

ST. PATRICK'S SCHOOL PRELIMINARY EXAMINATION 2021

SUBJECT	:	Computing Paper 1 (7155/01)	DATE :	23 August 2021
LEVEL	:	Secondary 4 Express	DURATION :	2 hours

Candidates answer on the Question Paper.

INSTRUCTIONS TO CANDIDATES:

Write your Name, Class and Index No. in the spaces at the top of this page. Write in dark blue or back pen. You may use a soft pencil for any diagrams or graphs. Do not use staples, paper clips, glue or correction fluid.

Answer all the questions.

The use of an approved scientific calculator is expected, where appropriate. You are reminded of the need for clear presentation in your answers.

The number of marks is given in brackets [] at the end of each question or part question. The total number of marks for this paper is 80.

INFORMATION FOR CANDIDATES:

The allocated marks for each question are indicated in the brackets [].

For Examiner's Use		
Score	/80	

This question paper consists of 16 printed pages, including the cover page.

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1 Five items of computer architecture and six descriptions are given.

Draw **one** line from each item to its appropriate description.

ltem		Description
Data bus		Transfers required memory location from processor to memory; uni- directional
	1	
Address bus		Stores data, instructions and the results of processing for immediate use
Secondary storage		Extremely fast but small data storage spaces used directly by the ALU and control unit
Memory		Transfers data between memory and processor; bi-directional
Processor register		Stores large amounts of data that will not be lost when power supply is interrupted
		Processes data and follows instructions; consists of an arithmetic logic unit and a control unit

- 2 A software company is creating an online learning portal for adult learners.
 - (a) The user must first register an account in the portal. The user will then receive a verification email. Upon successful verification, the user can now login to the portal.

In the portal, a registered user will be able to access the profile page where he/she can edit his/her personal information, email address, password and profile picture.

The user can also access the courses page where he/she can view the details of the various courses available and select the courses that he/she wishes to enroll. Upon enrolling into a course, he/she can access the course materials and the portal will automatically track his/her learning progress.

During the planning stage, the problem must be decomposed into smaller, more manageable parts called modules.

Identify and describe two of these modules.

(b)

	1	
•	~	
	2	
•		[2]
	Another team in the company is responsible in creating a detective strategy game where the player assume the role of a detective. In one part of the game, the detective can access the files of the suspects.	
	Identify two common elements between this game and the learning portal described in part (a) .	
	1	
-		
	2	

[2]

3 Consider the following algorithm.

```
01 Ratio_1 = 0
02 Ratio_2 = 0
03 INPUT Bigger_Num
04 INPUT Smaller_Num
05 Ratio_1 = ROUND(Bigger_Num/Smaller_Num, 3)
06 Ratio_2 = ROUND((Bigger_Num + Smaller_Num)/Bigger_Num, 3)
07 IF Ratio_1 == Ratio_2 THEN
08 OUTPUT True
09 ELSE
09 OUTPUT False
09 ENDIF
```

(a) Complete the following trace table for the algorithm.

Use the data Bigger Num = 61.84, Smaller Num = 38.22 as input.

Bigger_Num	Smaller_Num	Ratio_1	Ratio_2	OUTPUT

[2]

(b) The algorithm does not include validation on the inputs.

Name and describe one validation check that could be added to validate the inputs.

(c)	Decide on the data validation technique you would used in the algorithm and give a reason on your decision.	
		[2]
(d)	For each of the following test case conditions, give one example of the test data that you would use to test the above algorithm.	
	Normal Test Case	
		[1]
	Error Test Case	
		[1]
	Boundary Test Case	
		[1]
		[.]
In ge	eneral, there are five stages in developing a program.	
For be d	each of the following stages, describe the goal of the stage and describe one task that can lone during that stage.	
Gat	her Requirements Stage	
Goa	l	
Tasl	k	

Plan Solutions Stage

4

Goal	
Task	
	[4]

5 When we use a programming language, the source code must be translated into machine code before it can be run. Source code can be translated by a compiler or an interpreter.

Describe **one** advantage that a compiler has over an interpreter and **one** advantage that an interpreter has over a compiler.

