BOON LAY SECONDARY SCHOOL

PRELIMINARY EXAMINATION

2022

Name	
CCA	

Subject	:	**COMPUTING**
Paper No	:	**1**
Subject Code	:	**7155/01**
Level	:	**SECONDARY FOUR EXPRESS**
Date/Day	:	**XX XXX 20XX / XXXXESDAY**
Time	:	**XXXX – XXXX**
Duration	:	**2 HOURS**

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Before you start your exam, check that you have received the correct paper and the number of printed pages are correct.

Write your name, index number, and CCA in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.

Approved calculators are allowed.

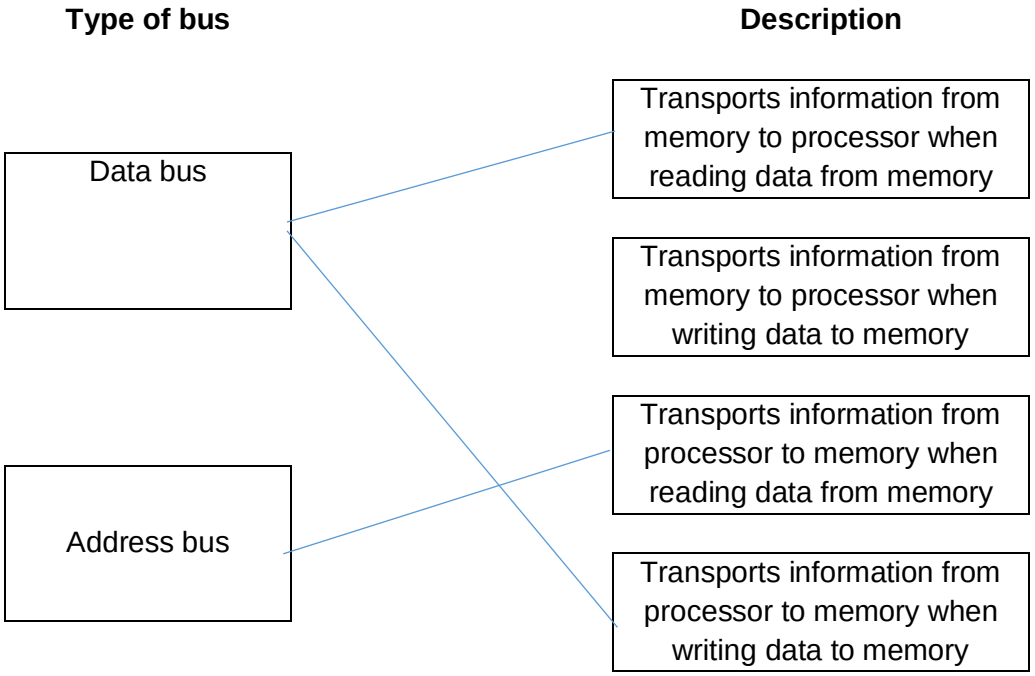
Answer **all** questions.

The number of marks is given in brackets [ ] at the end of each question or part question.
You should show all your working.
The total number of marks for this paper is 80.

1 **(a)** A computer is a complex electronic device that utilizes many different components to perform calculations and output the desired results.

(i) Buses are used to transfer data from one part of a computer to another.

Draw one or more lines to match the type of bus (left) to their correct description(s) (right).



[2]

(ii) What are the two components inside a CPU and what are their respective functions?

Component 1 : Control Unit

Function: Coordinates all input, output and data transfer functions in the computer

……

……...[2]

Component 2 : Arithmetic Logic Unit

Function: Performs all logical and mathematical calculations

……

……...[2]

(b) RAM is placed near to the CPU as it is a “volatile” memory.

(i) Explain the term “volatile” in this context.

It means that data will be erased once the memory loses power.

……

……...[1]

(ii) State two functions of RAM.

It stores data and programs that are frequently used.

It stores temporary data or results from intermediate calculations.

……

……...[2]

(iii) Other than being volatile, state another characteristic of RAM and explain why it is placed near the CPU.

