SC015
Computer Science
Semester 1
2022/2023
2 hours

SC015
Sains Komputer 1
Semester 2
Sesi 2022/2023
2 jam

Nama :		Tutoran :	
Nama Pensyarah Tutoran :			
No. Matrik		**No. Kad Pengenalan**	

M	S																■			■				

KOLEJ MATRIKULASI PERAK
PERAK MATRICULATION COLLEGE

PRA PEPERIKSAAN SEMESTER PROGRAM MATRIKULASI
MATRICULATION PROGRAMME TRIAL EXAMINATION

SAINS KOMPUTER
2 jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Untuk Kegunaan Pemeriksa		
No. Soalan	Markah	Markah Pemeriksa
1	5	
2	21	
3	19	
4	22	
5	4	
6	9	
JUMLAH *TOTAL*		

PRAPSPM 2022/ 2023

1. a) Infographic given below shows the credit card payment process. There are four (4) operations involved during this process.
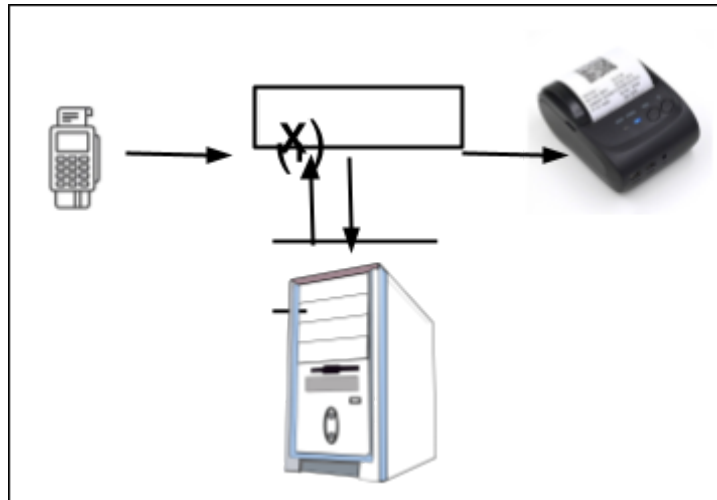

Figure 1 : *Point Of Sale Terminal*

i) Using step **X** in **Figure 1**, determine the action of the information processing cycle.

[1 mark]

Process

ii) Puan Awatif needs to get teaching feedback from her students. The teaching feedback consists of three elements; **personality, teaching strategy and teaching delivery** as shown in *Figure 2*. She collects data from the student surveys before analyzing it and presents it in the table and graph form as a report. The mean for each teaching element also needs to be included in the report. She submits her teaching report to the management at the end of semester by hardcopy and also in CD.

	TEACHING FEEDBACK ANALYSIS			

College Name	: ABS COLLEGE			
Lecturer	: MADAM AWATIF		Session :	2012/2013
Date	: 9 JULAI 2022		Semester :	1 / 2
Class Time	: 2.00 - 4.00 PTG		Venue :	Computer Lab

Student	Personality	Teaching Strategy	Teaching Delivery
1	3.0	4.0	5.0
2	5.0	5.0	5.0
3	4.0	5.0	5.0
4	5.0	5.0	5.0
5	3.0	4.0	4.0
6	5.0	5.0	5.0
7	5.0	5.0	5.0
Mean	**4.29**	**4.71**	**4.86**

Figure 2 : Teaching Feedback Analysis

Based on the given scenario, identify the activity for each operation of the information processing cycle during **producing the report.**

[4 marks]

Information processing	Activity
Input	Computer read the survey data/ computer accept the personality data/ computer accept the teaching strategy data/ computer accept teaching delivery data
process	Computer analyze the survey data / Computer converting the data into graph form / Machine calculate mean from the survey data/ Machine calculate number of student
Output	Print the report / Display the report / table and graph on the monitor
Storage	Store the report in CD / Save the report in CD for future use

1m for each activity

2.   a) Answer the following question and give your answer in the requested number system.

i) AZ Cakes & Pastries produces 2550 cakes a week. They make 1230 chocolate cakes and the rest are red velvet nutella cakes. How many red velvet nutella cakes do they produce? Give your answer in hexadecimal number.

