Name:	Class	Index Number

Jurong West Secondary School

Preliminary Examinations 2018

80

COMPUTING 7155/01

Secondary Four Express

Paper 1

27 August 2018

0800 – 1000

2 hours

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces provided at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
Do not use correction fluid.

Approved calculators are allowed.

Answer **all** questions.

The number of marks is given in brackets [ ] at the end of each question or part question.
You should show all your working.
The total marks for this paper is 80.

After checking of answer script		
Checked by	**Signature**	**Date**
Student		

This document consists of **14** printed pages.

Setter: Mr V Surya

Answer all questions

1 Draw a line to match the computer parts to the correct description.

CPU	Collection of wires for transporting data from one part to another
Control Unit	Stores large amount of data that will not be lost when power is interrupted
ALU	Part of the processor that follows instructions and decides when the data should be stored, received or transmitted
Secondary Storage	Part of the processor that processes data by performing basic mathematical and logical operations
Bus	
ROM	

[4]

2 Cloud services allow users to run programs and access data anywhere over the Internet without having to be at a particular physical location.

Describe two safety measures you can take to prevent unauthorised access to your private information when using cloud services.

(a) Safety measure 1 ……..
……..
……..

(b) Safety measure 2 ……..
……..
…….. [2]

3 Insert five of the following words about network devices and components, in the correct place in the text below.

client	network hub	router	SSID
modem	server	network bridge	port

The ……..…… number is used together with an IP address to uniquely identify a program that is running on a network.
The ……..…… is a device that connects multiple devices to the same network and transmits received packets to all connected devices.
The ……..…… is a device that converts digital signals to analog signals and vice-versa.
The ……..…… is a 32-bit string that identifies a wireless access point and all devices connected to it.
The ……..…… is a device that forwards packets between separate networks. [5]

4 When we use a programming language, the source code must be translated into machine code before it can be run.

Identify two ways by which source code can be translated into machine code and give an advantage of each method.

Method 1 …….
Advantage ……..……..
……..……..

Method 2 ……..
Advantage ……..……..
……..……... [4]

5 A meteorologist wants to find out the day and temperature recorded, for the hottest day in the month of January, which contains 31 days.

State the inputs and outputs required for this problem.

Inputs ……...
……..
Outputs ……....
……..

State two examples of inputs where it may not be possible to find the hottest day in the month of January.

Example 1 ……...…….
……..……
Example 2 ……...…….
……..…… [6]

6 Sequence data types allow you to store multiple values in an ordered, organised and efficient fashion.

(a) State two sequence data types in Python.

(i) ……..……
(ii) ……..…… [2]

(b) State two non-sequence data types in Python.

(i) ……..……
(ii) ……..…… [2]

7 Data can be corrupted due to a number of reasons.

(a) Describe how the following causes can contribute to data corruption and provide a preventive measure for each cause.

(i) Human error ..……

……...

Preventive Measure ..……

……... [2]

(ii) Power failure ..……

……...

Preventive Measure ..……

……... [2]

(b) To ensure integrity of data during network transmission, parity checks are commonly used for error-checking.

(i) The word “be” was sent across the internet. Assuming an odd parity system was used, state if there were any errors in the transmission for each character.

ASCII character	**Data received at destination**	**Was there an error? (Indicate Yes / No)**
b	01100010	……
e	01100101	…… [2]

(ii) State one limitation of parity checks.

……...

……... [1]

8 A topology describes the physical layout of a network. Understanding the topology is essential to designing a network.

(a) State three common types of network topology.

……
……
…… [3]

(b) A businessman intends to set up a company in town and wants to have a secure LAN in the office. He has around 150 staff working in the same office and another 25 staff working from offsite locations. The staff need to share files and connect to the printers. He also plans to expand his business in the next five years.

(i) Which network topology is most suitable in this case? Why?

Choice ……
Reason ……
…… [2]

(ii) State two advantages of a client-server network over a P2P network.

Advantage 1 ……
……
Advantage 2 ……
…… [2]

9 In order to locate or identify a particular component on a network, an IP (Internet Protocol) address is used along with a MAC (Media Access Control) address.

(a) State the difference in operation between an IP address and a MAC address.

……

……

…… [2]

(b) The following is a valid IPv4 denary address.

12.97.19.155

Convert the IPv4 denary address into a 32-bit binary address.

……

……

……

…… [2]

(c) The following is a valid MAC hexadecimal address.

20:17:0B:AD:C0:DE

(i) Identify the number of bits represented by the MAC address.

…… [1]

(ii) Convert the MAC address to a binary address.

……

……

…… [2]

(iii) Briefly explain the benefit of using the hexadecimal representation of the MAC address compared to its binary representation.

……

……

…… [1]

10 An algorithm is required to find the highest and lowest numbers based on 100 positive inputs provided by the user. Study the following pseudo-code.

```
highest = 0
lowest = 0
Counter = 1
WHILE Counter < 100
    INPUT Number
    IF Number < highest
        highest = Number
    ENDIF
    IF Number < lowest
        Number = lowest
    ENDIF
    Counter = Counter + 1
ENDWHILE
OUTPUT highest, lowest
```

There are four errors in this pseudo-code. Locate the errors and state the correct pseudo-code.

Error 1 .....

Correction .....

.....

Error 2 .....

Correction .....

.....

Error 3 .....

Correction .....

.....

Error 4 .....

Correction .....

..... [8]

11 (a) Identify the logic gate represented by the following truth table.

Inputs		Output
X	**Y**	**Q**
0	0	0
0	1	1
1	0	1
1	1	1

…… [1]

(b) The following truth table is linked to a three-input logic circuit.

The output is represented by the letter **X**.

