Bukit View Secondary School

Secondary 4 Express
Preliminary Examination 2023

CANDIDATE NAME	
CLASS	

INDEX NUMBER

COMPUTING   **7155/01**
Paper 1   **25 August 2023**
                                                              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.

For Examiner's use
Marks
80

Setter: Ms Lee Poh Tin   **Parent's Signature:_____**

This question paper consists of **18** printed pages.

1 A Science teacher records the first Weighted Assessment (WA1) marks of 20 students who are registered for the subject. The full marks of this WA1 Science Paper is 25 marks. The marks of students who were absent from the WA1 are recorded as VR (Valid Reasons) if they have Medical Certificates; otherwise, they are given zero mark. The teacher will need to produce a report on a list of students who need remedial lessons and their marks. Students who scored less than 40% will need remedial lessons.

(a) Specify the inputs, stating the requirements for valid inputs.

....

....

.... [2]

(b) Specify the outputs, stating the requirements for correct outputs.

....

.... [1]

2 A software company develops software for the consumers to use technology for entertainment.

(a) Describe **one** positive social impact for people to use technology in entertainment.

....

....

....

.... [2]

(b) Describe **one** negative social impact for people to use technology in entertainment.

....

....

....

.... [2]

3 Four descriptions of spreadsheet functions are on the left, and five spreadsheet functions are on the right.

Draw **one** line to link each description to the correct spreadsheet function.

Description	Spreadsheet Function

LARGE

Returns the most frequently occurring or repetitive value in the set of given numbers.

MEDIAN

Returns the largest value in the set of given numbers.

AVERAGE

Returns the number in the middle of the set of given numbers.

MAX

Returns the k-th largest value in the set of given numbers.

CEILING.MATH

MODE.SNGL

[4]

4   An English Language Teacher uses a spreadsheet to keep track of students scores.

There are 4 assessments in a year, namely WA1 (Weighted Assessment 1), WA2 (Weighted Assessment 2), WA3 (Weighted Assessment 3) and EOY (End of Year Exam). The weightage of the respective assessments is shown in the table below. The overall marks is calculated based on the weighted sum of the various assessments. Students who score at least 50 marks overall have passed the subject.

Assessment	Weightage
WA1	15%
WA2	15%
WA3	15%
EOY Exam	55%

The spreadsheet is shown:

	A	B	C	D	E	F
1	English Language Sores of Class 1A					
2						
3	Student	WA1	WA2	WA3	EOY	Overall
4	ST01	65	72	58	61	62.8
5	ST02	36	52	69	42	46.65
6	ST03	80	75	77	71	73.85
7	ST04	79	70	65	61	65.65
8	ST05	48	64	60	78	68.7
9	ST06	57	42	61	59	56.45
10	ST07	49	45	56	40	44.5
11	ST08	68	73	82	75	74.7
12						
13	Number of students passing the subject:					6

(a)   State the formula for cell F4 to calculate the overall marks for student ST01.

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

(b)   The cell F13 shows the number of students passing the subject.
Identify the function in cell F13.

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

(c)   The text color of cells F4 to F11 changes to green if the student passes the the subject. Identify the spreadsheet feature used to change the colour of the cells depending on their value.

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

5 A kindergarten is planning to have a computer network for the staff working at the kindergarten.

(a) The operation manager has decided to set up a wireless computer network for the kindergarten.

(i) Describe **one** advantage of a wireless computer network compared to a wired network for the kindergarten.

....

....

....

.... [2]

(ii) Describe **one** disadvantage of a wireless computer network compared to a wired network for the kindergarten.

....

....

....

.... [2]

(b) Describe the function of a wireless access point.

....

.... [1]

6 Parity check is an error checking method to ensure that the data received at the destination is the same as the source.

(a) The 7-bit binary value of 0110011 is to be transmitted from one computer to another computer on a network which uses the odd parity check with a prepended parity bit. Fill in the boxes below to show the final 8-bit binary value which will transmitted over the network.

[1]

(b) State the limitation of the parity checking method.

....

