SERANGOON SECONDARY SCHOOL
PRELIMINARY EXAMINATION
SECONDARY 4 EXPRESS

CANDIDATE NAME	( )	CLASS	
CENTRE NUMBER	S	INDEX NUMBER	

COMPUTING

Paper 1

7155/01
25 August 2020
2 hours

Setter(s): Mr Adrial Tan

READ THESE INSTRUCTIONS FIRST

Write you Centre number, index number and name in the spaces at the top of this page.
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.

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 number of marks for this paper is 80.

For Examiner's Use
80

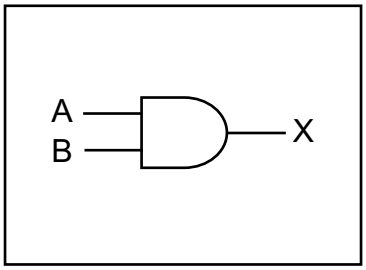
This question paper consists of **14** printed pages including the cover page.

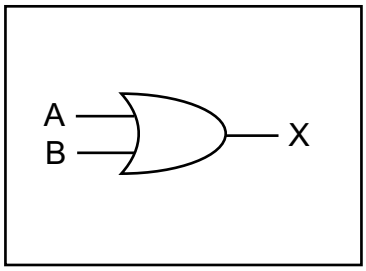
[Turn over

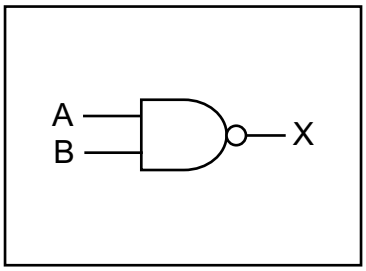
1 (a) The diagram below shows four logic gates on the left and three sets of Boolean values on the right. The Boolean values have been extracted from the truth tables of logic gates.

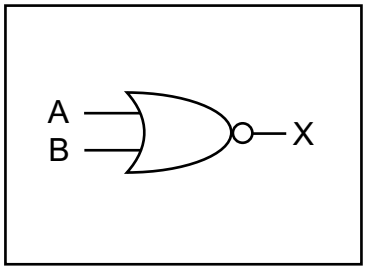
Draw **one** line from each logic gate to the correct set of Boolean values. Each set of Boolean values **may have more than one** logic gate matched to it.

