ZHONGHUA SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2019
SECONDARY 4 EXPRESS

Candidate's Name	Class	Register Number

COMPUTING

7155/01

Paper 1

19 September 2019
2 hours

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** the questions.
Write your answers in this question booklet.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of a scientific calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

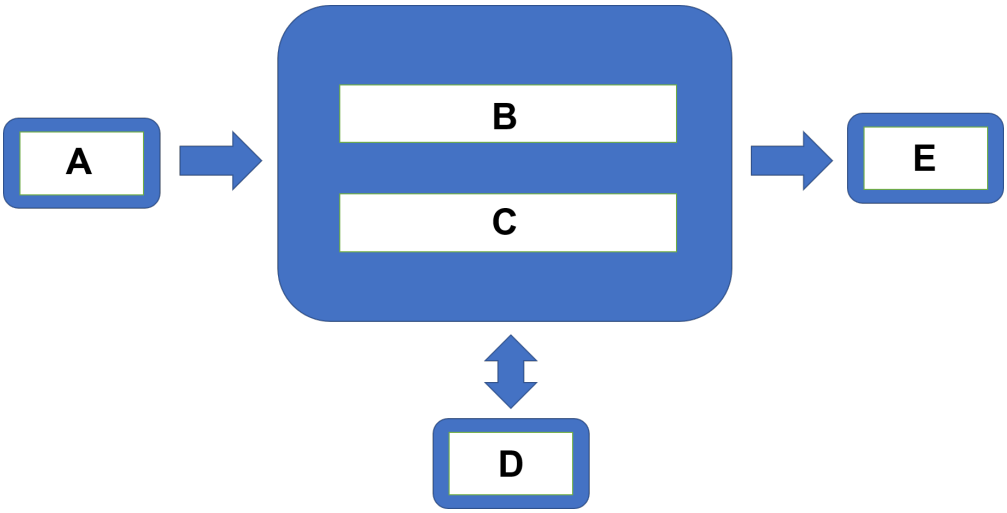
At the end of the presentation, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is **80**.

For Examiner's Use:

Setter: Mr. Calvin Heng
Vetter: Mr. Low Kee Ley

1 The following is a simplified computer architecture diagram.



Complete the Table:

Label	Name of Device	Purpose of Device	
A			[2]
B			[2]
C			[2]
D			[2]
E			[2]

2 (a) Describe one difference between a LAN and a WAN. [2]

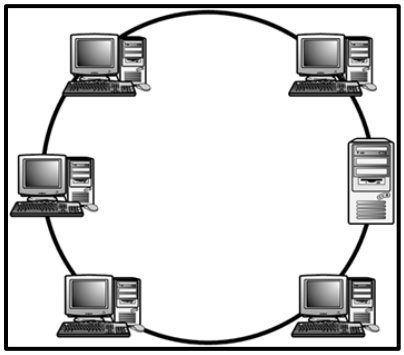
_____

_____

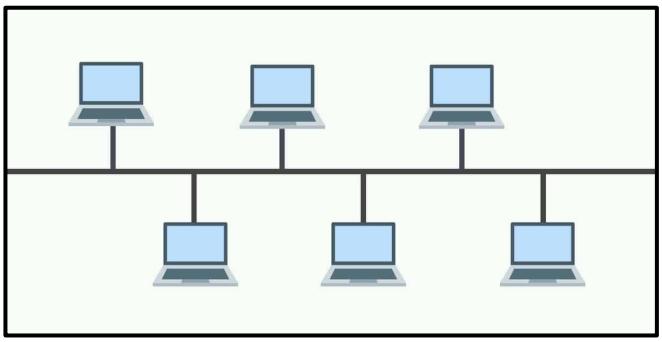
_____

(b) Topology describes the physical layout of a computer network. Name each of the topologies shown below.

(i) [1]



(ii) [1]



(c) With respect to **cabling**, describe one advantage and one disadvantage in a Star Topology network.

