XINMIN SECONDARY SCHOOL

新民中学

SEKOLAH MENENGAH XINMIN

Preliminary Examination 2020

CANDIDATE NAME

CLASS

INDEX NUMBER

COMPUTING
Paper 1 – Written

7155/01

16 Sep 2020

Secondary 4 Express

2 Hours

Setter: Mr Lim Kim Soon
Vetter: Mr Lee Foo Yong

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
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.

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

For Examiner's Use	
Total	/80
Parent's Signature	

1   A computer has many different components.

Study each statement. Tick to show whether the statement is True or False.

Statement	True	False
Registers are physically located inside the processor.		
Data on the address bus travels bi-directionally.		
Data and instructions on the ROM are used for startup only.		
Typically, solid state type of storage device transfers data faster than magnetic but slower than optical storage devices.		

[4]

2 Hexadecimal notation is often used in computing.

(a) List **two** uses of hexadecimal notation in computer science.

1 ....

2 .... [2]

(b) State **two** advantages of using hexadecimal notation to represent binary values.

1 ....

....

2 ....

.... [2]

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

(a) Decomposition is a technique of breaking down a complex problem into smaller parts.

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

....

....

.... [2]

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

....

....

.... [2]

(b) What is Pattern Recognition? How is it useful to solving problems?

....

....

....

.... [3]

4 A computer network is a system of two or more computers that are connected together by a transmission medium for the exchange of data.

(a) Modem is a device responsible for modulation and demodulation? What is modulation?

....

....

.... [2]

(b) What is the function of a router?

....

....

.... [2]

(c) State and explain **one** advantage of a wired network over a wireless network.

....

....

.... [2]

(d) State and explain **one** advantage of a wireless network over a wired network.

....

....

.... [2]

5 Data can become corrupted or lost due to malicious software.

(a) Identify **two** methods to prevent our computers from malicious software.

1 ....

....

2 ....

.... [2]

(b) Describe the following terms and explain how they could be used in cyberattacks. Your description must clearly state the difference between the two terms.

Phishing ....

....

....

Pharming ....

.... [4]

....

6 Source codes are translated into machine codes using compiler or interpreter.

(a) Describe an interpreter.

....

....

.... [2]

(b) State **two** advantages that it has over a compiler.

1. ....

....

2. ....

.... [2]

(c) State **two** disadvantages that it has compared to a compiler.

1. ....

....

2. ....

.... [2]

7 You are required to write an algorithm that:

- accepts an input of a string
- outputs the number of letters in the string
- outputs the number of digits in the string
- outputs the number of characters in the string that is not letter and not digit

Write the algorithm using pseudo-code or flowchart.

[8]

8 A school wants to know how many of its Secondary 1 students needs to be put in the PRIDE programme (for students whose BMI is greater than 27.0). BMI is calculated using the formula

$$BMI = mass\ (in\ kilograms)/height^2\ (in\ metres)$$

Study the following pseudo-code.

```
Count_student = 0

Total_for_pride = 0

INPUT number_sec_1

WHILE Count_student <= number_sec_1 DO

    INPUT weight

    INPUT height

    bmi = weight / height * height

    IF bmi >= 27.0 THEN

        Total_for_pride = Total_for_pride + 1

    ENDIF

ENDWHILE

OUTPUT Total_for_pride
```

(a) There are **four** errors in the given algorithm.

State each error **and** write the correct pseudo-code.

Error 1

....

Correction

....

Error 2

....

Correction

....

Error 3

……………………………………………………………………………………

Correction

……………………………………………………………………………………

Error 4

……………………………………………………………………………………

[8]

Correction

……………………………………………………………………………………

(b) The algorithm does not include validation on input.

(i) Name and describe **one** validation check that could be added to validate the input for the number of secondary one students.

…………………………………………………………………………………...

…………………………………………………………………………………...

…………………………………………………………………………………...

…………………………………………………………………………………... [2]

(ii) Name **one** other different general validation check, other than your answer above.

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

(c) Software testing is important to verify that our program does what it is supposed to do. In your own words, describe why it is important to design good test cases.

……………………………………………………………………………………

……………………………………………………………………………………

…………………………………………………………………………………… [2]

(d) In the following year, the school decided that the program should validate that weight should be at least 15kg.

Identify **two** test conditions that should be used to test the algorithm for weight.

For the condition, give an example of test data for this algorithm.