Logic gates









Boolean Values

A	B	X
0	0	1
0	1	1

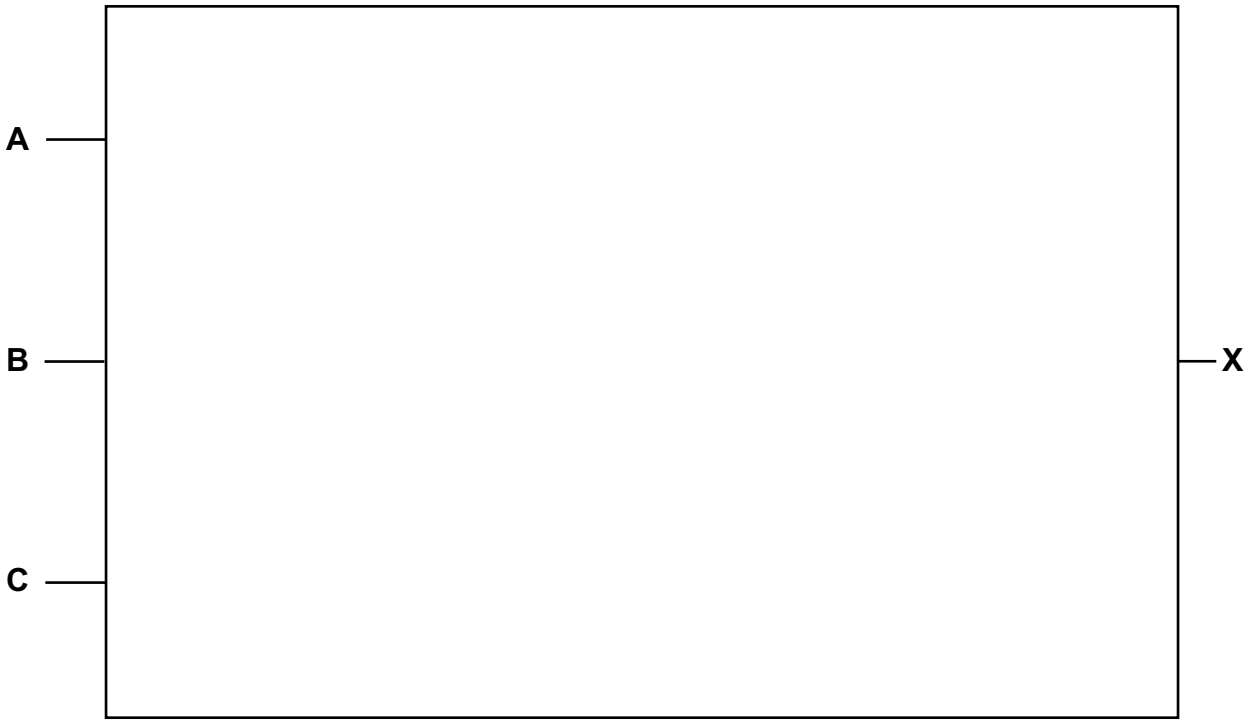
A	B	X
0	0	0
1	1	1

A	B	X
0	1	0
1	1	0

[4]

(b) Draw a logic circuit to represent the following Boolean statement. Do **not** simplify the statement.

X = (**A** OR (NOT **B** NAND **C**)) AND (**A** NOR **B**)



[5]

(c) Complete the truth table for the Boolean statement:

X = (**A** OR (NOT **B** NAND **C**)) AND (**A** NOR **B**)

A	B	C	Working Space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

2 Insert **five** of the following word(s) about network devices and terms used in the correct place in the text below.

DHCP server	firewall	LAN cable	modem
network hub	network interface card	network switch	router

(a) The ……..… is the hardware interface that enables the transfer of data between a device and a network.

(b) The ……..… is a device that constructs a single network by connecting two similar networks together.

(c) The ……..… is a device responsible for modulating and demodulating digital data when data is transmitted over long distances.

(d) The ……..… is a device that forwards packets between separate networks.

(e) The ……..… is a device that transmits received packets to all connected devices. [5]

3 During the outbreak of COVID-19 pandemic, countries all over the world went into lockdowns. Technology was extensively used to minimise the impact on the everyday lives of people.

(a) Give **two** social and **two** economic benefits that technology has brought about on the everyday lives of people during the lockdowns.

Social benefit 1 …….

…….

Social benefit 2 …….

…….

Economic benefit 1 ……..

…….

Economic benefit 2 ……..

……[4]

(b) Give **two** negative impacts that technology may have brought about on the everyday lives of people during the lockdowns.

1 ……

.....

2 ……

…… [2]

4 **(a)** Convert the binary number **1001 0110** into a positive whole denary number. Show your workings.

……

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…… [2]

(b) Convert the positive whole denary number **459** into a hexadecimal number. Show your workings.

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…… [2]

(c) RGB colour codes are used to describe colours which can be displayed on computer systems. Describe how number systems are used in the RGB colour code system.

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…… [3]

5 The following spreadsheet shows the profit or loss on sales at *Hougang 88 Drink Stall* during a five week period.

	A	B	C	D	E	F
1	***Hougang 88 Drink Stall***					
2		Cost Price	Selling Price		Weekly Expenses	$ 1250.00
3	Soya Bean Milk	$ 0.35	$ 1.30			
4	Grass Jelly	$ 0.45	$ 1.50			
5						
6		**Soya Bean Milk Sales**	**Grass Jelly Sales**	**Sales ($)**	**Expenses ($)**	**Profit/Loss**
7	Week 1	850	750	$2,230.00	$1,885.00	Profit
8	Week 2	550	650	$1,690.00	$1,735.00	Loss
9	Week 3	750	200	$1,275.00	$1,602.50	Loss
10	Week 4	800	300	$1,490.00	$1,665.00	Loss
11	Week 5	700	850	$2,185.00	$1,877.50	Profit
12						

(a) What is the data type in cell **B7**?

……[1]

(b) Write down a formula that could be in cell **D7** to calculate the amount of sales for week 1.

……[2]

(c) Describe how the formula in **D7** can be copied into the cells **D8**, **D9**, **D10** and **D11**.