(i) Advantage [1]

(ii) Disadvantage [1]

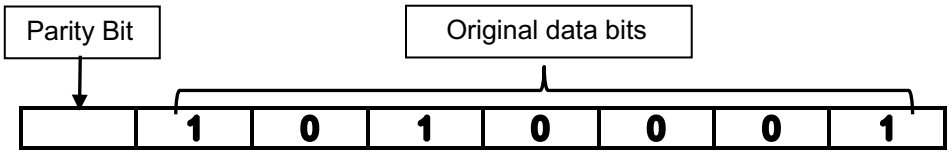
(d) Explain the concept of the Parity Check. [2]

_____

_____

_____

(e) Using the example of the bit string below, indicate what the parity bit should be, based on the system of odd parity. [1]

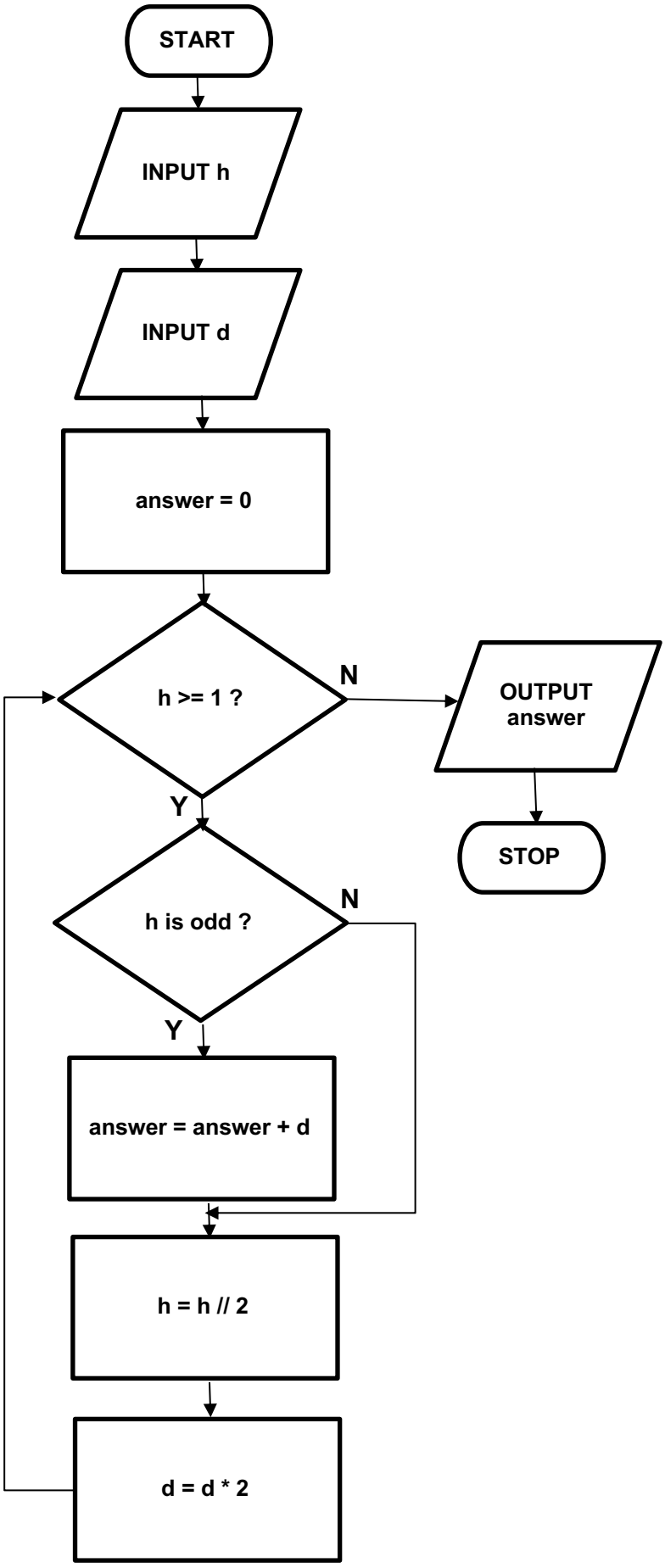


(f) What is a shortcoming of the parity check? [1]

_____

_____

3 Study the flow chart and answer the questions.



(a) Complete the Trace Table for 2 runs: h=11, d=8 and h=5, d=12

[6]

h	d	answer	h >= 1?	h is odd?	output

(b) What does the algorithm do? [1]

_____

_____

(c) Based on the algorithm described by the flowchart, write a python function that will return the result as computed by the algorithm. The starting statement has been given.

def function_m(h, d): [5]

4 When conducting Program Testing, a good programmer will consider the following Types of Conditions:

Normal Conditions

Boundary Conditions

Error Conditions

Consider the following Python Program:

```
number = 0
while number < 1 or number > 9:
    number = int(input('Please enter a number between 1 and 9 inclusive '))
if number % 2 == 0:
    print('Number ', number, ' is even')
else:
    print('Number ', number, ' is odd')
```

Complete the table for Test Conditions to test the above Python Program.