[4 marks]

2550 - 1230 = 1320 (red velvet nutella cake)   1m

16	1320	
16	82	- 8
16	5	- 2
	0	- 5

(1m) (calculation)

Answer : 528_{16} (1m) - Base 1m

ii) For year 2022, all of the college students are eligible to receive a monthly allowance of 11111010_2 per month. Convert the value into decimal

[3 marks]

1m

1	1	1	1	1	0	1	0
1×2^7	1×2^6	1×2^5	1×2^4	1×2^3	0×2^2	1×2^1	0×2^0
128	64	32	16	8	0	2	0

= 128 + 64 + 32 + 16 + 8 + 0 + 2 + 0 (1m)
= 250 (1m)

iii) Convert the following binary numbers into hexadecimal numbers: Show your calculation.

[6 marks]

Binary number	Hexadecimal numbers
i) 1111 0000	1111 0000 **8421** **8421** 8+4+2+1 0 1m 15=F 0 1m ---> **F0$_{16}$** 1m → tolak 1 jika tiada base
ii) 10 1111 1010	10 1111 1010 8421 8421 8421 2 15=F 8+2=10=A 1m 2 8+4+2+1 8+0+2+0 1m **2FA$_{16}$** 1m → tolak 1 jika tiada base

iv) Convert each part of the IP address below into an **8 bits** binary number.

24 . 2 . 0 . 10

[4 marks]

3

Each digit change to binary CORRECTLY and 8 bits gets 1 mark

2	24	
2	12	0
2	6	0
2	3	0
2	1	1
	0	1

2	2	
2	1	0
	0	1

2	0	
	0	0

2	10	
2	5	0
2	2	1
2	1	0
	0	1

1m   1m   1m   1m

0001 1000 . 0000 0010 . 0000 0000 . 0000 1010 $_2$

4

c)   Identify the coding scheme based on information given, then complete the following table based on the identified coding scheme.

[4 marks]

Coding Scheme	Example of bits used for one (1) character for this type coding scheme	Category of computer used the coding scheme/context of use	Range of value that can be presented
X	01100011	Personal computer(Extended ASCII) / IBM mainframe and high end server (EBCDIC)	0-255
Y	1011001010111110	OS including Windows, Mac OS and Unix	0-65535

1m for each answer

3.   (a) Harithxan Rossy wants to spend his mid semester break at Qatar to watch the 2022 FIFA World Cup. He can only go to Qatar if he completed two doses of Sinovac vaccine and a Pfizer booster or two doses of Pfizer vaccine and without the booster.
(i) Identify the legend and write a Boolean expression for the scenario.

[4 marks]

Y = go to Qatar
A = two doses of Sinovac vaccine
B = done a Pfizer booster
C = two doses of Pfizer vaccine (2m if all legend are correct)

Y=(A.B)+(C.B') - (2m)

ii)   Construct the truth table based on scenario in **1(b)(i)**

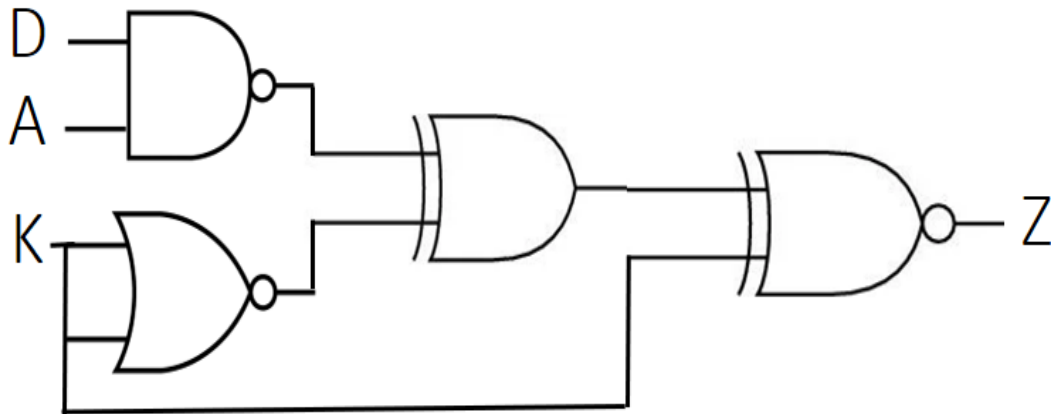[4 marks]

A	B	C	B'	A.B	C.B'	Y
0	0	0	1	0	0	0
0	0	1	1	0	1	1
0	1	0	0	0	0	0
0	1	1	0	0	0	0
1	0	0	1	0	0	0
1	0	1	1	0	1	1
1	1	0	0	1	0	1
1	1	1	0	1	0	1

1m for each true output column

5

(b) Write the boolean expression based on the given logic circuit.