.... [1]

(c) Identify and describe **one** other error checking method that could be used to detect errors in data transmission.

Error checking method ....

Description ....

....

....

....

....

[3]

7 There are various privacy and security threats that may impact the computer users.

Complete the following paragraphs by filling in the missing words.

A .... is a computer program that pretends to be a harmless

file or useful application. Once this program is run, it does something harmful

such as giving intruders .... access to the computer instead.

.... involves the use of emails and fake websites that appear

to be from reputable companies in order to steal personal information such as

passwords and credit card numbers from users.

A .... is a computer program that runs automatically and

attempts to spread by sending copies of itself to other computers; it does not

need to attach itself to an existing program.   [4]

8 **(a)**   The following table lists some statements about storage devices.
       Tick (✓) one or more boxes in each row to determine whether the statement
       applies to each component.

Statement	Storage Devices			
	RAM	ROM	SSD	Hard Disk
It is a primary storage.				
It does **not** have any moving part.				
It is volatile.				

[3]

(b)   Convert **28.5 GiB** of memory to MiB.

……………………………………………………………………………………………

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

9 (a) Convert the binary number **10111000** into a hexadecimal number.
Show your working.

…………………………………………………………………………………

…………………………………………………………………………………

………………………………………………………………………… [1]

(b) Convert the denary number **199** into a hexadecimal number.
Show your working.

…………………………………………………………………………………

…………………………………………………………………………………

………………………………………………………………………… [1]

(c) Identify the largest denary number formed by a 8 bit binary number.

…………………………………………………………………………………

………………………………………………………………………… [1]

(d) Describe, using an example, how a binary number is converted into a
denary number.

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

………………………………………………………………………… [3]

10 Data validation is a process of ensuring that the input data satisfies a set of requirements.

The possible grades which can be obtained from a Music Test are A, B, C, D, E and F.

(a) Complete the following pseudo-code by extending it to perform validation check on the `grade` input. The algorithm should continually prompt for another grade until a valid grade is entered.

```
OUTPUT "Enter the music grade: "
INPUT grade
```

....

....

....

.... [2]

(b) The algorithm is tested with three **different** test case conditions.

Identify 3 **different** test case conditions in the following table and give a **different** example of test data for each condition.

Test case condition	Test data

[3]

11 The pseudo-code below inputs 5 numbers. The predefined function ROUND(num, dp) will return the rounded value of num to dp decimal places. For example, ROUND(7.35, 0) will return 7 and ROUND(7.35, 1) will return 7.4.

```
FUNCTION calculateFinal(mark1, mark2)

     RETURN 0.7 * mark1 + 0.3 * mark2

ENDFUNCTION


FUNCTION calculateGrade(mark)

     IF mark < 50

          grade = "Fail"

     ELSEIF mark < 75

          grade = "Credit"

     ELSE

          grade = "Dist"

     ENFIF

     RETURN grade

ENDFUNCTION

# The main program in pseudo-code is:

count=0

FOR i = 0 to 3

     INPUT score1, score2

     result = ROUND(calculateFinal(score1, score2),0)

     status = calculateGrade(result)

     IF status == "Fail"

          OUTPUT "Try harder"

     ELSEIF status == "Credit"

          OUTPUT "Fine"

     ELSE

          OUTPUT "Well done"

          count = count + 1

     ENDIF

NEXT i

OUTPUT count
```

(a) Complete the trace table for this pseudo-code using the following test data.

45, 63, 82, 65, 92, 36, 52, 40

Main program							calculateFinal()
i	score1	Score2	result	status	count	Output	Value returned

[5]

(b) Give an advantage of using functions.

....

.... [1]

(c) Identify an user-defined function from the pseudo-code.

.... [1]

(d) Identify a global variable from the pseudo-code.

.... [1]

(e) Describe the purpose of the variable `count` in the given pseudo-code.

....

....

....

.... [2]

Error 2 ....

Correction ....

....

Error 3 ....

Correction ....

....

Error 4 ....

Correction ....

....

[8]

(b) One method of debugging program errors is walking through a program. State another **different** debugging technique.

