Best

University of Management and Technology
School of Systems and Technology, Department of Computer Science

Final Term Exam – FALL 2022

Course Title:	Introduction to Information & Communication Technologies	**Course Code:**	IT1091	**Credit Hours:**	3 (2,1)
Course Instructor:	Mr. Rehan Raza & Mr. Muhammad Owais Khan	**Programme Name/Section:**	FA22-BSCS-V11/V14		
Student Name:	Malaikah Hameed	**Registration No:**	F2022266540		
Time Allowed:	120 minutes	**Maximum Marks:**	40		
Dated:	Wednesday, March 15, 2023	**Obtained Marks:**			

Important Instructions / Guidelines:

Attempt all questions.
Read each question statements carefully.
In case of cheating all involved will get straight **Zero.**
Paper understanding is the part of the exam.
Note: Use the backside of the sheet for the solution.

Paper Review Date: 17-03-2023

Q. No. 01 – CLO-1	Q. No. 02 – CLO-2	Q. No. 03 – CLO-3	Q. No. 04 – CLO-4	Total
10	15	10	05	40
09	14	09	05	37

Question No 1. [CLO-1] <Bloom Taxonomy C1: Understanding> Marks: [10 x 1 = 10] 9

Describe the following fundamental concepts and give brief answers to each question. Your answers should be to the point. [Estimated Time: 30 minutes]

i. What are the uses of videoconferencing and telemedicine in the application of computer networks?

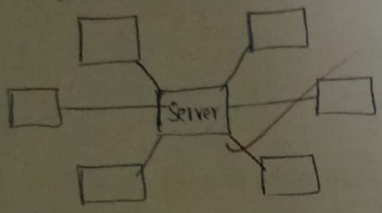
- Videoconferencing uses computers, microphones, webcams and other networking technologies to enable face-to-face meetings over a network.
- Telemedicine makes use of networking technologies to provide many facilities remotely. These include - remote consultations, remote diagnosis, remote prescriptions etc. ~~One of the other~~ Telesurgery is also a part of telemedicine and it also uses networking technologies to enable robot-assisted surgeries where the doctors physical location is different from the robots and patients. The doctor through the use of networking technologies like computers etc to control the robot.

1

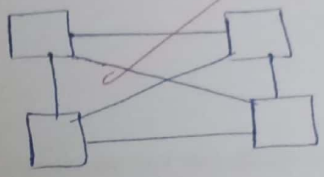
ii. Differentiate between star and mesh topologies. Illustrate with the help of a diagram.

Topologies basically identify how the computers in a network are connected. In star topology, there is a central server to which all networked devices are connected to. The network devices are connected through wires. If the central server fails, the network will not work. Whereas in mesh topology, each device in a network is connected to all the other devices in the network. There is no central server. The data can take several paths along the network.

STAR TOPOLOGY DIAGRAM



Mesh TOPOLOGY DIAGRAM



iii. List at least four applications of the internet apart from writing an email.

① Instant Messaging - real-time messages

② Text Messaging - also known as SMS - could be done if you have a mobile phone

③ Tweeting-uploading short messages over the internet as tweets. used by both individuals and businesses.

④ Forums - are basically web-pages that allow the user to enter information about a certain topic and which can be seen by people and they could respond to it as well.

⑤ Social networking ~~sites~~ media - A collection of social networking sites that enables the user to share information over the internet and communicate with people.

iv. What is Artificial Intelligence (AI)? How can the AI help in medical domain?

Artificial Intelligence is basically giving logic to computers. making computers smart so they can think on their own, can make logical decisions and organize. AI is helping in the medical domain in several ways like robots with AI technology are capable of performing surgeries on robots ~~that~~ or machines that can provide diagnosis to by taking patients symptoms.

v. What are the factors would you be considering before establishing a new internet connection at your home?

① Bandwidth - no. of data that can be processed in a given amount of time

② Speed of the internet

0.5

vi. List two potential advantages of E-commerce for consumers and two disadvantages for business.

Two advantages of E-commerce for consumers:

① Convenient (no travelling)

② Has a large range of merchants to choose from.

Two disadvantages for business:

① A lot of competition as new businesses are created.

② Risk of fraudulent activity from credit card transactions.

③ Most consumers hesitate to buy products online so loss in sale.

1

vii. Define B2B, C2B business models. Also, give an example.

B2B - Business-to-business - It's an e-commerce model in which a business provides several goods and services to another business.
eg: wholesale businesses providing local business products

C2B - Consumer-to-business - It's an e-commerce model in which a consumer provides several goods and services to a business.
eg: etsy - consumer sells the products on business website.

1

viii. What is database and DBMS?

Database - collection of related data that is stored in a manner so that that it can be retrieved as needed. Organized.

DBMS - used to create, update and access databases.
used CRUD - create, read, update and delete.

0.5

ix. Why assuring data security is important in a database?

→ data security is protecting the data against destruction and misuse. In a database, which contains alot of personal data, it is very important to maintain security of data. Prevent unauthorized access from accessing the information. ~~Backup~~ Disaster recovery programs/techniques should also be used for any natural disaster occurring leading to loss of information. special softwares can be used to detect any intrusion.

1

x. Why writing an algorithm is important before moving directly towards coding phase?

Writing an algorithm is important because through that you are basically making the logic of the program. You identify what variables you need, how the data will flow or be processed within a program. and testing it again so theyre no logical errors. Only then you can create/move towards the coding phase.