[2 marks]

$$Z = \left(\left((D.A)' \oplus (K + K)'\right) \oplus K\right)' \text{ - 2m}$$

(c) Logic gates are used to make decisions so that electrical outputs only 'turn on' when the correct logic sequence has been applied. Choose the best logic gate from the provided description.

[3 marks]

	Description	Logic Gate Name
i)	If inputs A or B, or A and B are high, output Q will be high	OR gate
ii)	the output is in state 1 when both inputs are the same, that is, both 0 or both 1.	XNOR gate
iii)	The logic gate, which gives a high output (i.e., 1) if either input A or input B but not both are high (i.e. 1)	XOR gate

1m for each

(d) Langkawi RO-RO Ferry Services use their own traffic light system to allow cars to enter and exit their ferry. They use logic gates as part of the control system. The system is operated to allow cars movement when the output Y has the value 1. This happens when:

      (a) The ferry stop moving (signal is red)

      (b) The ferry tied to the terminal (signal is green)

      (c) The ferry ramp in place to allow movement of cars (signal is green)

Write the **logic notation** to represent the above situation and draw the **truth table**.

(Note: You may assume for this problem that **red = 0 and green = 1**)

[6 marks]

Logic notation : **Y = A' . B . C   (1m)**

Y = A' . B . C   (1m)

Legend (2m)
Y - traffic light is operated
A - The ferry moving
B - The ferry tied to the terminal
C - The ferry ramp in place to allow movement of cars

A	B	C	A'	A' . B	Y
0	0	0	1	0	0
0	0	1	1	0	0
0	1	0	1	1	0
0	1	1	1	1	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	0	0

Marks:
Legend : 2M
Boolean expression : Y = A' . B . C - 1M

ALL **Output** correct - 3M
1 m for each correct column (row)

4.   a) Client/server architecture is a network architecture in which each computer or process on the network is either a client or a server. Clients initiate requests to servers, which fulfill those requests.

Illustrate an architecture to depict a student registration system that can only be ==accessible by staff or employees== of the organization. The architecture consists of **2 desktop clients, 1 mobile client, 1 printer and 1 web ==server== with database support.**

[7 marks]