Test conditions	Test data

[4]

9 A bank has the following spreadsheet, which shows the records of lump sum repayment loans taken out by its customers.

	A	B	C	D	E	F
1	ABC Bank - Loans with Lump Sum Repayments					
2						
3	**Account ID**	**Loan Principal**	**Period (in Months)**	**Interest (Annum)**	**Payment Due**	**Risky?**
4	M0025	$5,000.00	12	4.50%	$5,229.70	NO
5	M0026	$2,800.00	36	3.50%	$3,109.51	NO
6	F0027	$900.00	4	5.50%	$916.61	YES
7	M0028	$9,000.00	16	4.50%	$9,555.46	NO
8	F0029	$17,000.00	30	4.00%	$18,784.78	NO
9	F0030	$9,200.00	24	4.00%	$9,964.92	NO
10	F0031	$200.00	9	5.50%	$208.40	YES
11	M0032	$500.00	2	5.50%	$504.59	YES
12	M0033	$21,000.00	40	3.50%	$23,594.63	NO
13	M0034	$7,000.00	2	5.50%	$7,064.31	NO
14	F0035	$5,500.00	30	4.00%	$6,077.43	NO
15						
16	Amount Loaned:	$78,100.00				
17	Range of Loans:	$20,800.00				

(a) State the type of data that is held in each of the following cells.

B4 ………………………………………………………………………………………….

C4 ………………………………………………………………………………………….

D4 …………………………………………………………………………………………. [3]

(b) **(i)** In cell **B16**, the function gives the total of cells B4:B14.

Identify the most appropriate function to use in this cell.

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

(ii) In cell **B17**, the formula shows the difference between the highest and the lowest Loan Principal.

Write the formula to use in this cell.

…………………………………………………………………………….. [2]

(iii) In cell **E4**, the formula gives the lump sum repayment amount at the end of the loan period.

Write the formula to use for this cell.

[2]

……………………………………………………………………………..

(iv) The formula in cell **F4** shows if the particular loan is risky or otherwise. The loan is risky if the Loan Principal is less than or equal to $1000.00 and the loan Period is less than or equal to 4 months.
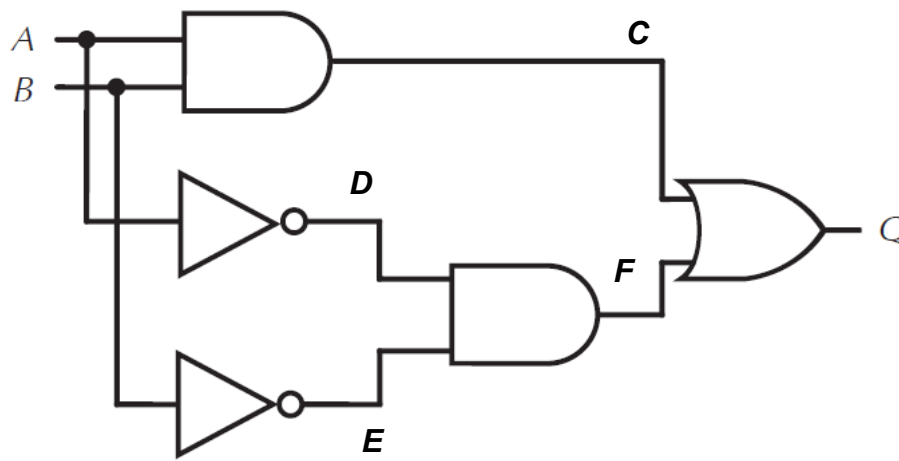
Write the formula used in cell **F4**.

…………………………………………………………………………….. [2]

10 (a) A two-way switch involves the use of a logic circuit to allow a single light to be switched on and off from 2 different locations. The diagram shows how Q can be lighted on/off through A and B switches.
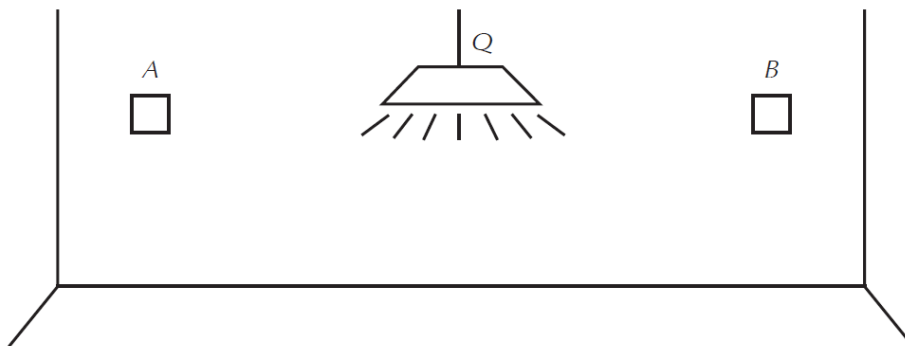
The logic circuit for such a two-way switch system can be designed as follows (**C**, **D**, **E** and **F** are intermediate inputs of the system):

(i) Write down the Boolean statement for this system.

………………………………………………………………………………….... [2]

(ii) In your own words, describe how this logic circuit works. Use the intermediate inputs to help you in your description.

……………………………………………………………………………………....

……………………………………………………………………………………....

……………………………………………………………………………………....

……………………………………………………………………………………....

……………………………………………………………………………………....

……………………………………………………………………………………....

……………………………………………………………………………………....

………………………………………………………………………………….... [4]

(b) Draw the truth table for a 2 input NAND gate.

[4]

End of paper