

KOLEJ MATRIKULASI PULAU PINANG
 SEMESTER / SESI : 01 - 2023 / 2024
 NAMA SUBJEK: **SAINS KOMPUTER 1**
 PRA PSPM SC015
 MASA: **120 MINIT**
 NAMA PELAJAR :
 KUMP. PRAKTIKUM :



Section A

Q1 : / 23

Q2 : / 21

Q3: / 12

Q4: / 10

Q5: / 5

Q6: / 9

Total : /80

Answer all the questions in the space provided in the question paper.

- The information processing cycle enables computers to perform various tasks such as calculations, simulations, graphics, animations, games, etc. by applying different instructions to data.

- Aishah is taking a photo with her smartphone. She taps the screen to focus on her subject and then presses the shutter button to capture the image. The image is then saved in her phone's memory. State what operation is being performed when the image is saved in Aishah phone's memory?

[1 mark]

Storage

- Alicia drives to Sunrise Carnival Mall that has a cashless parking system that accepts Touch 'n Go cards. A cashless parking system is a parking and payment system that does not require the physical need for cash. It uses a prepaid card or an e-wallet apps.

Based on the scenario of how Alicia uses a Touch 'n Go card for cashless parking system in Sunrise Carnival Mall, explain **one (1)** activity for each operation in the information processing cycle.

[4 marks]

Operation	Activities
Input	<ul style="list-style-type: none"> scans Touch 'n Go card at the entrance of the parking area. The card reader device reads the card information
Process	<ul style="list-style-type: none"> verifies the card information and checks the balance. calculates the parking fee based on the time and location. deducts the fee from the card balance. updates the record.
Output	<ul style="list-style-type: none"> displays the remaining balance prints a receipt for Alicia sends a confirmation message to her phone.

Storage	<ul style="list-style-type: none"> stores the card information, the parking fee, and the transaction details in a database saves a backup copy of the data in case of power failure or system crash
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(c) A number system is defined as a system of writing that is used to express numbers. Convert the following numbers to the correct base. Show your calculations.

i. 11110101_2 to decimal

[3 marks]

128	64	32	16	8	4	2	1	} 2M
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
1	1	1	1	0	1	0	1	
128	64	32	16	0	4	0	1	
128 + 64 + 32 + 16 + 0 + 4 + 0 + 1 = 245								
11110101 ₂ = 245 ₁₀ ----- 1M								

ii. $ADAB_{16}$ to binary

[3 marks]

8 4 2 1	8 4 2 1	8 4 2 1	8 4 2 1	8 4 2 1	} 2M
A(10)	D (13)	A (10)	B (11)	1	
1 0 1 0	1 1 0 1	1 0 1 0	1 0 1 1	0 0 0 1	

ADAB₁₆ = 101011011010110001₂ ----- 1M

iii. 101101000101110_2 to hexadecimal

[3 marks]

1 0 1	1 0 1 0	0 0 1 0	1 1 1 0
4 2 1	8 4 2 1	8 4 2 1	8 4 2 1
4+1	8+2	2	8+4+2
5	10 (A)	2	14 (E)
$101101000101110_2 = 5A2E_{16}$			

- (d) Calculate the sum of $11011_{10} + 1DA0_{16}$. Write your answer in decimal. Show all the steps.

[4 marks]

4096 16^3	256 16^2	16 16^1	1 16^0
1	D(13)	A(10)	0
(4096 X 1) +	(256 X 13) +	(16 X 10) +	0
4096 +	3328 +	160 +	0

$= 7584_{10}$

Sum of $11011 + 7584 = 18595_{10}$

2m

1m

- (e) An information coding scheme is a set of rules or standards that is used to convert data from one form to another, such as from text to binary digits, for computers to process and understand.

- i. You're a web developer creating a multilingual website that mainly serves Western European languages. You've picked an encoding scheme called 'X,' but it has limitations when it comes to characters beyond ISO-8859-1. What is the encoding scheme 'X'?

[*notes: ISO-8859-1 primarily covers characters used in Western European languages.]

[1 mark]

Extended ASCII

- ii. Statements given in Table:1 are refer to the types of Information Coding Scheme.