It is very fast – able to read and write very quickly.

It is placed near the CPU to reduce the time needed to transfer data between the CPU and the RAM.

……...[2]

(c) Data for longer-termed storage is usually kept in secondary storage drives.

(i) Provide an example of data that is usually kept in secondary storage drives and explain your choice.

An archive of photos / Any other reasonable answer.

As an archive, the photos do not need to be accessed frequently and can thus be stored on secondary storages which are slower but also cheaper.

……...[2]

(ii) Explain how data in secondary storage devices can be accidentally damaged without internet access.

There could be malfunctions in the reading and writing sequences that caused data corruption. OR, there could have been an interruption during the transmission of data resulting in the loss of data.

……...[2]

2 **(a)** A simple home network can allow for devices in a home to connect to the internet.

(i) State the function of the following networking hardware.

Network interface controller

Allows a computer or hardware to connect to a network.

……

……...[1]

Network hub

Receives an input packet and broadcasts it to all the devices connected to it.

……

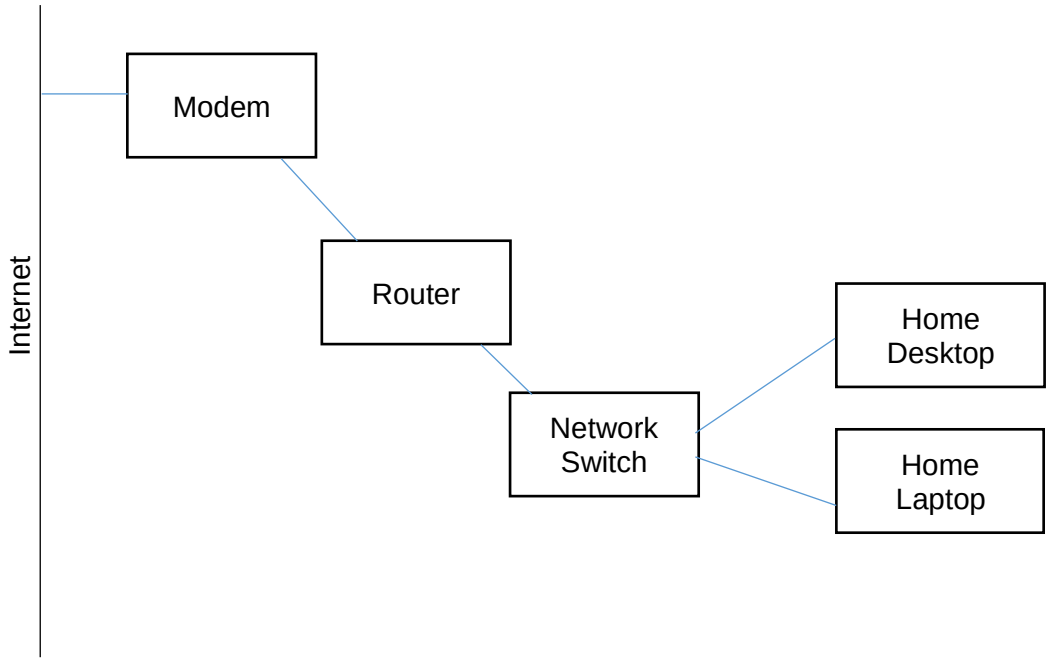
……...[1]

(ii) In the space provided below, construct a simple home network that would allow devices to connect to the internet.

Your network must consist of the following:

- Modem
- Router
- Network Switch

You should use well labelled boxes to represent the hardware.



[3]

(b) **(i)** State and explain if a home network should use a wired or wireless setup.

(Accept either answer with reasonable justifications)

Wired – higher speed, more secure, reliable

Wireless – decent speed, higher mobility, easy to add devices.

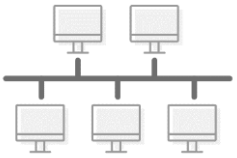
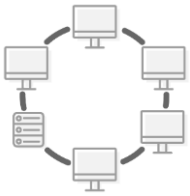
……

……

……...[3]

(ii) The table below shows three common network topologies.