Test Condition Type	Sample Input Data	Expected Output	
			[1]
			[1]
			[1]
			[1]
			[1]
			[1]

5 All the sheep belonging to Farmer Miles have escaped from his farm to a nearby hillside, where they have joined other sheep. Farmer Miles wishes to recover all his sheep and knows the following:

- Not one of his sheep is black as he believes these to be unlucky.
- All his sheep are branded 'G', or have a collar.

Use the following:

B = black sheep
G = branded 'G'
C = has a collar
F = belongs to Farmer Miles

(a) Draw a Truth Table from these conditions to show those sheep owned by Farmer Miles.

Truth Table: [4]

B	G	C	F

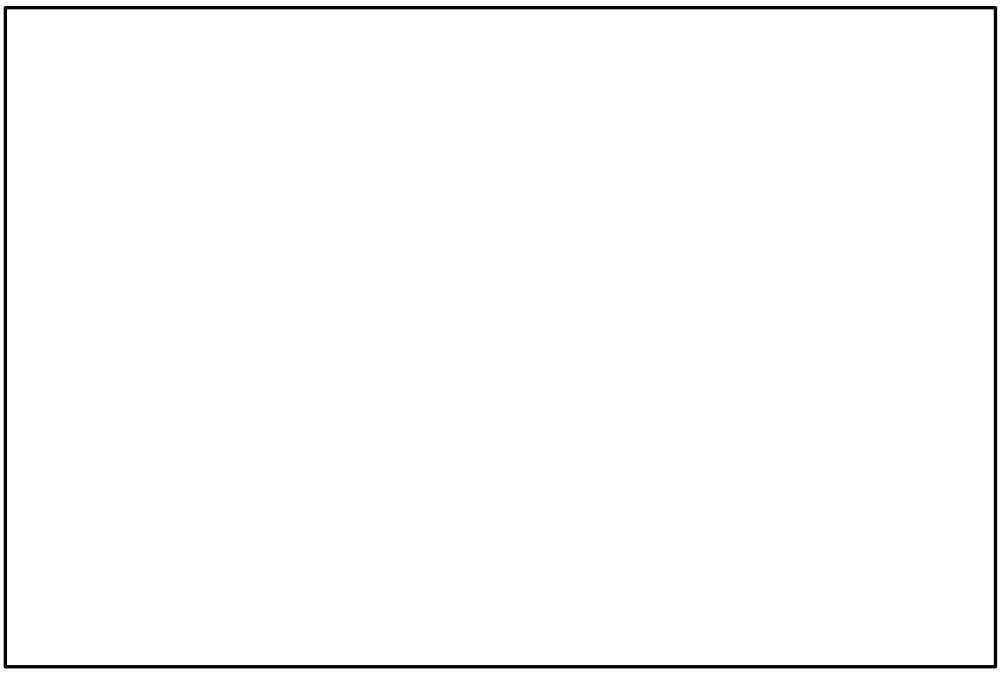
(b) From your Truth Table, produce a Boolean expression to represent those sheep owned by Farmer Miles.

[2]

F =

(c) Using only **NAND** gates, draw a logic circuit diagram capable of carrying out the Boolean expression.

[4]



6 (a) Denary numbers are represented as binary numbers inside a computer.

Note: all workings must be clearly shown.

(i) Convert the denary number (**123**)$_{10}$ into 8-bit binary. [2]

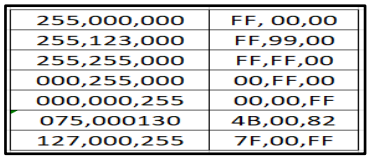
_____

(ii) Convert the positive whole binary number (**10001010**)$_2$ into a Hexadecimal number. [2]