Statement A	"This coding scheme uses a variable-width encoding and can represent characters from virtually all the world's writing systems, including emojis and special symbols."
Statement B	"Primarily used on IBM mainframes, this coding scheme is known for its fixed width encoding and is commonly associated with legacy systems."

Table:1

Based on statement in Table:1, Differentiate between these two types based on the characteristic given.

[4 marks]

	Number of characters can be represented	Context of use
Statement A	<i>Can represent 65536 characters</i>	<ul style="list-style-type: none"> <i>Most Web browsers</i>

	$(2^{16} = 65536)$	<ul style="list-style-type: none"> Widely used for Web pages and Web applications Software programs Modern programming languages
Statement B	Can represent 256 characters ($2^8 = 256$)	particularly used on IBM mainframe

2. (a) LightAi company is installing a smart home security system in the customer's house. The system features door sensors, window sensors, and motion detectors designed to safeguard the home against intruders. The logic for triggering the alarm operates as follows:
- The alarm will activate if either the front door is opened, or the living room window is opened.
 - In addition to the above condition, the alarm will only be activated if the motion detector in the hallway detects movement.
- i. Write Boolean expression that represents the condition described in the scenario.

[4 marks]

Legend:

- A: Alarm activate
- F: Front door is opened
- W: Window is opened
- M: Motion detector detected motion.

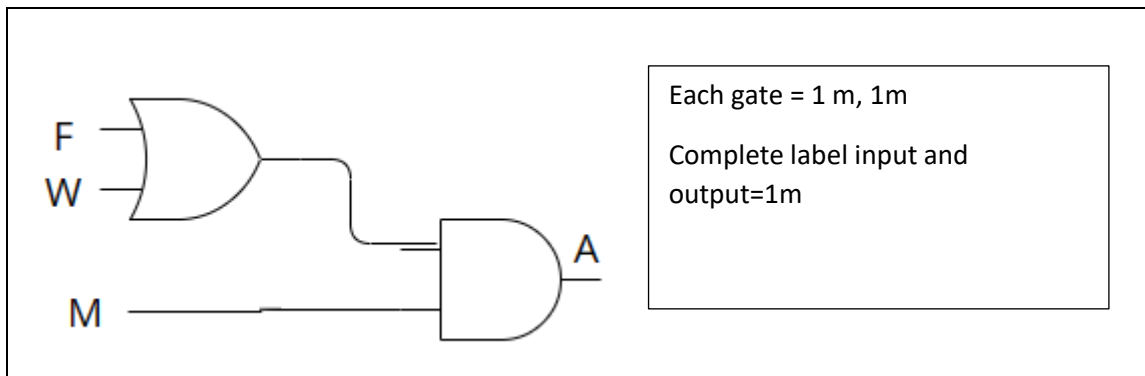
$$A = (F + w) \cdot M$$

1M 1M 1M

1M

- ii. Create a logic circuit diagram to represent the condition described in the scenario.

[3 marks]

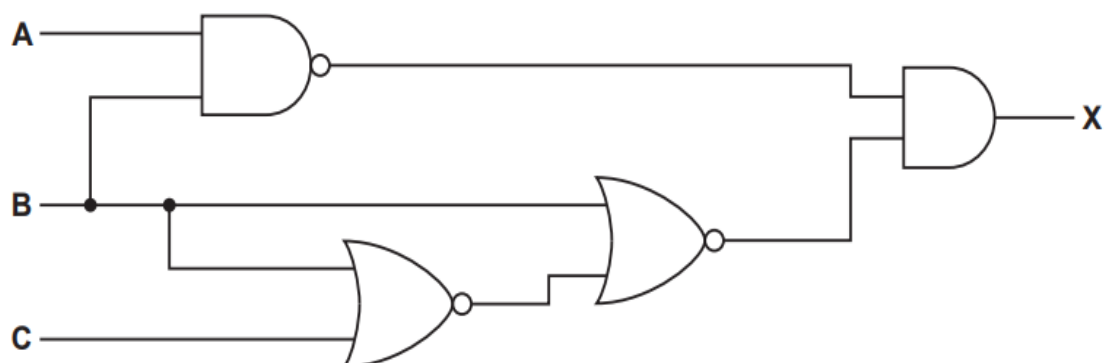


- iii. Construct a truth table for the smart home security system.