Label them with their correct names and state a feature of each topology.

			
Name	Bus	Ring	Star
Feature	Unidirectional	Messages travel through all computers in the network	Easy to add / remove nodes

[6]

(c) **(i)** Explain the need for parity bits and checksums in data transmissions.

During transmission, there can be packet (data) losses due to transmission errors that might occur over long distances. Parity bits and checksums provide a simple low-level method to determine if packets received are correct.

……...[2]

(ii) Explain how checksums can be used in a network.

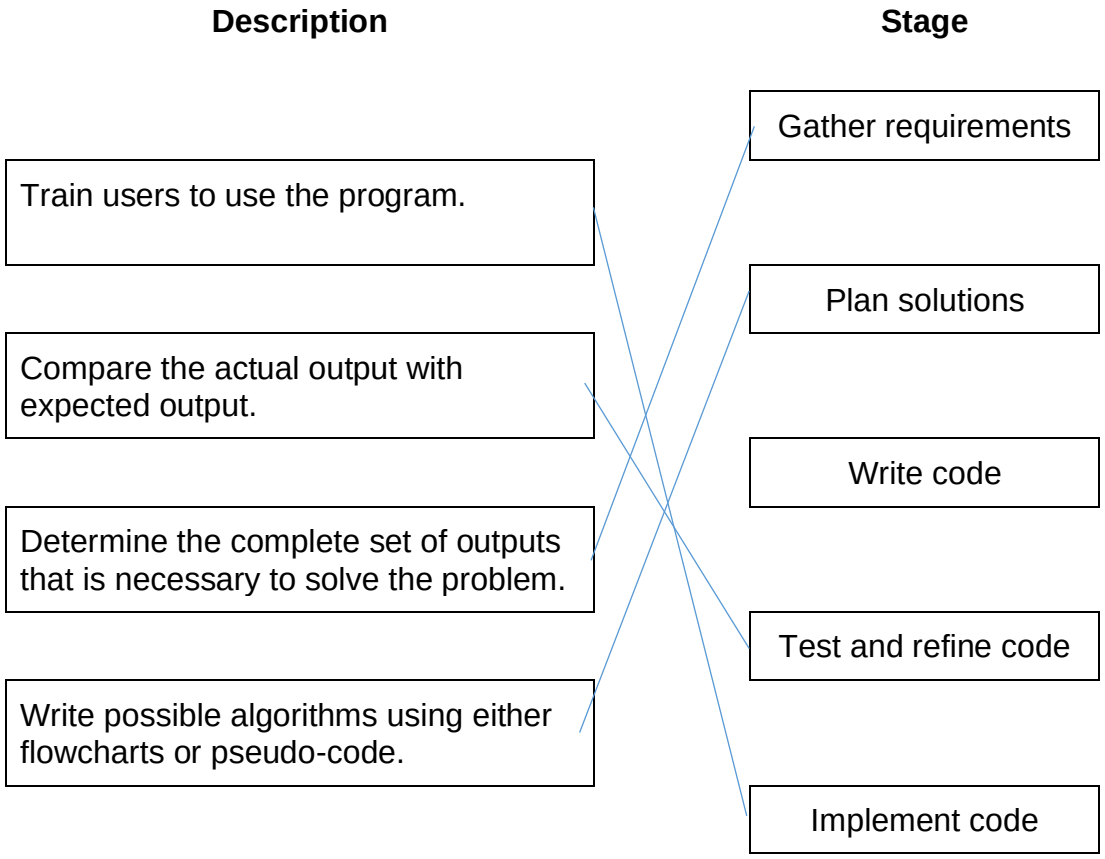
A checksum is calculated using a predetermined hashing function (calculation steps) and is applied on every packet of data. This checksum is also transmitted to the receiver. When the receiver receives the data packet and the checksum, it will generate its own checksum value from the data packet to determine its integrity.

……

……...[3]

3 **(a)** The development of a program involves many stages.

