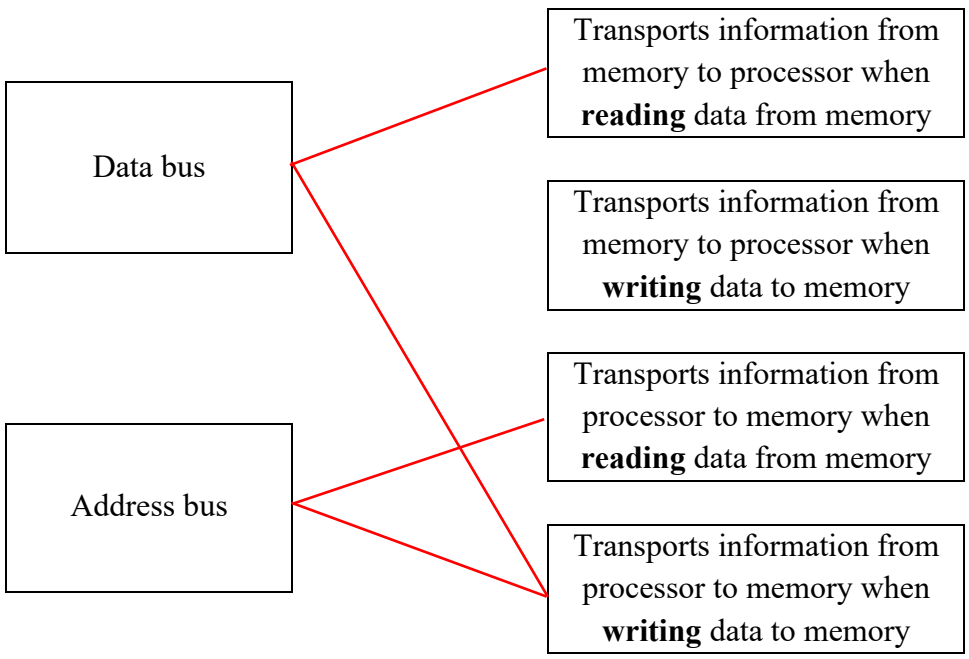
2021 SEC 4 COMPUTING PRELIM PAPER 1 MARKING SCHEME

<table>
<tr><th>Qn 1</th><th>Marking Scheme / Answer</th></tr>
<tr><td>(a)</td><td>Type of bus Description
 
</td></tr>
<tr><td>(b)(i)</td><td>An input device is a hardware device that allows users to enter data/instructions into a computer</td></tr>
<tr><td>(b)(ii)</td><td>Any two appropriate input device, such as:

Web camera, microphone</td></tr>
<tr><td>(c)(i)</td><td>Any sensible answer, such as:
Data stored in the RAM is volatile and will be lost once the power supply is interrupted. Since the operating system is required every time the computer is booted up, it is necessary to store it in a non-volatile storage.
OR
The capacity of the RAM is usually small. The operating system is stored on the hard drive so that the capacity of the RAM is not wasted.</td></tr>
<tr><td>(c)(ii)</td><td>The data and instructions can be quickly accessed by the processors as required.</td></tr>
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<tr><th>Qn 2</th><th>Marking Scheme / Answer</th></tr>
<tr><td></td><td>
<table>
<tr><th>Statement</th><th>IPv4 Address</th><th>IPv6 Address</th><th>MAC Address</th></tr>
<tr><td>Also known as a physical address.</td><td></td><td></td><td>✓</td></tr>
<tr><td>Used to direct data transmitted over the Internet to a device.</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Used by a switch to forward data to the intended recipient device.</td><td></td><td></td><td>✓</td></tr>
<tr><td>Represented by more than 4 bytes.</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>Usually represented in hexadecimal.</td><td></td><td>✓</td><td>✓</td></tr>
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</td></tr>
<tr><td></td><td></td></tr>
<tr><th>Qn 3</th><th>Marking Scheme / Answer</th></tr>
<tr><td>(a)</td><td>Any sensible answer, such as:
- Benefit: The Internet has enabled diverse cultures to interact and share ideas with each other. Social networking sites have also allowed users to remain connected with friends, family and colleagues even over long distances.
- Drawback: Some people use the Internet to reinforce their existing opinions or to spread rumours and misinformation.</td></tr>
<tr><td>(b)(i)</td><td>Creations of the mind that have value but can exist purely as data with no physical form.</td></tr>
<tr><td>(b)(ii)</td><td>The social media influencer is only guilty of plagiarism.