.... [1]

13 A canteen operator decides to install a vending machine in the canteen.

Write an algorithm using program code or pseudo-code to
- initialize, using the table below, the price of the 6 drinks in a list which starts with index 0

Item Number	Drinks	Price
1	Coke	$1.20
2	Milo	$1.60
3	Milk	$1.30
4	Soya Bean	$0.90
5	Orange Juice	$1.70
6	Apple Juice	$1.70

- input the item number selected by the customer

- input the cash payment by the customer

- if the cash payment is insufficient for the selected item, a message `"Insufficient cash. Return cash."` will be displayed and the cash will be returned; otherwise, the drink is dispensed and the change will be displayed and dispensed

- prompt the customer "Do you wish to have another item (Y/N)?". If the customer wants another item, the above process will be repeated

- output the total amount paid by the customer

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

[5]

14 Write an algorithm using flowchart to count the number of vowels in a word. Vowels are the following letters: a, e, i, o, u.

You are required to
- ask the user to enter a word
- output the number of vowels in the word

You do **not** need to validate any data entered. You may assume the user inputs are also in lowercase. You may wish to use the predefined function `len(word)` which will return the number of characters in the word.

[5]

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

$$Z = ((NOT\ A)\ NOR\ B)\ OR\ (A\ NAND\ C)$$
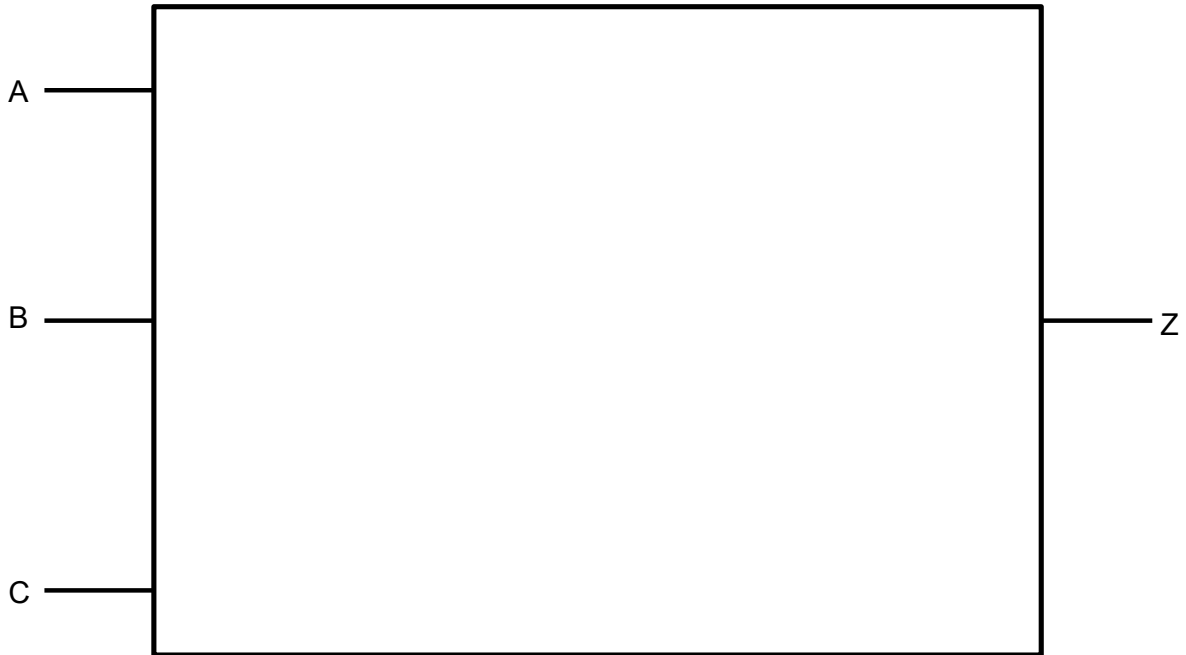
[4]

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

$$Z = ((NOT\ A)\ NOR\ B)\ OR\ (A\ NAND\ C)$$

A	B	C	Working Space	Z
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]

- End of paper -