[3 marks]

1M			1M	1M
F	W	M	F+W	A=(F+W) .M
0	0	0	0	0
0	0	1	0	0
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	1	1
1	1	0	1	0
1	1	1	1	1

- (b) Derive a Boolean Expression based on the logic circuit.



[5 marks]

$$X = \overline{(A \cdot B)} \cdot (B + (\overline{B + C}))$$

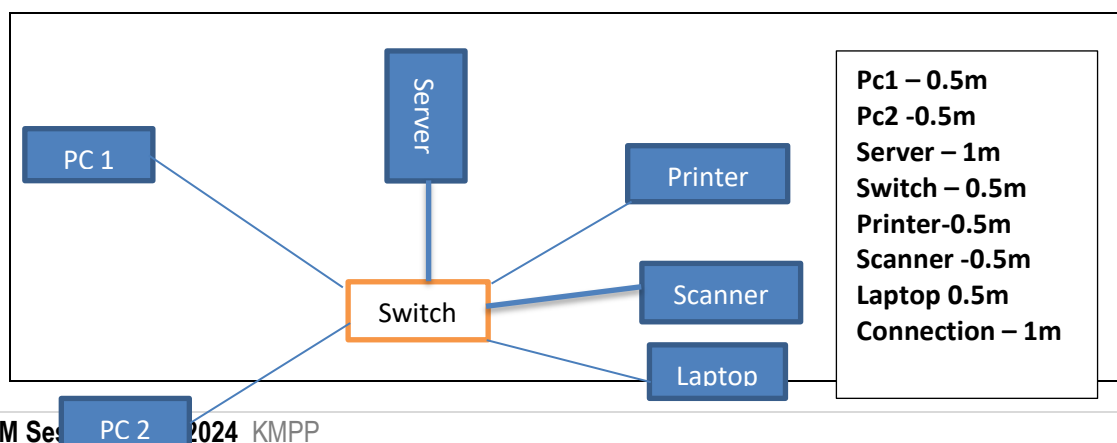
Complete expression (include X =) : 1 M

$$Y = ((A \cdot B') \oplus (B \oplus C'))'$$

The diagram shows a logic circuit for a 3-input majority gate. It consists of three inputs: A, B, and C. Input A is connected to the top input of a 2-input AND gate. Input B is connected to the bottom input of the same AND gate after passing through a NOT gate. Input C is connected to the bottom input of a 2-input OR gate. The output of the AND gate (A AND NOT B) is connected to the top input of a 3-input OR gate. The output of the OR gate (C OR (A AND NOT B)) is connected to the bottom input of the same 3-input OR gate. The final output of the circuit is Y. The text 'label & connection: 1m' is present at the bottom right of the diagram.

- [1mark]

[5 marks]



- (b) Sarah wants to download a rare movie not available on popular streaming services. She connects to the internet and uses specialized software to find and acquire the movie. The download process involves receiving parts of the movie from multiple sources at the same time.

i. What type of network architecture might Sarah be using to download this movie.

[1 mark]

Peer to Peer Network (P2P)

ii. Justify your answer in 3(b) i

[2 marks]

The download process involves receiving parts of the movie from multiple sources at the same time shows that each computer in P2P has equal capabilities to share resources.

(c) Identify one (1) suitable network classification for each given statement or scenario.

[3 marks]

Statement / Scenario	Network Classification
i. A multinational company uses a global network to connect its offices around the world, enabling smooth communication and data sharing between distant locations.	WAN
ii. In 1974, Cambridge University developed the Cambridge Ring, which helped connect the computing devices used within the university campus.	LAN
iii. This network uses the services of carriers, such as telephone companies, cable companies, satellite systems, and network providers.	WAN

4. (a) In our connected world, network technologies are essential for communication and collaboration. Two key types, intranets and extranets, serve different purposes.

i. Explain the differences between Intranet and Extranet using the table provided.

[4 marks]

	Intranet	Extranet
Accessibility	An intranet is a private network limited to the organization's internal users, such as employees, contractors, and partners.	Extranet can be access by authorized people such as vendor
Usage	used for internal purposes, such as sharing company documents, internal communications,	used to extend a part of the organization's network to external partners, suppliers, or customers.

ii. Name two ways an intranet ensures data security and privacy for an organization's internal information.