Advantage of a compiler

6

Advantage of an interpreter [2] A multinational social enterprise sets up its main headquarters in Country A and establishes another office in Country B. (a) State the type of network that would be suitable to enable the office in Country B to share information with its main headquarters in Country A.[1] (b) The office in Country B uses a Local Area Network (LAN) where both wired and wireless connections are used to connect the different computers and other network devices. Describe two possible examples with reasons why the office in Country B uses both wired and wireless connections.

[4]

(c) The social enterprise packs canned food for refugees. The flowchart below checks the weight of each canned food to determine whether it can be packed in the box. The maximum number of canned food that can be packed in a box is 6. Each canned food should only weigh between 589 and 599 grams. The number of canned food accepted and rejected is output.



Complete the trace table for the following data.

589, 590, 580, 592, 591, 599, 600, 595

Trace table

Accepted	Rejected	Canned	OUTPUT

(d) From the flowchart in (c), identify one variable and one constant.

(i)	Variable	
	Constant	
		[2]

[Turn over

		(ii)	State the difference between a variable and a constant.	
	(e)	Stud each refer	ly the flowchart in (c) . There is a need to calculate and output the average weight of n can in a box. Describe the changes required to the algorithm, making the necessary rences to the flowchart.	[2]
				[3]
7	Cyb mor and (a)	erattao e com pharm State	cks are intentional attempts to damage, disrupt or gain unauthorized access to one or puter systems through the Internet. Financial institutions are very wary of phishing ning attacks. e two tell-tale signs to identify phishing emails.	
	1			
	2			
	(b)	Expl	ain one measure that can be taken to protect against pharming.	[2]
				[1]

8 Complete the following paragraphs by filling in the missing words.

When Person A takes Person B's work and submit it as his/her own work without Person B's permission, Person A has committed infringement and

There are also laws against the crime of copying, distributing and/or using proprietary software		
illegally, also called software		
software we are installing requires a program called	that	
modifies proprietary software so that it cannot detect that	it is being used illegally.	

9 With the advent of technology, the healthcare industry has underwent many changes.

Give two positive impacts of using technology in healthcare.	
1	
2	
	_
Give two negative impacts of using technology in healthcare.	[2]
1	-
	•
2	•
	[2]
-	Give two positive impacts of using technology in healthcare.

[4]

- **10** Data corruption and loss can happen due to human error. For example, multiple users working on the same file may accidentally overwrite each other's data.
 - (a) Identify one way to prevent data corruption and loss due to overwriting errors.

..... [1] (b) Administrators often use file permissions settings on operating systems to manage user access and rights to a particular data. State one reason why this access control measure may still not prevent unauthorised access. [1] Convert the positive denary number 63 into an 8-bit binary number. (a) Show your working clearly. Answer [2] (b) Convert the binary number **1010 0001** into its hexadecimal equivalent. Show your working clearly. [2] Answer (c) State **two** examples where hexadecimal is used to represent binary. 1 2 [2]

11

(d) Describe how the binary number **0101 1110** is converted into a positive whole denary number. Give the denary value in your answer.

Denary value _____[4]

12 (a) Identify the logic gate that the following truth table represents.

Α	В	Х
0	0	0
0	1	0
1	0	0
1	1	1

.....[1]

(b) Complete the following truth table to represent a NAND gate.

Α	В	Х
0	0	
0	1	
1	0	
1	1	

[1]

(c) Draw a logic circuit to represent the following Boolean statement. All logic gates must have a maximum of **two** inputs. Do **not** simplify the Boolean statement.

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



(d) Complete the truth table for the Boolean statement:

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

Α	В	С	Working Space	X
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]

- **13** A binary comparison module is programmed.
 - A 12-bit binary number is hard-coded into the source code.
 - The user inputs a 12-bit binary number to compare with the above stored binary number.
 - If it is a match, the module outputs "Pass".
 - If it is not a match, the module outputs "Fail. Try Again.".

Write an algorithm, using pseudo-code, program code or a flowchart, for the above module.

 [5]

End of Paper