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	新加坡海星中学 MARIS STELLA HIGH SCHOOL PRELIMINARY EXAMINATION SECONDARY FOUR
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COMPUTING Paper 1 Written Candidates answer on the Question Paper. No Additional Materials are required.	7155/01 28 Aug 2019 2 hours
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MARK SCHEME

For Examiner's Use
80

- 1 Insert **six** of the following words or numbers about computers and data in the correct place in the text below.

2
binary

10
denary

16
digital

analogue
hexadecimal

While analogue data is transmitted via fibre optical cables, a computer cannot process this type of data. For a computer to be able to process data, it needs to be converted to digital data. As humans, we mostly use a denary number system; this is a base 10 number system. Computers use a binary number system; this is a base 2 number system.

[6]

- 2 The three binary numbers in the registers X, Y, Z were transmitted from one computer to another.

	Parity bit							
Register X	1	0	0	1	1	0	0	0
Register Y	0	1	1	0	0	1	1	1
Register Z	1	0	0	1	1	0	0	1

One binary number was transmitted incorrectly. This is identified through the use of a parity bit.

Identify which register contains the binary number that was transmitted incorrectly. Explain the reasons for your choice.

Any three from:

- Count the number of 1/0 bits (in each byte/register)
- Two bytes/registers have an odd number of 1/0 bits // Two use odd parity
- Odd parity must be the parity used
- One byte/register has an even number of 1/0 bits // One uses even parity
- One with an even number of one bits/even parity is incorrect// Register Z should be odd parity

[4]

- 3 John is writing a program using a high-level language. The program will be published and sold for a profit.

- (a) John uses an interpreter when creating the computer program.

State **three** features of an interpreter.

[3]

- (b) James writes a similar code and compiled the program when he completed it.

Explain **two** benefits of compiling the program.

[4]

- (a) Any three from:

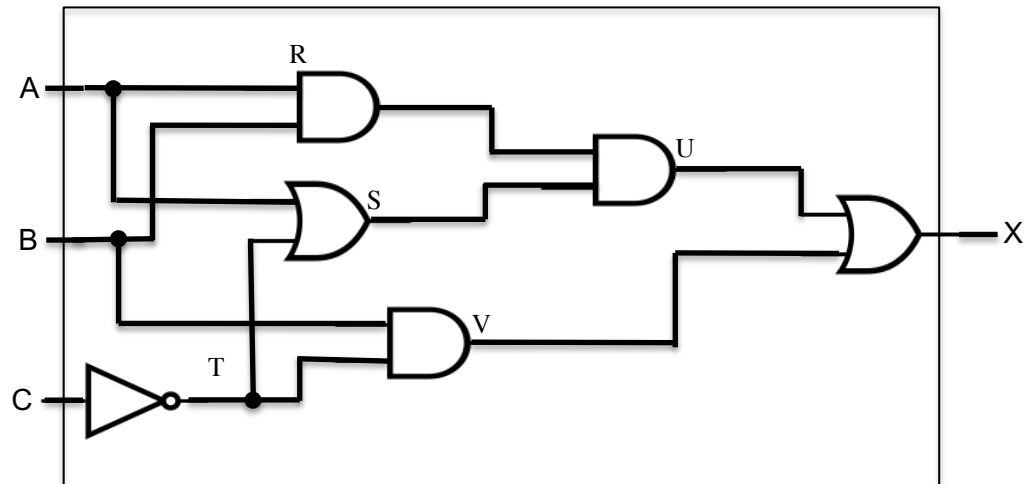
- Executes one line at a time // translates source code line by line
- Produces error message to tell user location of error // easier to debug code
- Stops execution once the program encounters an errors
- Changes to the source code take effect immediately
- Interpreters usually offer an interactive mode, which facilitates learning and experimentation.