[2 marks]

Access Control such as UserID and Password
Encryption
Firewall

- (b) An internet address often referred to as an IP address is like a unique number given to each device on the internet.

i. Explain the challenge that arises in the context of IP addresses as the Internet of Things (IoT) era witnesses an increasing number of connected devices.

[2 marks]

increasing number of connected devices nowadays can cause running out of IPv4

ii. Describe the solution for the challenge in 4(b) i

[2 marks]

Use IPv6 because it use 128 bits. So it can support larger address space (2^{128})

5. (a) Based on the following scenarios, determine the area of computer ethics involved

[2 marks]

Scenario	Area of Computer Ethics
i. An instructor saw a striking resemblance between four programs submitted by various students. It seems that three pupils from one class stole a computer program from another, altered the names of a few variables, and submitted it under their own name.	Intellectual Property Right
ii. A desktop computer owned by Wahab is no longer functional. So, he is considering submitting it to an e-waste firm.	Green Computing

- (b) Figure 1 shows a conversation between a student and his lecturer.

Based on Figure 1, list one (1) netiquette guideline that needs to be followed.

[1 mark]

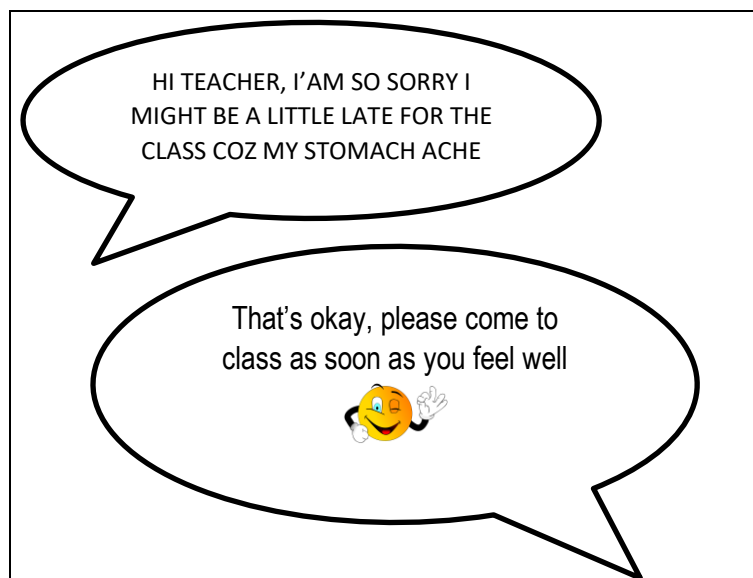


Figure1

Do not use all capital letter while chatting or writing message because it is interpreted as shouting in online communication

- (c) State two (2) good practice to follow and comply with netiquette rules when using a real-time online learning platform.

[2 marks]

Be polite, avoid offensive language
Keep messages brief. Use proper grammar, spelling and punctuation.

Participate Constructively and Engage Activel

6. A popular online retail company is looking to revamp its existing e-commerce platform to enhance user experience and expand its product offerings. The company aims to develop a more user-friendly online shopping system to attract a larger customer base and improve sales.

- (a) According to the situation, System Development Life Cycle (SDLC) is applied as an organized method to design, build, test, and manage new system development. SDLC also involves several key roles and individuals who play distinct roles in each phase of the development process.

What role does the Steering Committee play in SDLC?

[1 mark]

Decision-making body of an organization

- (b) Based on the deliverable in the following table, state the phase of SDLC and list one (1) activity of the phase.

[4 marks]

Phase	Activity	Deliverables
Planning	Allocate resources	<ul style="list-style-type: none">budget allocation for each resource category, including personnel, equipment, software, and other required
Implementation	Install and Test	<ul style="list-style-type: none">Compliance and Certification ReportsDeployment plan

- (c) Given the activity provided in the table, Identify the corresponding phase of the SDLC and the deliverable typically associated with that phase.

[4 marks]

Phase	Activity	Deliverables
Analysis	Conduct preliminary investigation.	Feasibility Study Report Executive summary Scope and Objectives: The strategy document
Design	Acquire Hardware & Software	Hardware and Software Specification Vendor Contract *any relevant answer

END OF QUESTIONS