

Computing

Paper 1

7155/01 15 September 2021 2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

Approved calculators are allowed.

Answer **all** questions. No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together. The number of marks is given in brackets [] at the end of each question or part question. You should show all your working.

The maximum number of marks is 80.



Setter: Ms Lee Poh Tin

Parent's Signature:____

This question paper consists of 15 printed pages and 1 blank page.

1 (a) Draw a line between the description and the correct stage in developing a program.

Description	Stage
	Gather requirements
Train users to use the program.	
	Plan solutions
Compare the actual output with expected output.	
	Write code
Determine the complete set of outputs that is necessary to solve the problem.	
	Test and refine code
Write possible algorithms using either flowcharts or pseudo-code.	
	Implement code

[4]

 (b) A program may use constants, variables and arrays. Describe an array. Give an example to explain the advantage of using arrays.
 Description
 Example
 [2]

- 2 A Local Area Network (LAN) is a network of computing devices connected within a small geographical area.
 - A LAN can have both wired and wireless connections. (a) (i) Give an advantage of using wired connection.[1] (ii) Give an advantage of using wireless connection. [1] (b) Identify and describe the function of two network devices that could be used in a LAN. Component 1 Description Component 2 Description [4]

(a) Convert 1810 KiB of memory to bytes.[1] (b) Convert 60416 MiB to GiB.[1] In an image file, 16 bits are used to represent each pixel of the image. The (c) image file has 6144 pixels. Calculate the size of the image file in bytes.

[1]

(d) Memory can be volatile or non-volatile. Give an example of volatile memory and an example of non-volatile memory.

Volatile memory	
Non-volatile memo	ory

[2]

3 Memory is the part of the computer that stores data.

4 A class of 20 students have taken their temperatures. For students who have temperature 38 degrees celsius or above, the Form Teacher needs to report their records to the school office.

(a)	State the inputs.	
		[1]
(b)	State the outputs.	
		[1]
(c)	Describe the processes required.	
		[1]

- **5** Data bus and address bus are components of a computer.
 - (a) State the function of the address bus.

		[1]
(b)	State the function of the data bus.	

......[1]

6 Name the type of cyberattacks described in the table below.

Type of cyberattack
r

7 (a) Explain how the binary number **11010111** is converted into a denary number.

[2]

- (b) Hexadecimal RGB codes represent colours.
 - (i) **E9A4B8** is an example of a hexadecimal RGB code.

Complete the table to convert each hexadecimal digit to its 4-bit binary value.

RGB code	E	9	Α	4	В	8
4-bit binary						

[3]

(ii) RGB colours comprise of Red, Green and Blue values. The Green value of one colour is **211** in denary.

Convert 211 into hexadecimal.

......[1]

(iii) RGB codes are one example of where hexadecimal is used to represent binary.

State two other examples where hexadecimal is used to represent binary.

1	
2	 [2]

8 The pseudo-code below inputs data on name, mass and height. The predefined function round (x, 0) will return the nearest whole number for x. For example, round (19.79, 0) will return 20; and round (19.79, 1) will return 19.8.

```
max = 0
FOR i = 0 to 2
INPUT name, mass, height
bmi = round(mass / (height * height), 1)
IF bmi > max
max = bmi
person = name
ENDIF
NEXT
OUTPUT person, round(max,0)
```

(a) Complete the trace table for this pseudo-code using the following test data.ALI, 52.5, 1.6, SARAH, 49, 1.5, TOMMY, 63.5, 1.8

i	name	mass	height	bmi	max	person	OUTPUT

- (b) Data validation is a process of ensuring that the input data satisfies a set of requirements. Range check is a data validation which checks that value entered is between an upper value and a lower value.
 - (i) Complete the following pseudo-code to perform range check on the height input. You may assume that height is positive and the tallest person in the world is 2.8 metres. The algorithm should continually prompt for a new height until a valid height is entered.

(ii) For each test case condition in the following table, give an example of different test data for the height in **part (b)(i)**. Your test data should not be from part (a).

Test case condition	Test data for height
Normal	
Error	
Boundary	

[3]

(c) Identify two other different validation checks in the description below.

Description	Validation Check
Ensure input data is not too short or too long.	
Ensure all the required inputs are provided.	

9 An algorithm has been written in the pseudo-code below to count the number of students in a class of 50 students taking each respective subject. The algorithm then displays the number of students taking each respective subject. Any subject taken by the student which cannot be found is categorized as "others".

The pseudo-code makes use of the function find(array, item), which returns the index of the first occurrence of the specific item. If the item is not found in the array, the find(array, item) function returns -1.

In this pseudo-code, the index of arrays starts from 0.

```
01
     subjects = [bengali, chinese, hindi, malay, tamil, others]
02
     number = [0, 0, 0, 0, 0]
03
     FOR count = 0 to 50
04
          INPUT student subject
05
          index = find(subjects, student subject)
06
          IF index = -1
07
               number[index] = number + 1
08
          ELSE
09
               number[5] = number[5] + 1
10
          ENDIF
11
     NEXT
12
     FOR count = 0 to 5
          OUTPUT subjects[5], number[5]
13
14
     NEXT
```

(a) Identify **one** variable used in the pseudo-code.

(b) There are **four** errors in this pseudo-code. Locate the errors and state the correct pseudo-code.

Error 1
Correction
Error 2
Correction
Error 3
Correction
Error 4
Correction

[8]

- **10** A hospital uses technology in its operating theatres, outpatient clinics and inpatient wards.
 - (a) State a social benefit to the patients for the use of technology in hospital.

		[1]
(b)	State a negative social impact to the patients for the use of technology in hospital.	
		[1]
(c)	State an economic impact to the hospital for the use of technology.	
		[1]
(d)	State an ethical issue which may arise due to the use of technology in hospital.	
		[1]

11 (a) Draw the logic circuit to represent the following Boolean statement. Do **not** simplify the statement.



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

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

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

Α	в	С	Working Space	Х
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		
		•		

(c) State, using the truth table from **part (b)**, the single logic gate that can be used to represent the Boolean statement.

......[1]

12 A human resource manager wants to find out the number of employees whose salary is below the average salary and number of employees whose salary is above the average salary in the company. The company has 80 employees.

Write an algorithm using pseudo-code to

- input the salary for all 80 employees and store it in an array;
- output the average salary of the 80 employees;
- output how many employees have salary which is below the average salary;
- output how many employees have salary which is above the average salary.

You do **not** need to validate the inputs.

[7]

13 A programmer wants to develop a program to count the number of punctuations in a string of characters. The punctuations include ".", "?" and "!".

Write an algorithm using a flowchart to

- ask the user to enter a string of characters
- output the number of times the punctuations appear in the string of characters.

You do **not** need to validate any data entered. In the flowchart, you may use the predefined function len(text) which will return the number of characters in the string text.

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