Marking Scheme

Q1 1(a) 1 mark for each correct line. Maximum 4 lines.



1(b)

Description

- An array is a variable with list of items of the same type that can be **indexed**. Example
- For example, an array can be used to store 40 students' marks. A repetition / loop can be used to process the array of 40 marks and this makes the program code more concise.

2(a)

(i)

- Data transfer is typically faster.
- Data transfer is typically more secure.

(ii)

- Users can be connected to a wireless network as long as they are within range of the network coverage.
- Low in cost
- Easy to configure and manage.

2(b)

Network Device	Description
Network interface	NIC provides the hardware interface to enable the
card (NIC)	transfer of data between a device and a network.
Network hub	A device that transmits received packets to all connected device.
Network bridge	A device that constructs a single network by connecting
	two similar networks together.
Router	A device that forwards packets between separate
	networks.
Modem	A device that is responsible for modulation and
	demodulation.
Wireless Access	A device that allows other wireless devices to connect to
Point	a wired network.

- 3(a) 1810 x 1024
 - = 1853440 bytes
- 3(b) 60416 / 1024

= 59 GiB

3(c) 16 bits = 16 / 8 = 2 bytes

6144 x 2 bytes

3(d)

Random access memory (RAM)

- Main memory
- Hard disk / Hard drive
- Flash memory
- Read-only memory (ROM)
- Any other correct answer

[

Q4 4(a) 20 student names and 20 student temperatures

4(b) Names of students who have temperature 38 degrees or above and their respective temperatures.

4(c)

- Store the 20 student names and temperature data in arrays / lists.
- Search for students with temperature 38 degree or above.

- 5(a) Transfers required **memory location from processor to memory**. It is unidirectional.
- 5(b) Transfers data between memory and processor. It is bi-directional.

Q6

Description	Type of cyberattack	
A computer program that attaches itself to a normally harmless program and modifies it.	Virus	
A computer program that pretends to be a harmless file or useful application but it can cause unauthorised access to the computer.	Trojan horse	
A computer program that runs automatically and attempts to spread by sending copies of itself to other computers.	Worm	
A small piece of data used by websites to store personal information on a user's web browser.	Cookie	
	[4m]	

7(a)

The **position of a digit** in a binary number determines its place value, which is **represented by 2**^N. The place value **starts from 2**⁰ **for the rightmost digit**, with the power (N) increasing by 1 for each subsequent digit on the left.

Hence,

11010111 (binary)
=
$$2^7 + 2^6 + 2^4 + 2^2 + 2^1 + 2^0$$

(or = 128 + 64 + 16 + 4 + 2 + 1)
= 215 (denary)

7(b) (i) Maximum 3 marks. Award 1 mark for every 2 correct conversions.

RGB ode	E	9	Α	4	В	8
4-bit binary	1110	1001	1010	0100	1011	1000

7(b) (ii)

211 / 16 is 13 remainder 3

13 / 16 is 0 remainder 13 (which is D in hexadecimal)

211 = D3 (hexadecimal)

7(b) (iii)

- Memory dumps
- Network addresses
- ASCII and Unicode
- URL encoding

Q8	
8(a)	

Maximum 5 marks.

i	name	mass	height	bmi	max	person	OUTPUT
					0		
0	ALI	52.5	1.6	20.5	20.5	ALI	
1	SARAH	49	1.5	21.8	21.8	SARAH	
2	TOMMY	63.5	1.8	19.6			
							SARAH 22

8(b)

(i) WHILE height <= 0 or height > 2.8

OUTPUT "Invalid height! Enter positive height and less than

or equal 2.8 m:"

INPUT height

ENDWHILE

[Note: 1m is awarded for appropriate Error message and INPUT statement written.]

(ii)

Test case condition	Test data for height		
Normal	Example: 1.2, 2.5		
Error	Example: -0.5, -1		
Boundary	Example: 0, 2.8		

=

8(c)

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

9(a) Any one: subjects, number, count, student subject, index

Note: The variable stated must be same case as given in the question.

