



**JUNYUAN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2022
SECONDARY FOUR EXPRESS**

CANDIDATE NAME

CLASS

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INDEX NUMBER

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COMPUTING

7155/01

Paper 1 Written

26 Aug 2022

Candidates answer on the Question Paper.

2 hours

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number 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 or graphs.

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 document consists of **14** printed pages and **2** blank pages.

[Turn over

- 1 (a)** The computer uses a complex circuit made of many components called the central processing unit (CPU). Two of these components are the ALU and CU.

(i) State what ALU is and describe its function.

.....
.....
..... [2]

(ii) State what CU is and describe its function.

.....
.....
..... [2]

- (b)** Computers represent data using numbers that are express in different number systems.

Show your working for the following questions.

(i) Convert 124_{10} to a hexadecimal number.

.....
.....
..... [2]

(ii) Convert 1101_2 to a hexadecimal number.

.....
.....
..... [2]

(iii) Convert 177_{16} to a denary number.

.....
.....
..... [2]

- 2 Five terms of network systems and communications, and eight descriptions are given.

Draw **one** line from each item to its appropriate description.

Term	Description
	Device that connects multiple LANs that uses the same protocol
Media Access Control (MAC) address	A 32-byte string that identifies a wireless access point (WAP) and all the devices connected to it.
Server	Used together with an Internet Protocol (IP) address to identify a program running on a network
Port number	Hardware interface to enable the transfer of data between a device and network
Ethernet	Computer that shares resources with and responds to requests on the network
Network Interface Controller	Sequence of bytes (usually permanent in nature) that is used to identify a particular physical network device.
	The most commonly used wired network protocol for local and metropolitan area networks.

[5]

- 3 (a) In data transmission, packets are checked for errors using two different methods.

One method is the parity check.

- (i) The data shown below uses an even parity system where the first digit is the parity bit.

Fill in the missing bit.

0	1	1	1		0	1	1
---	---	---	---	--	---	---	---

[1]

- (ii) A checksum is a second error-checking method.

Explain how a checksum detects errors.

.....

.....

.....

.....

.....

[3]

- (b) Jim plans to set up a new network system for his law firm with 50 staff working from the same office and 10 staff from remote locations such as their home or client's office. The staff in the office share files and connect to printers and scanners.

To protect their clients, data must be handled with high confidentiality. The new network system must be able to handle data from 10 years ago to the present. He plans to expand his firm in the next five years.

- (i) Suggest a suitable network topology.

.....

[1]

- (ii) Give **two** reasons why client-server network is more appropriate.

1

.....

.....

2

.....

.....

[2]

- 4 There are many ways to prevent unauthorized access.

encryption	security tokens	passwords
privacy policy	authenticated	secret key
firewall	biometrics	file permissions

Insert **five** of the terms shown above in the correct spaces in the text below.

Access control or authorization is the ability of a computer to control the access of data and resources by a/an _____ user. Below are three ways computers provide access control.

Most operating systems can control the ability of users to view or make changes to specific files or folders by setting _____. However, these settings do not prevent unauthorized physical access to the storage device. To prevent this, it is necessary to use _____, which is the process of encoding data so that a/an _____ is required to read the data. If the data is not decoded, it appears meaningless.

Computers connected to a network require another layer of access control called a/an _____. This can be a device or a program that monitors every data transmission and prevents unauthorized access from a private network.

[5]

- 5 (a) Spam is any kind of unwanted, unsolicited digital communication containing commercial messages that are sent out in bulk.

Describe **two** measures that can be taken to reduce the impact of spam on email accounts.

1

2

[2]

- (b) Tick (✓) **one or more** boxes in each row to indicate the type of intellectual property violation for each scenario, **if any**, described in the table below.

Scenario	Copyright Infringement	Plagiarism
Alif installs a computer game on two different computers even though the licence he purchased allows for one installation only.		
Betty takes her friend's artwork and submits it for a contest as her own artwork without her friend's permission.		
Tao purchases an educational licence for a spreadsheet program and installs the program on his home laptop for school projects.		

[3]

- 6 In a computer game, a character's status during a mission depends on three variables: health, hydration and weapon. If any of the three conditions are met then the character dies, otherwise they are alive. The conditions are as follows:

- Character has no more health or hydration.
- Character has no weapon and health or hydration is less than 20.
- All three of the variables are less than 10.

If character is still alive, a subfunction WEAPON is called.

1	alive = True
2	IF health == 0 or hydration == 0 THEN
3	alive == True
4	ELIF (health < 10 and weapon == 0) or (hydration < 10 and
5	weapon == 0) THEN
6	alive == False
7	ELIF health < 10 or hydration < 10 or weapon < 10 THEN
8	alive == False
9	ELSE
10	CALL WEAPON
11	ENDIF

- (a) There are three logic errors in the pseudo-code.
State the line number of each error and write the correct pseudo-code.