……

……

……

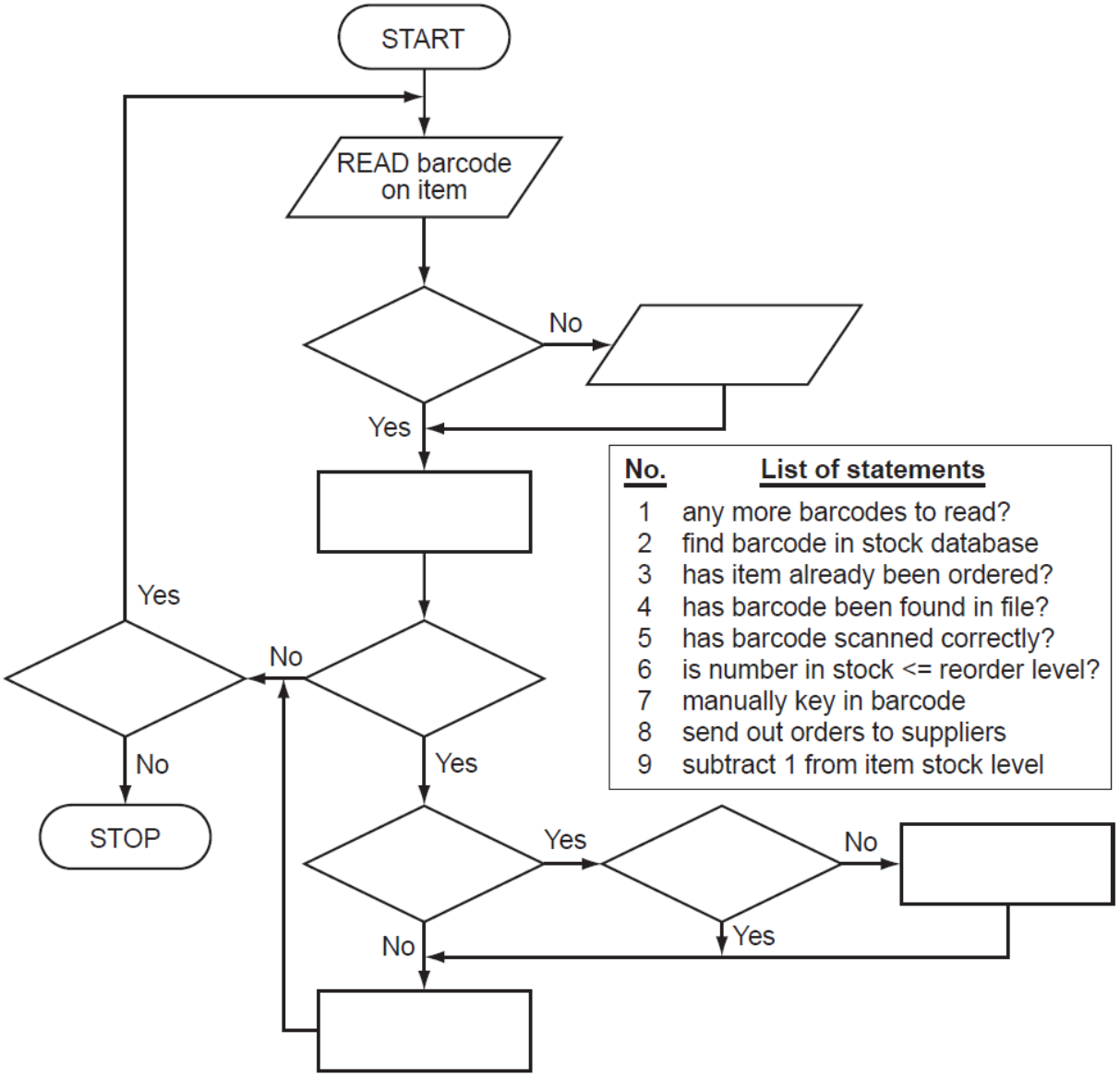
……[2]

(d) Write down a formula that could be in cell **F7** to determine if the stall was making a profit or a loss for week 1.

……... [2]

6 The following flowchart shows how barcodes are used at the point of sale in an automatic stock control system.

Select statements from the list below, using numbers only, to complete the flowchart.