(i) Draw lines to connect the descriptions on the left to the correct stages of developing a program on the right.



[2]

(ii) Explain why it is necessary to plan, test and refine the code before implementing it.

It is to ensure that the exact requirements of the program are known so that time spent writing code will be meaningful. This also allows the programmer to cater to the necessary error, boundary and normal test cases that are required.

……...[2]

(b) The code below was found in an unnamed python file without any instructions.

Study the code carefully and answer the questions that follow.

```
list1 = ["M", "na", "i", "Ke"]
list2 = ["y", "me", "s", "lly"]
list3 = []

for i in range(len(list1)):
    list3.append(list1[i]+list2[i])

print(list3)
```

(i) Trace the code shown above and complete the tracetable below.

i	list1[i]	list2[i]	list3
0	M	Y	My
1	na	me	My name
2	i	s	My name is
3	Ke	lly	My name is Kelly
4			

[4]

(ii) What is the function of this code?

It combines the elements from both lists with the name index.

……...[1]

(iii) State a type of check that can be implemented for this program and explain why it would be useful.

Presence check. It would determine if there is data in the element before attempting

to join them. Trying to access a list element that does not exist will result in an error.

……

……...[2]

(c) Python is considered an interpreted language. In programming terms, explain the difference between an interpreter and complier.

Compiler languages will read through all the code and compile them into low level code

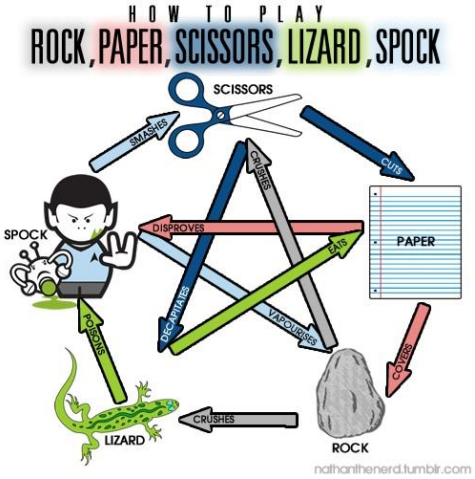
that the computer understands. Any error is picked up during compilation.

Interpreters read and run code at the same time and thus pick up errors during execution.

……..[2]

4 A game of rock-paper-scissors-lizard-spock is played between two players on a computer.

It is played like the traditional rock-scissors-paper but has two more possible moves.



A computer program is to be written to play this game. The first player to reach 3 consecutive wins will win the game.

(a) **(i)** State possible inputs for this game.

Choice of hand (Rock, Paper, Scissors, Lizard, Spock) for each player

……..[1]

(ii) State the possible outputs for this game.

The outcome of each round, the number of consecutive wins for each player

……..[1]

(iii) State the possible processes involved in this game.

Determine who wins, and counting the number of wins for each player.

……..[1]

(b) A student studying GCE O-Level Computing says that he can apply the principles of pattern recognition and generalisation to this problem and will be able to solve all the possible combinations if he can solve one of them.

Explain what is meant by pattern recognition, generalisation, and how such principles can be used to handle this programming problem.

For each hand that is played, there are two other hands that result in a win, and two other hands that result in a loss. This is known as generalisation, where a complex problem can be generalised into a simpler one.

Once one hand is solved, the same algorithm can be applied on other hands since they all share similar characteristics (2 other hands will win, 2 other hands will lose). This is known as pattern recognition.

……

……..[4]

(c) In a particular round, a player plays “Spock”.

Using pseudo code, write code to determine if the player wins.

You may make use of the following structures where required.

INPUT, IF… THEN …ELSEIF…END IF, WHILE… ENDWHILE…, FOR… NEXT

```
IF USER1 == SPOCK

THEN IF USER2 == PAPER OR USER2 == LIZARD

THEN USER2 WINS

ELSEIF USER2 == SCISSORS or USER2 == ROCK

THEN USER1 WINS

END IF
```

[4]

5 **(a)** Malicious software, or malware, refers to software that is intentionally used to damage, disrupt, or gain unauthorised access to a computer system.

