case  Output(TaxRate)  Output(NewSalary x TaxRate)  End |  |
|  |  |

**Question 25 (10 Marks)**

The Analyst has also recommended the following changes to occur

* A client server arrangement with the new server located in the Files office
* A combination of WiFi and wired Local Area Network to be located and accessible throughout the whole building.

1. Discuss the advantages and disadvantages of a client server arrangement for Trand Pty Ltd.Blue. (4 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses 2 advantages and 2 disadvantages | 4 |
| Discusses advantage/disadvantage 3 of | 3 |
| Discusses an advantage and a disadvantage | 2 |
| States an advantage/disadvantage – little discussion | 1 |
| **Total** | **4** |
| **Possible Answer**  A client server arrangement would mean that the resources are located on the server and the clients or other devices request those services. This allows for greater control of the data being used as everything can be secured on the server in a secure room. It also means that, in relation to accessing the internet, there only needs to be one connection so resources are conserved. However a client server arrangement does mean that the company hires or trains someone to look after it as it requires specialist knowledge. Servers can be expensive and having important data stored in one location could be dangerous in terms of security if something happened to the server. |  |
|  |  |

1. Identify and describe the devices necessary to establish and secure this network.

(6 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and describes at least two devices necessary to create the network | 0-4 |
| Discusses a device that can help secure the network | 2 |
| **Total** | **6** |
| **Possible Answer**  Two devices required would be a switch and a wireless access point. The switch would be used to create both the LAN and the WAN in the first instance as it would allow all devices to join the network if they pass security credentials. To secure the network, the Wireless access point should have WPA 2 protocols that encrypts the wireless network and ensures only authorized users can connect via network software installed on the server. A physical firewall can also be installed onto the network to secure it and it’s data from malicious data theft |  |
|  |  |

End of questions