No.	List of statements
1	any more barcodes to read?
2	find barcode in stock database
3	has item already been ordered?
4	has barcode been found in file?
5	has barcode scanned correctly?
6	is number in stock <= reorder level?
7	manually key in barcode
8	send out orders to suppliers
9	subtract 1 from item stock level

[5]

7 To enhance contact tracing in public places during the COVID-19 pandemic, the government has tasked SingStar to create a kiosk with an automated gantry system that can be installed at all public spaces such as retail malls, public libraries and sports facilities. The information of people visiting such public spaces are stored in a central database where other information from other agencies reside, such as the information of people on quarantine or who are infected by the COVID-19 virus.

- The contact tracing kiosk will require visitors to scan their NRIC and enter their contact number.
- A thermal scanner will scan the temperature of the visitor and log it into the visitor's visit record together with the visitor's NRIC number and contact number.
- The system will search through the central database to determine if the visitor is currently on home quarantine, or is an undischarged patient tested positive for the COVID-19 virus.
- The system will search through the central database against the visitor's home address, to determine if anybody residing at the address is currently on home quarantine, or who are currently infected by the COVID-19 virus.
- The system will search through the central database to determine if the visitor has recently been to any public spaces and came into close contact with someone who was infected with COVID-19 virus.
- The gantry will automatically open to allow the visitor to enter the premise and display a "*Welcome*" message on a LCD panel if all checks are clear, or display an "*Entry Denied*" message on the LCD panel if the visitor fails any of the checks.

(a) Name **two** input devices that may be used in the automated gantry system.

1 ……

2 …… [2]

(b) When developing the system, SingStar system developers used modular decomposition to break down the system into smaller, more manageable modules to develop. One such module is the **thermal scanning system**.

Name **four** other possible modules that can be decomposed from the problem.

Module 1 ……...

…….

Module 2 ……...

…….

Module 3 ……...

…….

Module 4 ……...

…… [4]

(c) The following pseudo-code algorithm validates the contact number of a visitor.

```
01   valid_contact = False
02   WHILE not valid_contact
03        valid_contact = True
04        PRINT "Enter contact number: "
05        INPUT contact_num
06        IF LEN(contact_num) != 8:
07             valid_contact = False
08        ENDIF
09        IF contact_num[0]!="9" or contact_num[0]!="6"
10             valid_contact = False
11        ENDIF
12   ENDWHILE
```

(i) The variables valid_contact and contact_num were used in the algorithm. What is the data type of each of the variables?

Variable	Data Type
valid_contact	
contact_num	

[2]

(ii) Identify **two** data validation techniques used in the algorithm.

Validation 1 ……...

Validation 2 …… [2]

(iii) To validate the algorithm, suggest test data for the contact number of visitors for the given test case conditions shown in the following table.

Test case condition	Test data
Normal	
Error	

[2]

(iv) The algorithm needs to be changed such that the validation of the visitor's contact number allows contact numbers to start with "7" and "8" as well.