- (b) Any four from:

- Produce executable file...
- ... more saleable
- Program will be machine independent/portable...
- ... this means it can be used on any hardware
- No need for compiler to run executable file...
- ... this means it will be quicker to run
- ... customers can just execute the program
- Source code cannot be accessed...
- ... therefore, code cannot be stolen/plagiarised

$$X = ((A \text{ AND } B) \text{ AND } (A \text{ OR NOT } C)) \text{ OR } (B \text{ AND NOT } C)$$

- (a) Draw a logic circuit to represent the given logic statement.



[6]

1 mark per correct gate with correct inputs.

- (b) Complete the truth table for the given logic statement.

A	B	C	R	S	T	U	V	X
0	0	0	0	1	1	0	0	0
0	0	1	0	0	0	0	0	0
0	1	0	0	1	1	0	1	1
0	1	1	0	0	0	0	0	0
1	0	0	0	1	1	0	0	0
1	0	1	0	1	0	0	0	0
1	1	0	1	1	1	1	1	1
1	1	1	1	1	0	1	0	1

[4]

- 5 Phishing and pharming are two examples of online security threats to a computer system.

(a) Explain what is meant by phishing and pharming.

(a) Four from:

Phishing:

- A legitimate looking email is sent to a user
- The email will provide the user with a link/open an attachment
- The link will redirect a user to a legitimate looking webpage (to steal personal data)

Pharming:

- Manipulating a user's computer by installing malicious code on a user's hard drive/server
- The code will cause a redirection to a legitimate looking webpage (to steal personal data)

[4]

(b) Identify **two** other online security threats to a computer system.

(b) Two from:

- Hacking
- Virus
- Denial of service
- Spyware
- Worms
- Trojan Horse

[2]

(c) Give **two** security measures that can help to protect a computer system from online security threats.

(c) Two from:

- Firewall
- Proxy server
- Anti-virus
- Anti-malware
- Anti-spyware
- Username and password

[2]

Describe **two** methods that he could use to avoid loss of stored data.

Backups

- Make a copy of the data
- Copy stored away from main computer
- Data can be restored from backup

Anti-virus

- Scans computer for viruses
- Software to detect/remove viruses
- Can prevent data being corrupted by viruses

Firewall

- Hardware or software that monitors network traffic
- To help prevent hackers gaining access / deleting data