Error 1

Correction

Error 2

Correction

Error 3

Correction

[6]

- (b) What data type is the variable 'alive'?

..... [1]

- (c) Identify **two** other types of program error.

1

2 [2]

7 Study the following algorithm represented in pseudo-code.

```

1  count = 0
2  sum = 0
3
4  INPUT number
5  WHILE number >= 100
6      INPUT number
7  ENDWHILE
8
9  WHILE number >= 0
10     IF number % 2 == 0 THEN
11         sum = sum + number
12         count = count + 1
13     INPUT number
14     WHILE number >= 100
15         INPUT number
16     ENDWHILE
17 ENDWHILE
18
19 IF count != 0 THEN OUTPUT sum/count

```

(a) Complete the trace table for the following set of data.

7, 12, 2, 4, 1, 6, -8

count	sum	number	OUTPUT

(b) State the purpose of the algorithm.

.....
..... [2]

(c) What happens if a negative number was the first data input?

.....
..... [1]

(d) Name a validation check that is used in the algorithm.

..... [1]

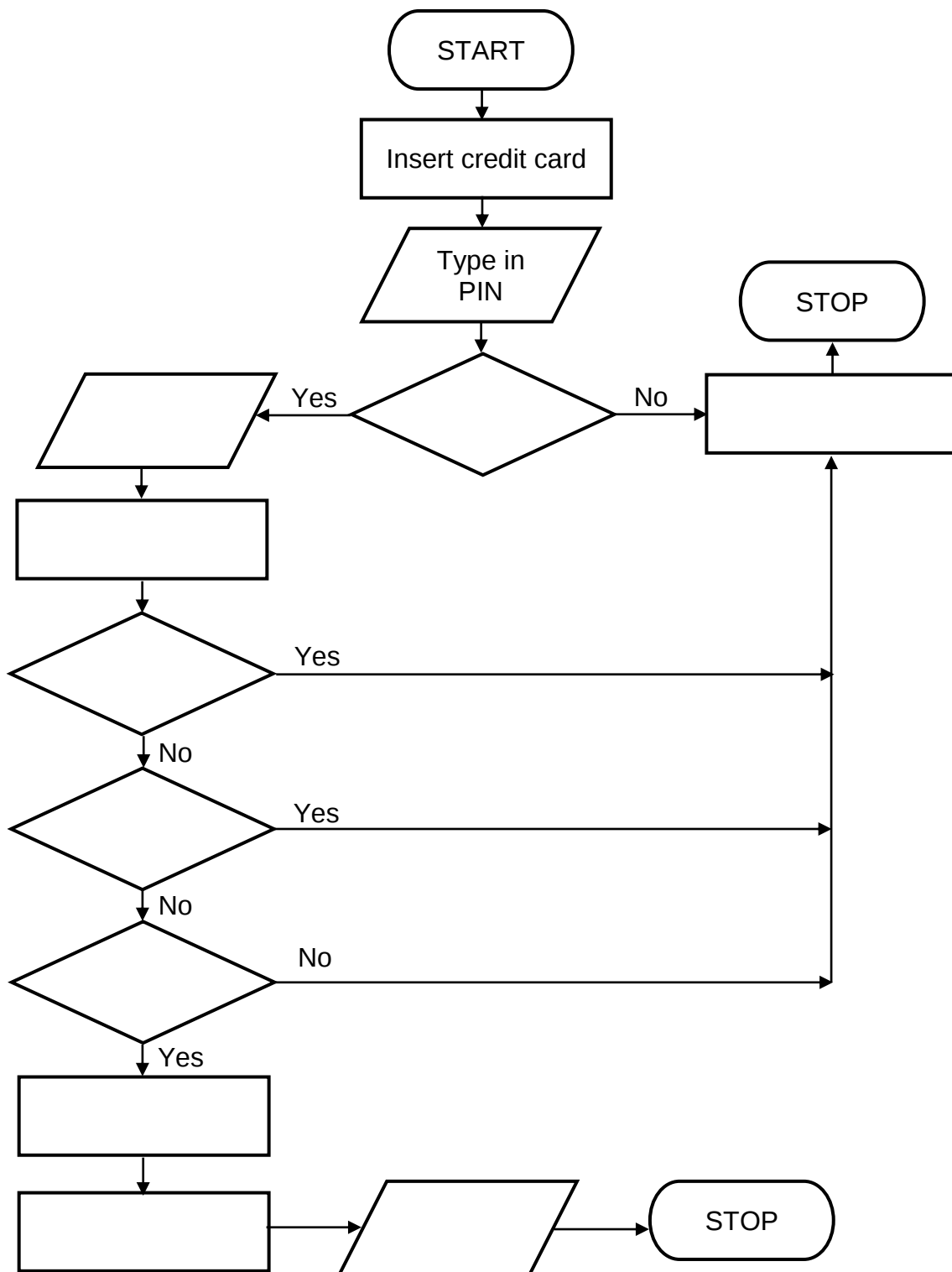
(e) The algorithm needs to check if the input is numerical.