9(b) One mark for each error identified. One mark for suggested correction.

```
Error 1 :
              03
                   FOR count = 0 to 50
                                                              [1m]
Correction : FOR count = 0 to 49
                                                              [1m]
Error 2 :
              06
                   IF index = -1
                                                              [1m]
Correction : IF index != -1
                                                              [1m]
Error 3 :
              07
                   number[index] = number + 1
                                                              [1m]
Correction : number[index] = number[index] + 1
                                                              [1m]
Error 4 :
              13
                   OUTPUT subjects[5], number[5]
                                                              [1m]
Correction : OUTPUT subjects[count], number[count]
                                                              [1m]
```

Corrected Pseudo-code:

01	<pre>subjects = [bengali, chinese, hindi, malay, tamil, others]</pre>						
02	number = $[0, 0, 0, 0, 0, 0]$						
03	FOR count = 0 to 49						
04	INPUT student_subject						
05	<pre>index = find(subjects, student_subject)</pre>						
06	IF index != -1						
07	<pre>number[index] = number[index] + 1</pre>						
08	ELSE						
09	number[5] = number[5] + 1						
10	ENDIF						
11	NEXT						
12	FOR count = 0 to 5						
13	OUTPUT subjects[count], number[count]						
14	NEXT						

10(a)

- Technology has enabled **telemedicine**, which is the use of video conferencing and other technology, for doctors to provide medical **consultations and diagnoses over the Internet**.
- Patients who are located in remote places or have limited mobility has **better** access to healthcare.

10(b)

- Patients may find the use of **robots** and other technology in healthcare **impersonal**.
- Patients **may not trust** the ability of **machines** to provide proper heathcare.
- Patients may **misuse information** from the Internet and make potentially dangerous decisions based on **incorrect diagnoses**.
- Patients may be **uncomfortable** with the **collection of medical data** necessary to improve the performance of healthcare-related AI.

10(c)

- Technology has created **new areas of growth** in the healthcare industry, such as the provision of telemedicine solutions to existing healthcare businesses. In particular, many of these solutions provide a way for patients to securely transfer potentially sensitive medical information over the Internet.
- There is also an increased focus in **automating healthcare processes** through the use of robots to dispense medicine and other more menial tasks. This may in turn **cause such jobs to disappear** from the job market.
- The rise of **3D-printing technology** has also opened up new opportunities in the building and customisation of **prosthetic limbs**, **hearing aids and dental fixtures**.

10(d)

- Whether it is acceptable for **robots** to **replace humans** in providing certain kind of healthcare.
- Whether it is acceptable to transfer **private medical information** over the Internet.

Q11 11(a) Maximum 4 marks.



Correct use of MAIND gate	
Correct use of AND gate	– 1 mark
Correct use of OR gate	– 1 mark
Correct use of NOT gate	– 1 mark

11(b)

A	В	С	Wo	X= P OR R		
			P= A NAND B	Q= NOT B	R = Q AND C	T OKK
0	0	0	1	1	0	1
0	0	1	1	1	1	1
0	1	0	1	0	0	1
0	1	1	1	0	0	1
1	0	0	1	1	0	1
1	0	1	1	1	1	1
1	1	0	0	0	0	0
1	1	1	0	0	0	0

11(c) NAND gate (Note: A NAND B)

[1m]

Note: Accept the following. Q12 count low = 0company_salary= [] count high = 0Note: Accept the following. total salary = 0INPUT employee_salary, company_salary = company_salary + [employee salary] FOR employee = 0 to 79and a second contraction of fourtheast INPUT company salary[employee] total salary = total salary + company salary[employee] NEXT Note: Accept NEXT employee average salary = total salary / 80 FOR employee = 0 to 79IF company salary[employee] < average</pre> count low = count low + 1ELSE IF company salary[employee] > average count high = count high + 1ENDIF NEXT Note: Accept **NEXT** employee OUTPUT average, count low, count high

Correct initialisation of variables

First FOR loop (or WHILE loop count) is correct

Reading and storing of salary into the array is inside the FOR loop

Correct calculation of average_salary after the first FOR loop

Use of a second FOR loop (or WHILE loop count) is correct

Correct calculation of count_low and count_high variables in second

FOR loop

OUTPUT for the 3 variables average, count_low and count_high are after FOR loop

Correct INPUT before loop and OUTPUT after loop Correct Initialisation of variables before loop Correct Loop Condition of index and Increment of index variable Correct If Condition of Punctuations and Increment of count variable Correct use of shapes for all (including Terminator – 1 START and 1 STOP, Input/Output, Process, Condition)