Name two types of malware and describe their distinguishing features.

Malware 1: spyware

Description

Collects data by spying on a terminal and sending it to unauthorised personnel.

……

……..[2]

Malware 2: cookies

Description

Unencrypted data in cookies can be used to track your browsing habits or retrieve personal information or credentials.

……..[2]

(b) **(i)** Explain why students might be the target of a phishing attempt.

(Accept any reasonable answer) – Personal data for ransom / Possibly ignorant or easy targets

……

……...[2]

(ii) Describe how a phishing attempt might be carried out on a group of students.

(Accept any reasonable answer) – Emails posing as school authorities, asking for information

……

……...[2]

(iii) Explain how students can prevent themselves from falling prey to phishing attempts.

Verify the requests with trusted adults. Never revealing credentials online.

(Accept any reasonable answer)

……

……...[2]

(c) Explain what plagiarism is and describe at least two negative effects it can produce.

Plagiarism is the act of taking someone else's work and attempting to pass it off as your own

Effect 1 – defamation or loss of reputation of the original author if the work is used in unintended ways

Effect 2 – loss of income for the original author

Effect 3 – loss of motivation to produce better work

Effect 4 – misrepresentation or misinterpretation of work resulting in harm

……...[3]

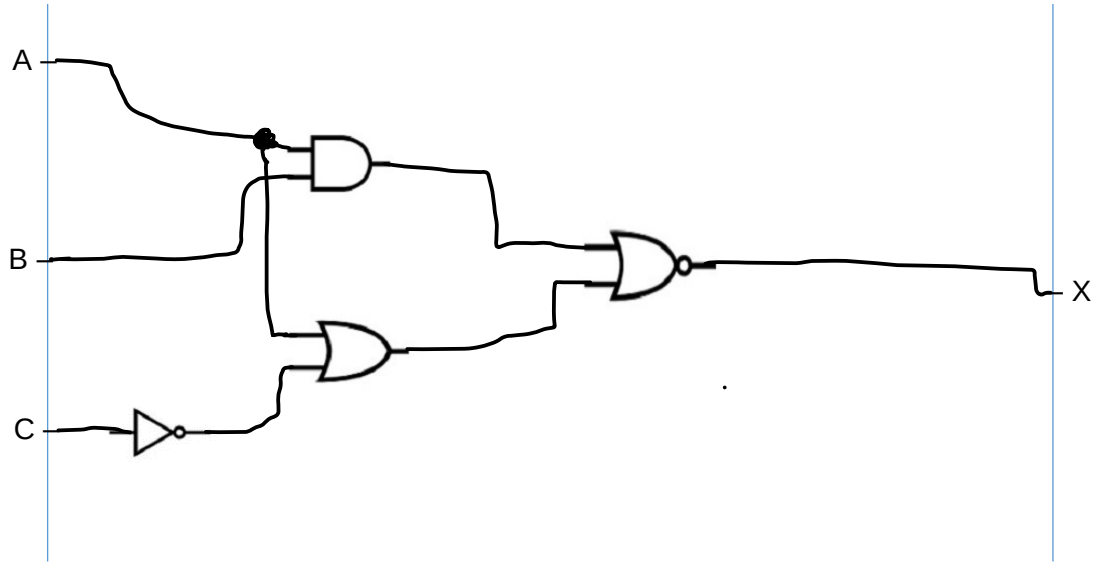
6 **(a)** Describe a Boolean data type.

It only contains 1s or 0s.

……..[1]

(b) A logic circuit has the following Boolean statement: **X = (A AND B) NOR (A OR (NOT C))**

In the space below, construct the logic circuit using the correct symbols.



[4]

(c) Complete the truth table below for the Boolean statement:

X = (A AND B) NOR (A OR (NOT C))

A	B	C		X
0	0	0		0
0	0	1		1
0	1	0		0
0	1	1		1
1	0	0		0
1	0	1		0
1	1	0		0
1	1	1		0

[4]