Printer

Desktop
client 1

Desktop
client 2

Mobile client

Organizatio
n Intranet

Database

Web Server

OR

Printer

Desktop
client 1

Desktop
client 2

Mobile client

Organizatio
n Intranet

Web Server
with
database
support
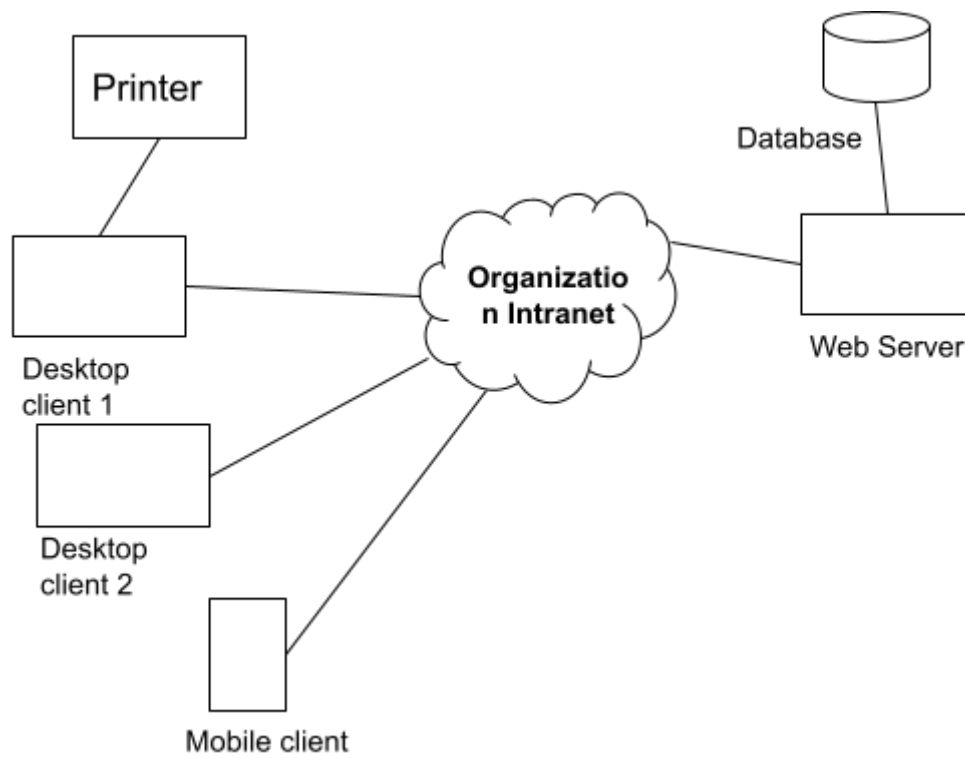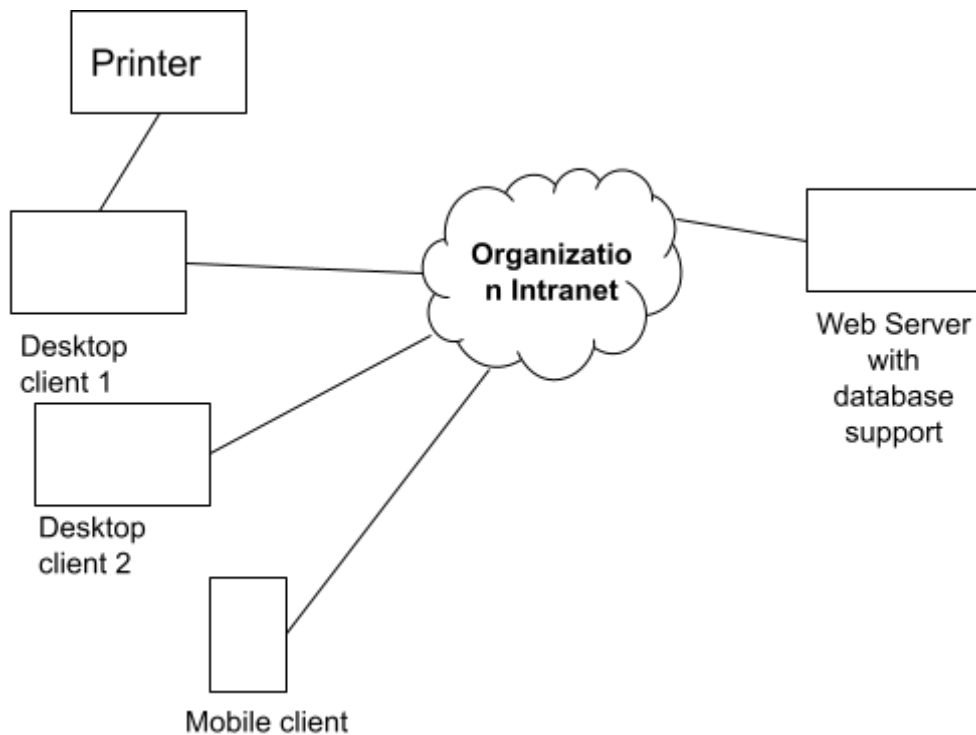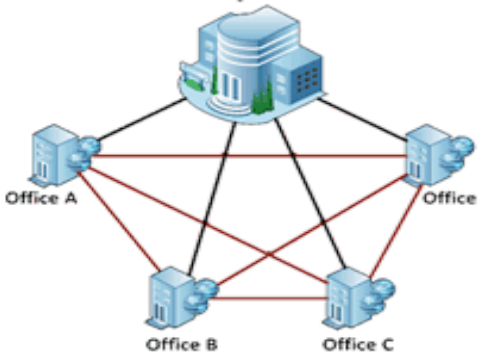
Answer :
all clients - 2m
printer -1m
web server with database support - 2m   /   database 1m, web server 1m
Intranet - 1m
arrow/line - 1m
incorrect line (deduct 1m)

Or any acceptable answer

8

b) The network allows computers to connect and communicate with different computers via any medium.

i) Distinguish both classification in terms of coverage area and give one (1) example.