Password/Biometrics

- To help protect files/computer from unauthorised access

Restricted access

- To stop users downloading/installing software that could harm

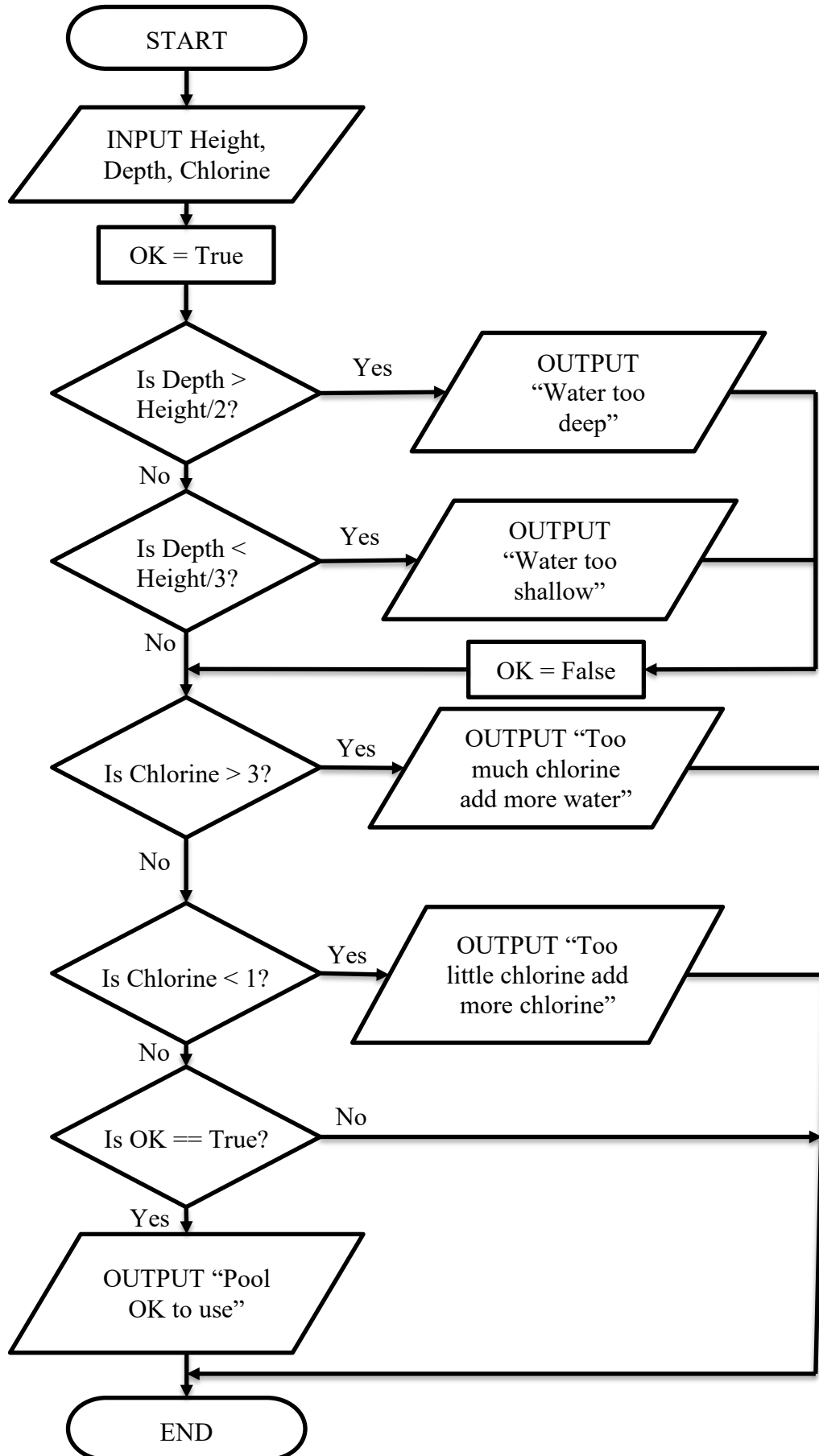
Verification

- Message to ask user if user is sure that file is to be deleted

Physical methods

- Locks/alarms/CCTV to alert/deter unauthorised access

- 7 The following checks the level of chlorine and the depth of water compared to the height of the swimming pool. Error messages are output if a problem is found.



- (a) Complete the trace tables for each set of input data.

Input data: 6, 2.5, 2

Height	Depth	Chlorine	OK	OUTPUT
6	2.5	2		
			True	
				Pool OK to use

Input data: 4, 3, 1.5

Height	Depth	Chlorine	OK	OUTPUT
4	3	1.5		
			True	
				Water too deep
			False	

Input data: 6, 3.5, 4

Height	Depth	Chlorine	OK	OUTPUT
6	3.5	4		
			True	
				Water too deep
			False	
				Too much chlorine add more water

[6]

- (b) Identify a problem with the algorithm that the flowchart represents.

Any one from:

- Cannot add more water if the water is too deep
- No validation e.g. allows a negative height/depth/amount of chlorine
- Tells you to add chlorine when there is no water

Runs only once

[1]

- 8 Describe **two** differences between Read Only Memory (ROM) and Random Access Memory (RAM).

Difference 1

.....

.....

.....

Difference 2

.....

.....

.....

Any **2 sets of points** from:

- ROM is permanent memory...
- ... RAM is temporary memory

- ROM is non – volatile
- ... RAM is volatile ...