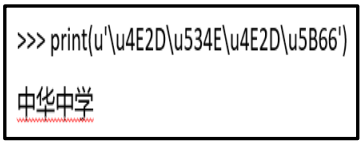
_____

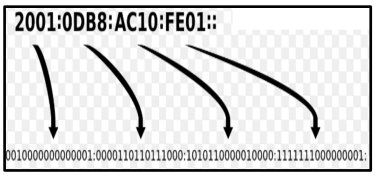
(b) Hexadecimal numbers are used as a form of shorthand to represent binary numbers. Draw a line to connect the Practical Usage (left side) of Hexadecimal numbers to the Example graphic (right side). [3]

Practical Usage	**Example Graphic**
(i) Memory Dump ☐	☐
	☐
(ii) Unicode ☐	☐
	☐
(iii) RGB Color Code ☐	☐



255,000,000	FF, 00,00
255,123,000	FF,99,00
255,255,000	FF,FF,00
000,255,000	00,FF,00
000,000,255	00,00,FF
075,000130	4B,00,82
127,000,255	7F,00,FF





7 Study the problem statement below and answer the questions:

Problem Statement

Evemach is the world's largest maker of health sensing instruments. Their flagship product is a smartphone app which provides a Body Mass Index (BMI) calculator with health advisory guidance to the user.

The user enters the height (metres) and the weight (kilograms), and the app will calculate and display the BMI based on this formula:

$$BMI = weight / height^2$$

Next, the app will refer to a table containing BMI values corresponding to health advisory messages and display them:

BMI	**Health Advisory Message**
< 18.5	Please see doctor for possible nutritional deficiency diseases and osteoporosis
< 23	Healthy Range! Keep up with your exercise and eating!
< 27.5	Please see doctor for possible risk of Type 2 diabetes and chronic diseases.
>= 27.5	Please see doctor for high risk of heart disease and Type 2 diabetes.

(a) What are the inputs for this problem statement? [2]

_____

_____

(b) What are the outputs for this problem statement? [2]

_____

_____

(c) Describe the process from this problem statement. [2]

_____

_____

_____

_____

8 Arnold has a taken a $60,000 study loan from the Developmental Bank of Wakanda. The loan is to be repaid over 4 years. The interest rate is 8% per year. He has a spreadsheet to keep track of the repayments and the amount he owes.

	A	B	C	D	E	F
1	**Initial Loan**	$60,000.00		**Total Paid to Date**	($9,844.83)	
2	**Interest Rate**	8%		**Amount Owed**	$71,785.00	
3	**Loan Length (months)**	48		**Number of Payment Made**	2	
4	**Monthly Payment**	-$4,922.42				
5	**Total to Pay**	($81,629.34)				
6						
7	**Date**	**Amount Paid**				
8	1/8/2022	-$4,922.42				
9	1/9/2022	-$4,922.42				
10						

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

A1= _____ [1]

A8= _____ [1]

B1= _____ [1]

(b) (i) The cell B4 shows the monthly payment amount.

Identify the most appropriate function to use in cell B4, if the interest rate and monthly payment amount remain the same.

_____ [1]

(ii) The cell E1 shows the total amount that Arnold has paid to date. The payments are entered in cells B8 to B56.

Identify the most efficient function to use in cell E1.

_____ [1]

(iii) The formula in cell E3 calculates the number of payments made. Identify the most appropriate function to use in cell E3.

_____ [1]

(iv) Cell E2 shows the amount owed to the nearest whole number. Identify the most appropriate function used in cell E2 to convert the value to the nearest dollar.

_____ [1]

9 (a) Match the term with the Cyberattack description by drawing a line. [3]

Term		Description	
Spyware	☐	☐	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 small piece of data used by websites to store personal information on a user's web browser.
Worm	☐	☐	A hidden program that secretly collects personal information about its users and sends this information to attackers without the users' knowledge.
		☐	A computer program that attaches itself to a normally harmless program and modifies it.
Phishing	☐	☐	A computer program that runs automatically and attempts to spread by sending copies of itself to other computers.

(b) Explain what is **Pharming**? [2]

_____

_____

_____

(c) State two measures that can be taken to protect against Pharming.

(i) _____ [1]

(ii) _____ [1]

(d) Describe how technology has had a positive impact economically on the Healthcare industry. [1]

_____

_____

_____

(e) Describe how technology has had a negative impact socially on the Finance industry. [1]

_____

_____

_____

(f) Describe two ethical issues arising from the use of technology in the Education industry. [2]

_____

_____

_____

_____

(g) Discuss an ethical issue arising from the use of technology in the Entertainment industry. [1]

_____

_____

End of Paper