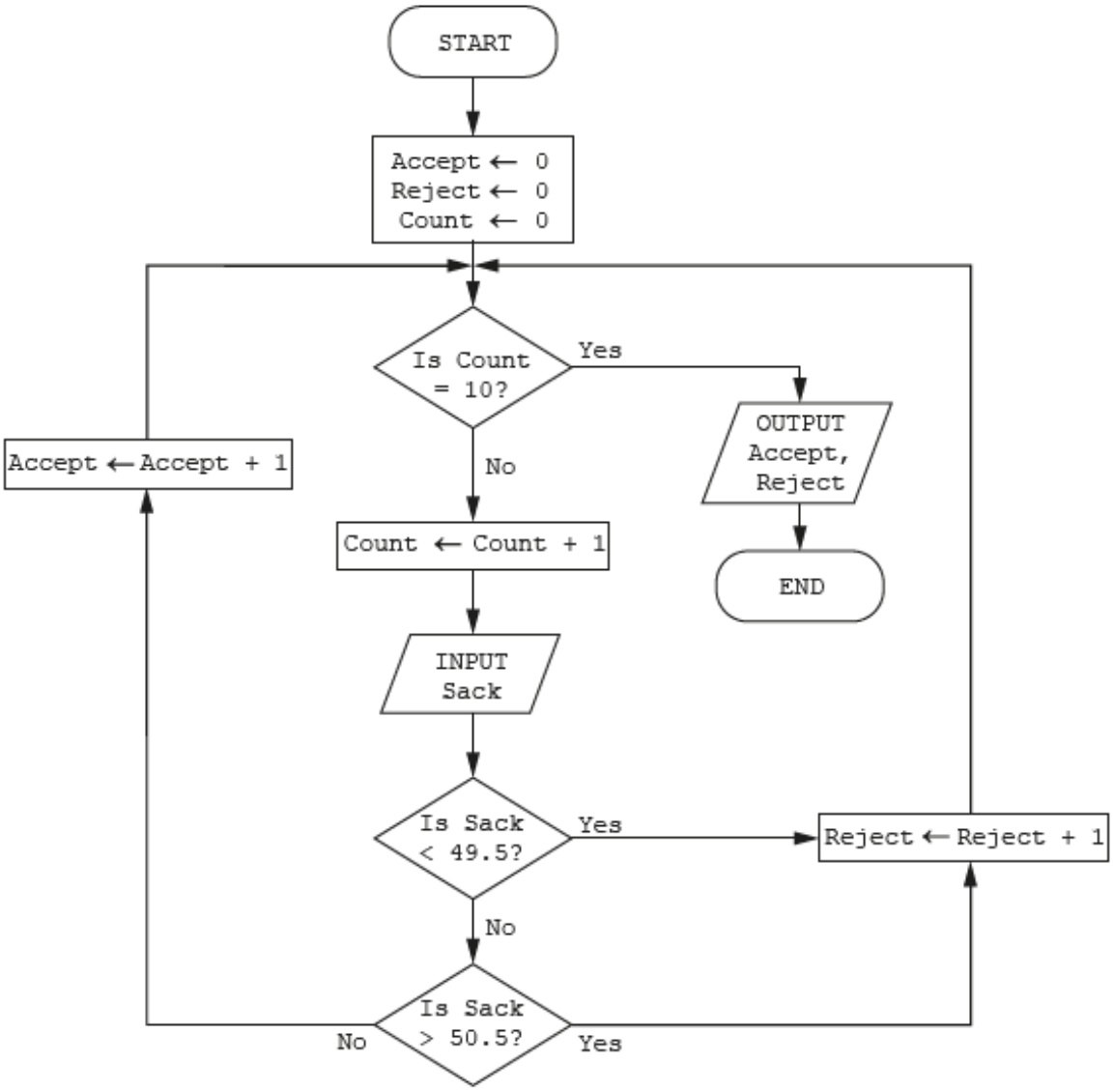
State the line number in the algorithm that needs to be changed and write the pseudo-codes for the changed line.

Line number .....

Changed line .....

..... [2]

8 Study the following flowchart very carefully.



(a) Complete the trace table for this flowchart using the following test data.

49.2, 50.4, 49.5, 50.2, 50.0, 49.7, 50.1, 51.3, 50.5, 50.6

Accept	Reject	Count	Sack	OUTPUT

[5]

(b) State the purpose of the algorithm.

……

……[1]

(c) The size of the batch has increased to 30 sacks. It has been decided to only reject sacks that are overweight. State the changes that need to be made to the flowchart.

……

……

……[2]

9 The following pseudo-code describes an algorithm which requests for the inputs of 40 numbers between 0 to 100. It checks that the numbers are in the correct range, and stores them in an array. It counts how many of the numbers are larger or equal to 50 and then outputs the result. Study the following pseudo-code.

```
01   Count = 0
02   FOR Index = 1 TO 40
03        INPUT Number
04        WHILE Number < 0 AND Number > 100
05             OUTPUT 'This is incorrect, please try again'
06             INPUT Number
07        ENDWHILE
08        NumArray[40] = Number
09        IF Number > 50 THEN Count = Count + 1
10   Until Count = 40
11   OUTPUT Count
12   OUTPUT ' numbers were at least 50.'
```

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]

10 A meteorological station wants to compare daily average temperatures over a period of 365 days between two cities (City A and City B).

Write an algorithm, using pseudo-code or a flowchart, which:

- inputs the two daily average temperatures for each city for all 365 days
- outputs how many days did City A have a higher daily average temperature
- outputs how many days did City B have a higher daily average temperature
- outputs the highest daily average temperature recorded in City A
- outputs the lowest daily average temperature recorded in City B

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END OF PAPER