Copyright infringement only applies to content that is copyrighted. As the photo is public domain, it is not copyrighted.

However, by passing the photo off as his own, he is guilty of plagiarism.</td></tr>
<tr><td></td><td></td></tr>
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Qn 4	Marking Scheme / Answer
(a)	*Any 2 sensible answers; such as*: - Trojan horse: A computer program that pretends to be a harmless file or useful application. Once a Trojan horse is run, it does something harmful such as giving intruders unauthorised access to the computer instead. - Virus: A computer program that attaches itself to a normally harmless program and modifies it. - Worm: A computer program that runs automatically and attempts to spread by sending copies of itself to other computers without the need to attach itself to another program first.
(b)	Updating software regularly will ensure that bugs that were discovered since the last update can be fixed. This will prevent certain malware/worms from exploiting these bugs to compromise the security of the (data on the) computer.

Qn 5	Marking Scheme / Answer
(a)	The ASCII code of the character represented.
(b)	$3B_{16} = 3*16 + 11 = 59_{10}$
(c)	$7_{16} = 111_2$ $D_{16} = 13_{10} = 1101_2$ Therefore, $7D_{16} = 0000\ 0000\ 0111\ 1101_2$ *1m for conversion of either 7 or D* *1m for combining them into a 2-byte binary number, including leading zeroes.*

Qn 6	Marking Scheme / Answer
(a)(i)	A firewall prevents unauthorised access to or from a private network.
(a)(ii)	The employees must be trusted and expected to keep information found on the network secret.
(b)(i)	Mr Yeo should choose a wireless network. A wireless networks is more suitable for an expanding company like SSTea Inc as it is easier to add new devices to the network at any time./ Mobility of the employees will be higher, allowing for more dynamic discussions in a small company. *OR* Mr Yeo should choose a wired network. A wired network is more secure for handling confidential information such as sales numbers or data of customers on their membership programme. / The

	equipment and wiring required for a wired network is cheaper a small company than a wireless network.
(b)(ii)	(Wireless network) *Any of the following:* - Equipment is more expensive. - Speed of transmission is generally slower and lower bandwidth. - Less reliable. - Less secure. (Wired network) *Any of the following:* - Lower mobility due to fixed network connections. - More cumbersome to add new devices to the network. - Tends to look more disorganised due to cables running across floors.
(c)	router service set identifier network interface card Wi-Fi
(d)	Metropolitan Area Network. *Answer must be spelt out in full. The abbreviation is not accepted.*
Qn 7	**Marking Scheme / Answer**
(a)	Error 1: Line 3 – `FOR day = 1 to 8` Correction: `FOR day = 1 to 7` Error 2: Line 9 – `OUTPUT hours_worked` Corrections: `OUTPUT total_hours * hourly_rate`
(b)	It is a constant. The value of `hourly_rate` does not change in this algorithm.
Qn 8	**Marking Scheme / Answer**
(a)	This is so that the score can be saved even after the game program is closed.
(b)	Inputs: text file containing the saved highest score, player's score Output: message to inform the player if they have successfully obtained a new highest score Processes: - comparing stored highest score with player's score - updating the highest score in the text file if player's score is higher than highest score.
(c)(i)	Range check/ Format check

(c)(ii)

Test case condition	Test data
Normal	10 (any positive integer)
Boundary	0
Error	-25/ "hello world" (any number that is not a positive integer, or a alphabetical string)

(c)(iii)

```
valid = False
WHILE valid == False
    score = get_score()
    IF score >= 0
        valid = True
    ENDIF
ENDWHILE
```