State the lines of code that are affected and describe the changes required in the algorithm.

.....
.....
.....
.....
..... [3]

- 8 (a) The following flowchart shows what happens when a customer uses a credit card to pay for goods at a supermarket.

Ten of the boxes are blank.



From the list of statements below, complete the flowchart by filling in the boxes with the correct corresponding letter. Each statement may be used **only once**.

LIST OF STATEMENTS

A	Are the PIN details correct?
B	Are there sufficient funds?
C	Card removed
D	End transaction
E	Is expiry date exceeded?
F	Is card reported stolen?
G	Money transfer commence
H	Print itemized bill
I	Read credit card details
J	Establish link to bank

- (b)** There are five stages of software development.

Name the stage a flowchart can be used.

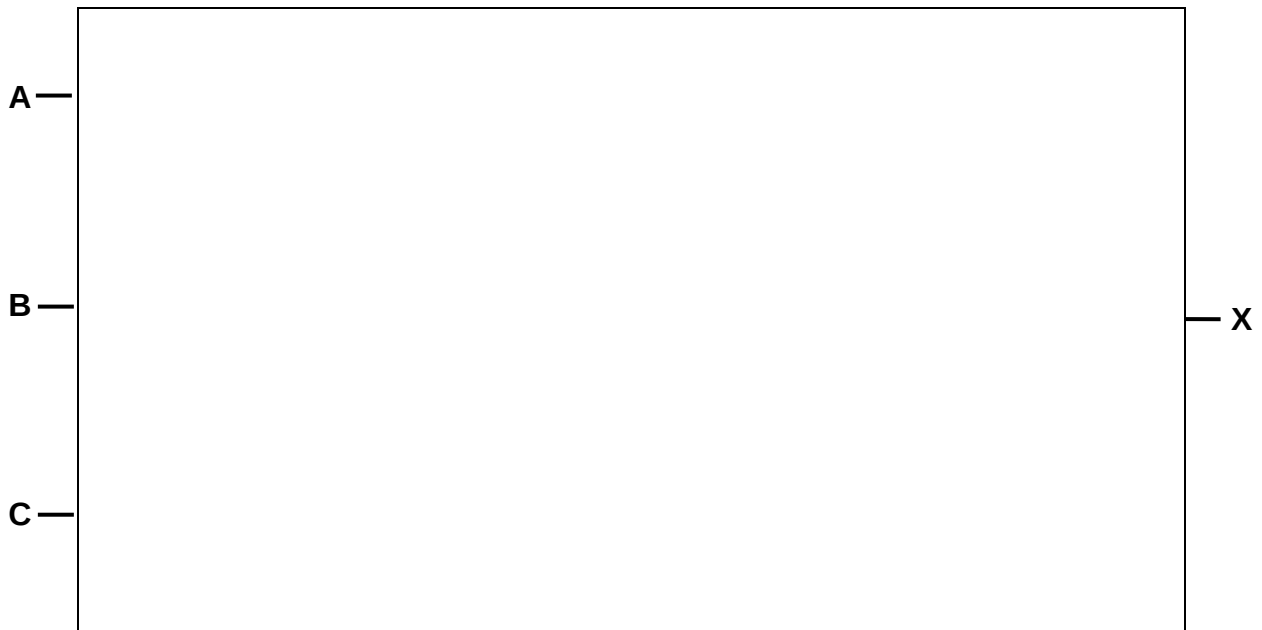
..... [1]

- (c)** Name a problem solving technique that can be used at the same stage.

..... [1]

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

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



[4]

- (b) Complete the truth table for the Boolean statement:

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

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]

- 10** The JoYSlice pizza store operates 7 days a week. The store pays their part-time staff weekly based on the number of hours they worked.

The store hires three part-time staff. Each part-time staff taps their staff pass against a card reader at the start and end of their shift daily and the data is stored on a computer. They are paid \$9 per hour.

Write an algorithm, using pseudo-code, to read the daily time the staff start and end their shift from the stored data, calculate and output their individual weekly salary. You do **not** need to validate the input.

[illegible]

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