A	B	C	X
0	0	0	1
0	1	0	0
1	0	0	0
1	1	0	0
0	0	1	1
0	1	1	0
1	0	1	0
1	1	1	1

State the Boolean statement associated with the truth table.

……

…… [3]

(c) A nuclear power plant has a safety system, that is controlled by a three-input logic circuit made up of **AND**, **OR** and **NOT** gates only. A **WARNING** signal (S = 1) is produced based on certain conditions, shown in the table below.

Input	Binary	Condition
T	0	Temperature ≤ 115^{o}C
	1	Temperature > 115^{o}C
P	0	Reactor pressure ≤ 15 bar
	1	Reactor pressure > 15 bar
W	0	Cooling water ≤ 120 litres/hour
	1	Cooling water > 120 litres/hour

A **WARNING** signal (S = 1) occurs only when:

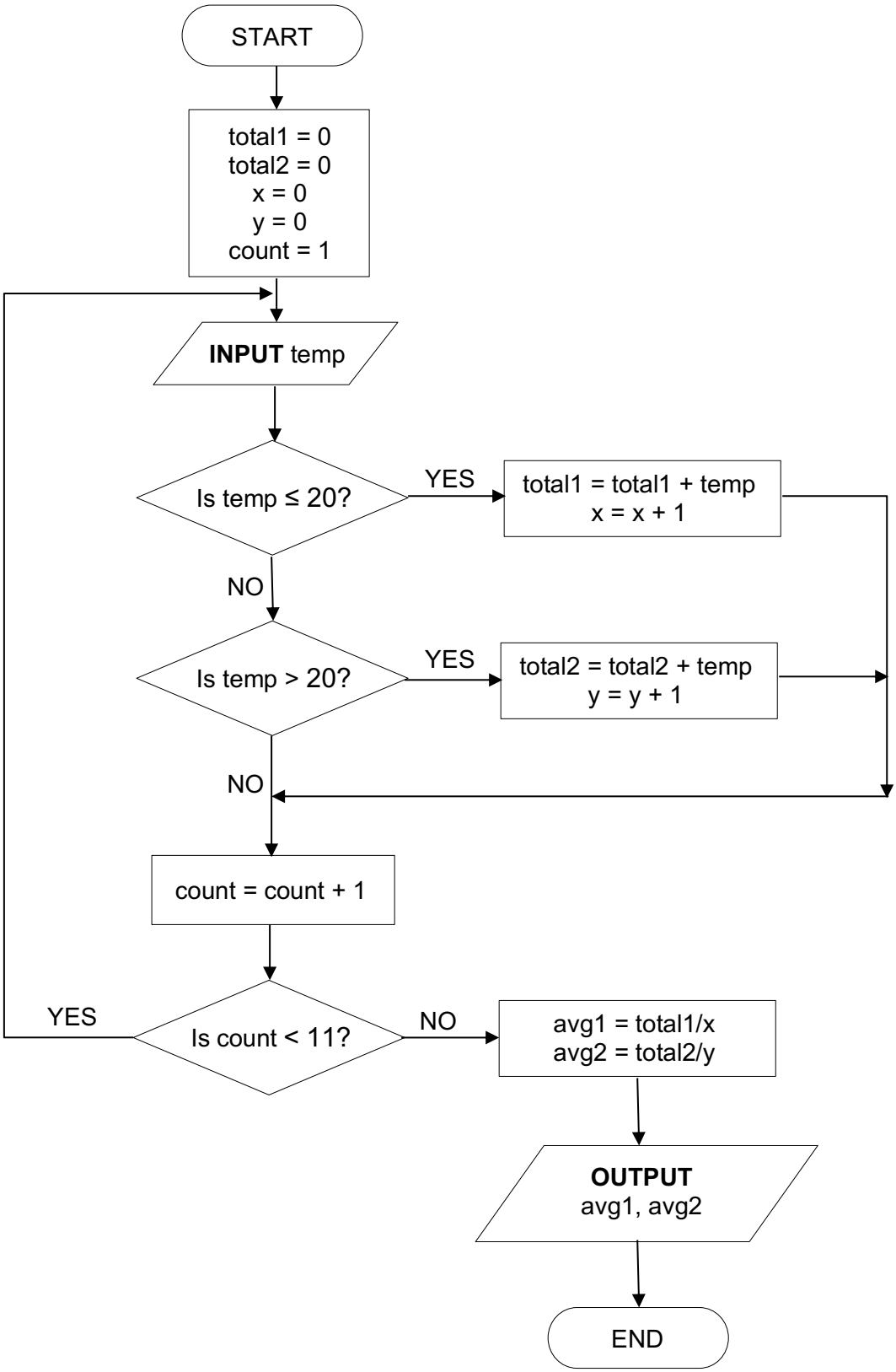
either Temperature, T > 115^{o}C and Cooling water, W ≤ 120 litres/hour

or Temperature, T ≤ 115^{o}C and Reactor pressure, P > 15 bar or Cooling water ≤ 120 litres/hour

Draw the logic circuit for the system.

[7]

12 Study the following flowchart and answer the questions that follow.



Complete the trace table for the following set of data.

24, 16, 31, 20, 28, 21, 18, 16, 25, 25

total1	total2	x	y	count	temp	avg1	avg2	OUTPUT

[7]

13 Write an algorithm using only pseudo-code or a program flowchart that:

- Inputs the value of 5000 houses in a town, one at a time,
- Calculates and outputs the tax amount each houseowner must pay, based on the value of the house:
    - Houses valued over $200 000 pay 2% of their value in tax;
    - Houses valued over $100 000 pay 1.5% of their value in tax;
    - Houses valued over $50 000 pay 1% of their value in tax;
    - Houses valued $50 000 and below pay 0% of their value in tax.

.... [7]

End Of Paper