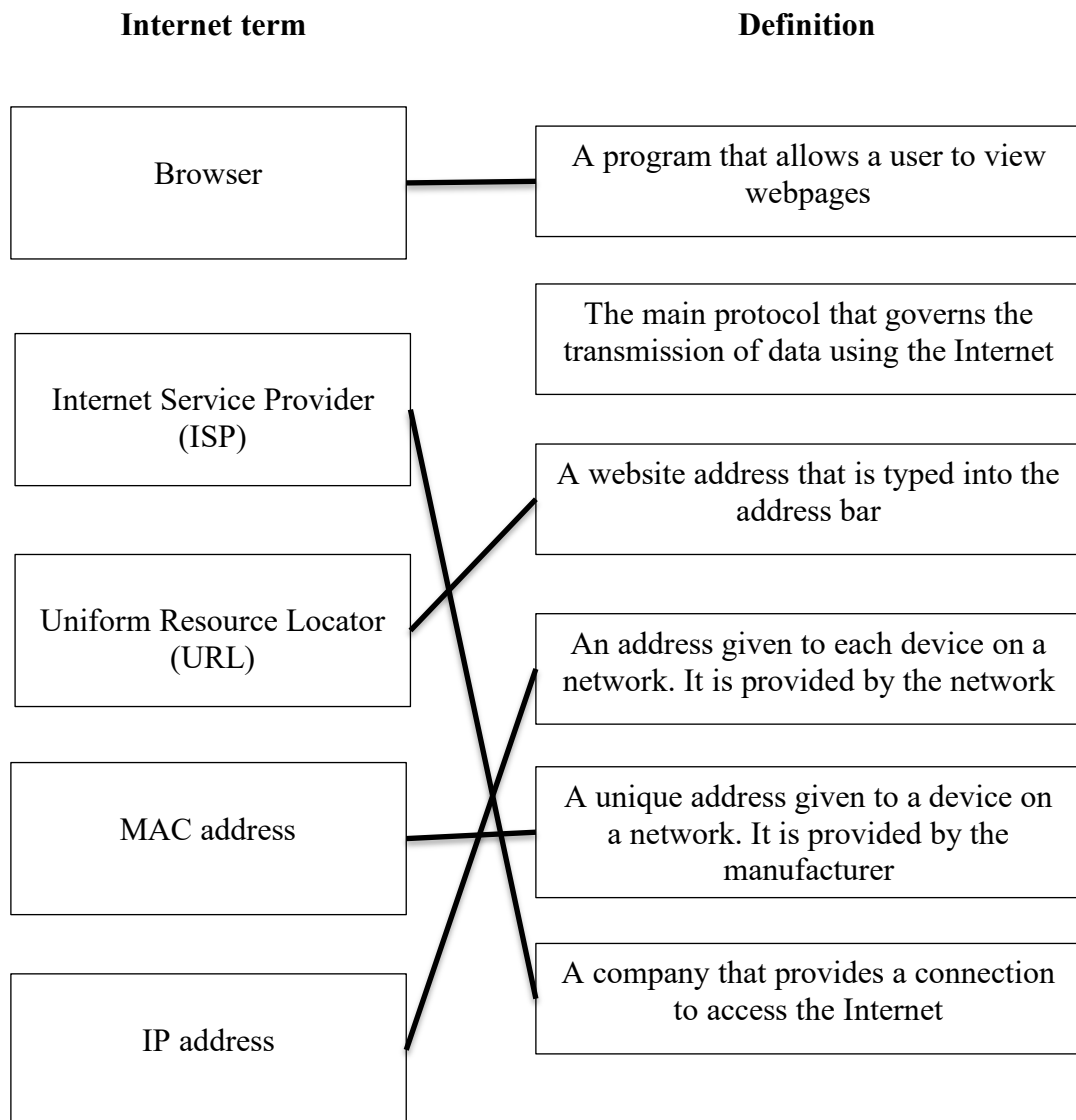
- ROM is read only ...
- ... RAM can have read/write operations

- ROM holds instructions for boot up ...
- ... RAM holds files/instructions **in use**

[4]

- 9 Five internet terms and six definitions are listed.