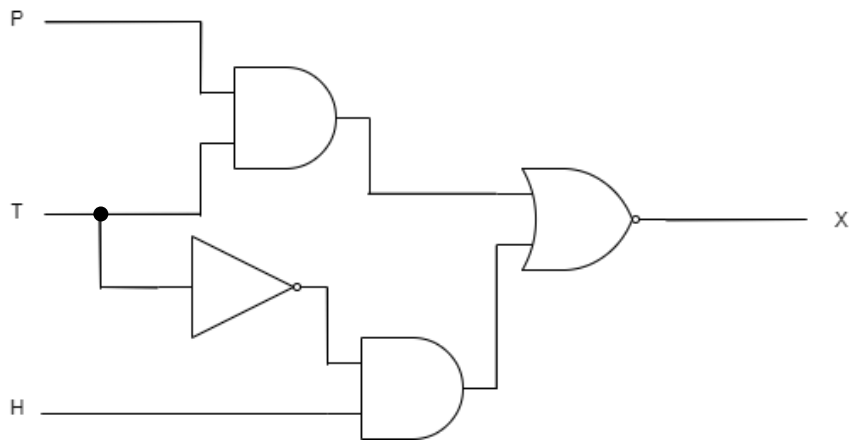
OR

```
valid = False
WHILE valid == False
    score = get_score()
    IF score consists wholly of digits
        valid = True
    ENDIF
ENDWHILE
```

(d)

Implement code.

The developers are required to evaluate the effectiveness of the program in determining and storing the highest score.
OR
The developers may consider any changes that might increase the code's usability or effectiveness.
OR
The developers have to work on transitioning from an old program or system to make sure the new code works with the rest of the game program.

Qn 9	Marking Scheme / Answer
(a)(i)	
(a)(ii)	**X** = (**P** AND **T**) NOR ((NOT **T**) AND **H**) *OR* **X** = NOT ((**P** AND **T**) OR ((NOT **T**) AND **H**)) *OR* (using de Morgan's Theorem) **X** = (**P** NAND **T**) AND (NOT **T** NAND **H**)
(b)	

A	**B**	**C**	**Working Space**			**X**
			B AND C	**NOT (B AND C)**	**NOT (B AND C) NAND A**	
0	0	0	0	1	1	1
0	0	1	0	1	1	1
0	1	0	0	1	1	1
0	1	1	1	0	1	1
1	0	0	0	1	0	1
1	0	1	0	1	0	1
1	1	0	0	1	0	1
1	1	1	1	0	1	1

Qn 10	Marking Scheme / Answer
(a)	

List1	List2	x	y	OUTPUT
[0,0,0,0]	[0,0,0,0]	0		
			0	
	[1,0,0,0]			
			1	
[1,0,0,0]				
		1		
			0	
	[1,0,0,0]			
			1	
	[1,1,0,0]			
			2	
[1,1,0,0]				
		2		
			0	
	[1,1,0,0]			
			1	
	[1,2,0,0]			
			2	
	[1,2,1,0]			
			3	
[1,2,1,0]				
		3		
			0	
	[1,2,1,0]			
			1	
	[1,3,1,0]			
			2	
	[1,3,3,0]			
			3	
	[1,3,3,1]			
			4	
[1,3,3,1]				
		4		
				8

(b)	This algorithm is used to find the value of 2^N. *OR* This algorithm is used to find the sum of binomial coefficients of N.

	OR This algorithm is used to find the sum of Nth row [or (N+1)th] of Pascal's triangle.

Qn 11	Marking Scheme / Answer
(a)	a. Initialisation of variable to store All-Rounder Score OR Initialisation of variable to store lowest unused grade
	b. Input of 8 grades
	c. Loop for 4 subject categories
	d. Compare the 2 grades in each subject category AND add the lower grade to All-Rounder Score
	e. Compare the higher grade to the previously stored lowest unused grade AND store the lowest unused grade if necessary
	f. Outside the loop, add the lowest unused grade to All-Rounder Score
	g. Output the All-Rounder Score
	Note: - Deduct 1m overall for use of wrong flowchart symbols or poor formatting such as unmerged flow-lines, missing terminal symbols. - Do not award mark for item that is written in a Pythonic manner. Flowchart syntax should be language independent.
(b)	Use a while-loop and break the loop when a certain word is input to indicate the end of the input. *OR* Ask for input of a variable to indicate the number of categories and loop until that number.

Qn 11	Marking Scheme / Answer	Marks

Sample flowchart: