BOON LAY SECONDARY SCHOOL

PRELIMINARY EXAMINATION

2021

Name	
CCA	

Subject	:	**COMPUTING**
Paper No	:	**1**
Subject Code	:	**7155/01**
Level	:	**SECONDARY FOUR EXPRESS**
Date/Day	:	**30th AUGUST 2021 / MONDAY**
Time	:	**1100 – 1300**
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.

This document consists of **13** printed pages.

1 Digital systems make use of several different methods to store data.

a **(i)** Explain what is meant by “hexadecimal digits”.

……

……...[1]

(ii) Describe two examples where a hexadecimal storage system would be preferred over a denary system.

……

……

……...[2]

(iii) Justify the use of hexadecimal storage systems in **one** of your examples in **a(ii)**.

……

……...[1]

b **(i)** The character Omega, “Ω” is represented by the binary number 11101010 in ASCII. Convert 11101010 into a denary number. Show your working.

……...[1]

(ii) The character “j” is represented by the denary number 106 in ASCII. Describe a method to convert 106 into its hexadecimal representation.

……

……

……

……

……...[3]

2 **a** Where appropriate, draw a line to match the terms to its correct description.

Terms			**Description**
DoS attack			
Cookie			A small piece of data used by websites to store personal information on a user’s web browser.
Encryption			Hidden program that secretly collects personal information.
Phishing			Flooding network with useless traffic, making the network slow or inaccessible.
Software piracy			Sending fake or spoof emails.

Worms

[4]

b **(i)** What are cybersecurity threats and how can they affect our data security?

……

……

……...[2]

(ii) In the context of computer systems, explain the difference between a computer worm, and a computer virus.

……

……...[2]

(iii) A key-logger is software that records every keystroke that has been entered into a computer system. Explain how a key-logger can be used as a part of a system's security, or as spyware.

As a part of a system's security

……

……

……...[2]

As a spyware

……

……

……...[2]

(c) **(i)** What is 'software piracy'?

……

……...[1]

(ii) Provide two possible reasons that causes software piracy to occur.

……

……

……...[2]

(iii) Describe possible positive and negative effects of software piracy on the software industry.

Positive

……

……...[1]

Negative

……

……...[1]

3 **a** Decomposition, Pattern Recognition and Generalisation are three common problem solving techniques.

(i) Describe how decomposition helps in problem-solving and algorithm design.

……

……...[1]

(ii) One approach to decomposing is modularity. Describe what this is.

……

……[1]

(iii) What is Pattern Recognition? How is it useful in solving problems?

……

……

……[2]

b Read the following lines of code.

```
1  string_1 = 'this is a string 1234AZ!@#$%'
2  count = 0
3  for i in range(len(string_1)):
4      if string_1[i].isalpha():
           count += 1
5  print(count)
```

(i) What is the function of this code?

……

……[1]

(ii) Explain how this code can be used for other similar situations with minimal modifications.

……

……

……[2]

(iii) In the code provided, suggest a replacement for the variable name `count` that is more self-explanatory.

……

……[1]

4 a (i) Besides magnetic storage devices, there are two other types of external storage technologies found in a computer system. List their corresponding example and describe each of them in terms of their advantage and disadvantage.

Type 1: Optical Storage

Example: ……

Advantage: ……

Disadvantage: ……..[3]

Type 2: Solid-State Storage

Example: ……

Advantage: ……

Disadvantage: ……..[3]

(ii) State what RAM stands for, and explain how it differs from Read Only Memory.

……

……

……...[2]

b Explain the difference between an address bus and a data bus in a computer.

……

……

……...[2]

5 **a** In the space below, construct the logic circuit diagram for the following Boolean statement.

X = (A OR B) NAND ((NOT A) AND C))

[4]

b Construct the truth table for the Boolean statement:

X = (A OR B) NAND ((NOT A) AND C))

A	**B**	**C**							
0	0	0							
0	0	1							
0	1	0							
0	1	1							
1	0	0							
1	0	1							
1	1	0							

1	1	1							

[4]

6 a (i) Suggest why a network of computing devices (computers, laptops, handphones, printers) could be useful at home.

……

……[1]

(ii) Suggest how the setup of a home network compares to the computer network in a school computer lab in terms of :

Data access control

……

……[1]

Preference for network interface (Wired or wireless connections)

……

……[1]

b The diagram below shows a network of computers that are connected to the internet.

(i) Identify the network topology shown above and justify your answer.

……

……

……[2]

(ii) What is a network interface card?

……

……[1]

(iii) From the diagram shown, identify components P and Q and state their functions.

Component P

Name:
..………………………………………………………………………………………………...[1]

Function: ……………………………………………………………………………………......

…………………………………………………………………………………………………......[1]

Component Q

Name:
....[1]

Function: ....

....[1
]

(c) **(i)** Why is there a need for checksums in data transmission?

....

....

....[2]

(ii) Briefly explain how checksums are implemented in data transmission.

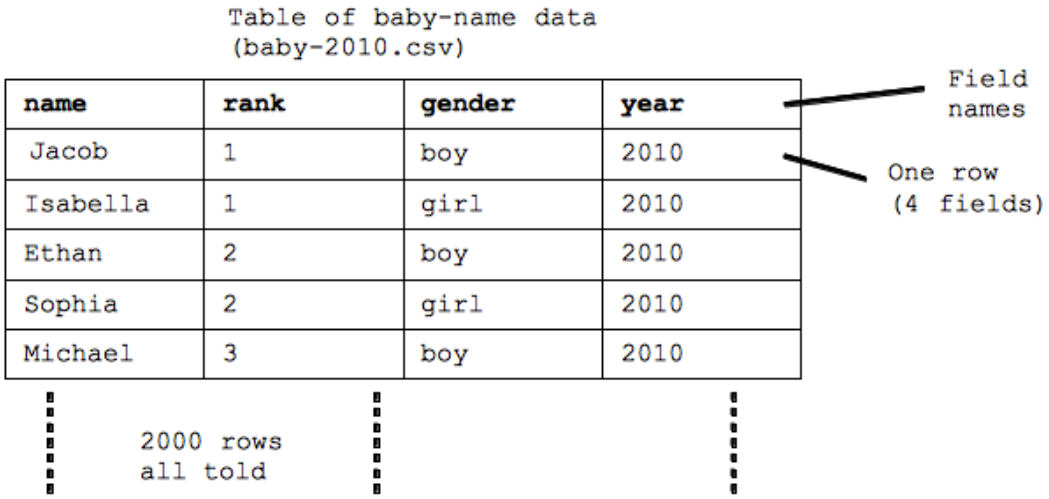
....

....

....

....[3]

7 The diagram below shows a table that tabulates information about the most popular names of babies in 2010.



a What data types should be used in the following columns?

(i) name: ……[1]

(ii) rank: ……[1]

b What function can be used to obtain the following information from the table?

(i) The rank of the name “Ethan” in 2010.

……[1]

(ii) The number of characters in each name.

……[1]

(c) Describe an algorithm that can be implemented in the table to determine if any of the names is repeated.

……
.

……
.

……[2]

8 A particular computer program was designed to obtain numerical inputs from the user and output the following information:

- the number of items entered
- the smallest number
- the largest number
- the average of all the numbers

(a) Describe a validation check that should be implemented on the input so that the program runs correctly.

……
.

……
.

……[2]

(b) Using either pseudocode or a flowchart, produce an algorithm for the computer program described above. You do not have to implement the validation check.

[6]