Draw a line to connect each term to a correct definition.



1 mark for each correct line

10 An algorithm is required to find the smallest number out of 10 positive numbers input.

```

1      Small = 0
2      Counter = 0
3      REPEAT
4          INPUT Num
5          IF Num < Small
6              Num = Small
7          ENDIF
8          Counter = Counter + 1
9          OUTPUT Small
10     UNTIL Counter < 10

```

(a) There are **four** errors in this pseudo-code.

Locate the errors and state the correct pseud-code.

1 mark for each error identified and 1 mark for suggested correction

Line 1 or Small = 0: this should read Small = 999

line 6 or Num = Small: this should read Small = Num

line 10 or UNTIL: this should read UNTIL Counter = 10 or
UNTIL Counter >= 10 or
UNTIL Counter > 9

line 9 or OUTPUT...: OUTPUT Small should come after the end of the repeat loop
or

line 10 or UNTIL: this should come before line 7

[8]

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

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

Range check, num should be more than 0

[2]

(ii) Name **two** different validation checks, other than your answer to **part (b) (i)**.

any 2 from:

Type check, format check, presence check

[2]

- (c) Once completed, the algorithm is tested with data for normal conditions.

Identify **two other** test case conditions that could be used to test the algorithm.

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

Test case condition	Test data
Boundary condition	0
Error condition	-10,"this is not a number"

[4]

- 11 A small cafe sells five types of items:
- | | |
|----------|--------------|
| bun | 0.50 dollars |
| coffee | 1.20 dollars |
| cake | 1.50 dollars |
| sandwich | 2.10 dollars |
| dessert | 4.00 dollars |

You are required to write a program for the cashier system that does the following:

- inputs item sold and the quantity for every transaction during the day,
- uses the string "end" to finish the day's input,
- adds up the daily amount earned for each type of item,
- outputs the total earnings (for all items added together) at the end of the day,
- outputs the type of item that had the highest earnings at the end of the day.

- (a) State the input, output, and process that are required for the program.

input – item(type of item), quantity of item (1mark)

output – total earnings, item with the highest earning (1mark)

process – check input item, add cost to counter, repeat checking input item and adding cost to counter till "end" is entered, compare cost to find highest earning(max 2 marks)

[3]

- (b) Write an algorithm, using pseudo-code or a flowchart, to create the program required in the question.

x, tbun, tcoffee, tcake, tsand, tdessert=0,0,0,0,0,0

REPEAT

 INPUT item

 INPUT quantity

 IF item = "bun" THEN tbun = tbun + 0.5* quantity

 ELSE IF item = "coffee" THEN tcoffee = tcoffee + 1.20* quantity

 ELSE IF item = "cake" THEN tcake = tcake + 1.50* quantity

 ELSE IF item = "sandwich" THEN tsand = tsand + 2.10* quantity

 ELSE IF item = "dessert" THEN tdessert = tdessert + 4.00* quantity

 ELSE PRINT "error"

 ENDIF

UNTIL item = "end"

IF tbun > x THEN x = tbun, ans="bun"

IF tcoffee > x THEN x = tcoffee, ans ="coffee"

IF tcake > x THEN x = tcake, ans ="cake"

IF tsand > x THEN x = tsand, ans = "sandwich"

IF tdessert > x THEN x = tdessert, ans = "dessert"

total = tbun + tcoffee + tcake + tsand + tdessert

PRINT "Total Earnings is ", total

PRINT "Highest Earning item is ", ans

– complete initialization

– correct loop structure (could be while – end while or do – until loop.)

– input item INSIDE the loop

– check on which item has been input

– *summation of value of each item input

– check if each item total is the largest value

– variable (e.g. x) takes on the highest total value

– total value of ALL five totals

– correct output OUTSIDE the loop

[6]

-End of Paper-