[5 marks]

Classification X	Classification Y
Coverage area : **Network that covers a large geographic area** such as a city, country, or the world using a variety of wired and wireless transmission media. - 2m	**Coverage area :** **Network that covers limited geographical areas** such as home, school, office building or closely positioned group of buildings. - 2m
Example : Internet, city network, bank network -½ m	**Example :** School network, home network - ½ m

c) Internet Technologies is a technical field that covers the necessary skills to develop applications on the Internet or Internet based systems, harnessing e-commerce, cloud, mobile, and Web based technologies.

Differentiate Intranet and Extranet based on criterias below.   [4 marks]

Criteria	Intranet	Extranet
Accessibility of the network	The whole private network/full access to employees within organization (1m)	A part of private network/limited access to authorized user (1m)
Authorized User	Employees/staff/members within organization (1m)	Authorized non-members of organization such as customer and supplier (1m)

d) An Internet Protocol (IP) address is a sequence of numbers that uniquely identifies the location of each computer or device connected to the Internet and consists of two IPs namely; IPv4 and IPv6. Meanwhile, domain name is part of the web address that you type in a browser's address bar to access a website.

i) Describe **two (2) reasons** for using IPv6 instead of IPv4.

[4 marks]

i) IPv4 address is running out
ii) lack of IPv4 by providing much larger address space
iii) improved traffic routing
iv) better security
Choose any two

ii) Explain the relationship between IP address and domain name.

[2 marks]

Domain name is a text-based name that corresponds to the IP address of a server that hosts a website.

5.   a) The Identify the areas of computer ethics based on the given scenario

[2 marks]

Scenario	Area of Computer Ethics
A teacher noticed a remarkable similarity among four programs turned in by different students. Apparently, three students in one class had copied a computer program from a student in another class, changed a few variable names, and then turned it in as their own work.	Software piracy
The election season is fast approaching and the digital world becomes even more limitless and without boundaries. Negative effects will occur when spreading false information.	Information accuracy

b) The figure below shows a conversation between a student and his friend.

FIGURE 1

i) Identify one (1) netiquette rules that must be abided based on figure 1

[1 mark]

Use emoticons and emojis to express emotion. /Be forgiving of others mistakes

ii) State one (1) good practice to follow and comply with netiquette rules when using real time conversation.

[1 mark]

1. Do not use all capital letters, which is equivalent to SHOUTING!
2. Be careful when using sarcasm and humor : It might be misinterpreted.
3. Use emoticons and emojis to express emotion.
   Popular emoticons include:
- :) Smile
- :| Indifference
- :o Surprised
- :(Frown
- :\ Undecided
4. Be polite : Avoid offensive language.
5. Use abbreviations and acronyms for phrases
6. Avoid sending or posting flames : Which are abusive or insulting messages.
   Do not participate in flame wars, which are exchanges of flames.

6.	a) The phases of the system development process constitute a loop, and each phase consists of a number of operations. The five phases of system development normally occur in that order, according to theory. Since activities typically interact with one another during subsequent phases, system development is truly a dynamic, iterative process.

Based on the action below, choose which phase of the System Development Life Cycle (SDLC) this activity belongs to.

[2 *marks*]

The new system's features are developed by Miss Bavini.	Design
Every day, Mrs. Ling constantly assesses the safety of the system.	Support and security

b) The RNB Corporation made the decision to create an information system that required managing a database and increasing business revenue. Additionally, this system must generate reports on the company's monthly profits, the rise in sales of the company's goods and other data. At the moment, all tasks requiring business decisions, producing reports and managing business data are carried out manually. Describe **one (1)** example activity based on the table given, refer to the state scenario. [6 *marks*]

SDLC Phases	Example of Activity
Planning	Steering committee will do a meeting to review and approve the project requests.
Design	Prototype for the system present to customer
Implementation	Programmers use Java to Develop programs. Development team will test the system with end user Train user to use the system Project team convert to new system using parallel conversion

c) Explain **one (1)** impact of RNB Corporation failing to complete the analysis phase of the System Development Life Cycle (SDLC).   [1 mark]

- Making the wrong decision about the system to be developed.
- The system may not be able to achieve its objectives accurately.
- Occurrence of excess or insufficiency of system development costs.

Or any acceptable answer

END OF QUESTION PAPER