1

2

uestion No 2. [CLO-2] <Bloom Taxonomy C1: Understanding> **Marks: [15]** 14

[Estimated Time: 45 minutes]

2(a): Describe SJF scheduling algorithms and find out the average turn around time, and average waiting times for the given processes (P1 to P5) using SJF scheduling algorithms. [Marks: 7] 7

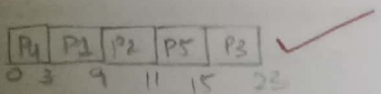
Process	Arrival Time (m/s)	Brust Time (m/s)
P1	2	6
P2	5	2
P3	1	8
P4	0	3
P5	4	4

TAT WT

P4 P1 P2 P5 P3

0 3 9 11 15 23

Solution:



P	AT	BT	CT	TAT	WT
P1	2	6	9	7	1
P2	5	2	11	6	4
P3	1	8	23	22	14
P4	0	3	3	3	0
P5	4	4	15	11	7

SJF → Shortest Job First - ~~On the~~ It is a type of non-preemptive scheduling and does not work on priority basis. Once the task being executed is completed and exits the system, the second process will wait in the ready queue.

average TAT = 9.8

average WT = 5.2

7

2(b): Explain the following terms that are used in communication technologies in detail and draw the diagram where required. [Marks: 8]

a) **Synchronous vs Asynchronous communication.**

b) **Infrared (IR) Transmissions.**

c) **Bridge and Router.**

d) **Podcast and Wikis.**

- Synchronous communication - sends blocks of ~~code~~ data at regular, specific intervals.
- Asynchronous communication - sends ~~a~~ data in bits whenever it is ~~a~~ ready to be sent. Each bit has a ~~start~~ bit and an end bit to identify its byte.
- Infrared Transmissions - using light rays to send the data. The signals are usually line of sight ~~so this~~ they're replaced by RFID technology. They're used in TV remotes, gaming consoles etc.
- Bridge - connects two LAN's together and router connects multiple networks together. together for example - 2 LAN's together, ~~2 WANS~~ LAN to the internet/network.

LAN1 ⟶ LAN2

- Podcasts and Wikis - podcasts are recorded audio and video content that is uploaded over the web. ~~It~~ could be about any topic. ~~It~~ used by both individuals and businesses to ~~talk~~ talk/discuss about almost any matter. ~~Posted~~ posted on regular basis.

Wikis - A collaborative webpage that is designed in a way that it can be edited by the general public. Anyone who wants to change/modify the information can do so. ~~It~~ is advised to recheck the information on wiki webpages before using it because ~~many peopt~~ not all people are serious about posting right content. ~~It~~ contains a variety of information about different topics.

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Question No 3. **[CLO-3]** **<Bloom Taxonomy C2: Applying>** **Marks: [10]** 9

[Estimated Time: 30 minutes]

a) **Solve** the following numbers in a given number system to its equivalent number systems. Show your working / complete step for each part. **[06]** 5

#	Decimal	Binary	Octal	Hexadecimal
1	105	1101001	151	69
2	672	1010100000	1240	2A0
3	62	111110	76	3E

① $(105)_{10} \Rightarrow (\quad)_2$

2 | 105	
2 | 52 - 1	
2 | 26 - 0	
2 | 13 - 0	
2 | 6 - 1	
2 | 3 - 0	
1 - 1	

52 / 2) 105 / -10 1 / 005 / -4 / 1

6 / 2) 13 / -12 / 1

1101001

$(1\times2^0)+(1\times2^3)+(0\times2^4)+(0\times2^5)+(1\times2^6)$

$(151)_8 \Rightarrow (\quad)_{16}$

1	5	1
421	421	421
001	101	001

000001101001

8421 8421 8421

0 6 9 — 69

$(1010100000)_2 \Rightarrow (\quad)_{10}$

$(1\times2^9)+(0\times2^8)+(1\times2^7)+(0\times2^6)+(1\times2^5)+(0\times2^4)+(0\times2^3)+(0\times2^2)+(0\times2^1)+(0\times2^0)$

$512+0+128+0+32+0+0+0+0+0$

672

2 | 672	
2 | 336 - 0	
2 | 168 - 0	
2 | 84 - 0	
2 | 42 - 0	
2 | 21 - 0	
2 | 10 - 1	
2 | 5 - 0	
2 | 2 - 1	
1 - 0	

$(76)_8 \Rightarrow (\ 62\ )_{10}$

$(7\times8^1)+(6\times8^0)$

$56+6$

Hexadecimal

0011 1110

8421 8421

3 + 14

17

00101001000

421 421 421 421

1 + 2 + 4 + 0

7

111110

7 6

421 421

111 110

$(1\times2^5)+(1\times2^4)+(1\times2^3)+(1\times2^2)+(1\times2^1)+(0\times2^0)$

62

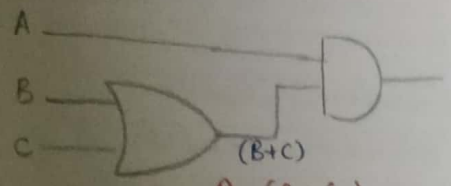
b) **Interpret** the following Boolean equation (Distributive Property) and fill in the truth table at right for. Prove it with the help of Truth Table. **[04]**

AND OR

$A \cdot (B+C)$

$A\,(B+C) = (AB) + (AC)$

$(A \cdot B) + (A \cdot C)$



$A \cdot (B+C)$

A	B	C	(B+C)	Z
0	0	0	0	0 ✓
0	0	1	1	0 ✓
0	1	0	1	0 ✓
0	1	1	1	0 ✓
1	0	0	0	0 ✓
1	0	1	1	1 ✓
1	1	0	1	1 ✓
1	1	1	1	1 ✓

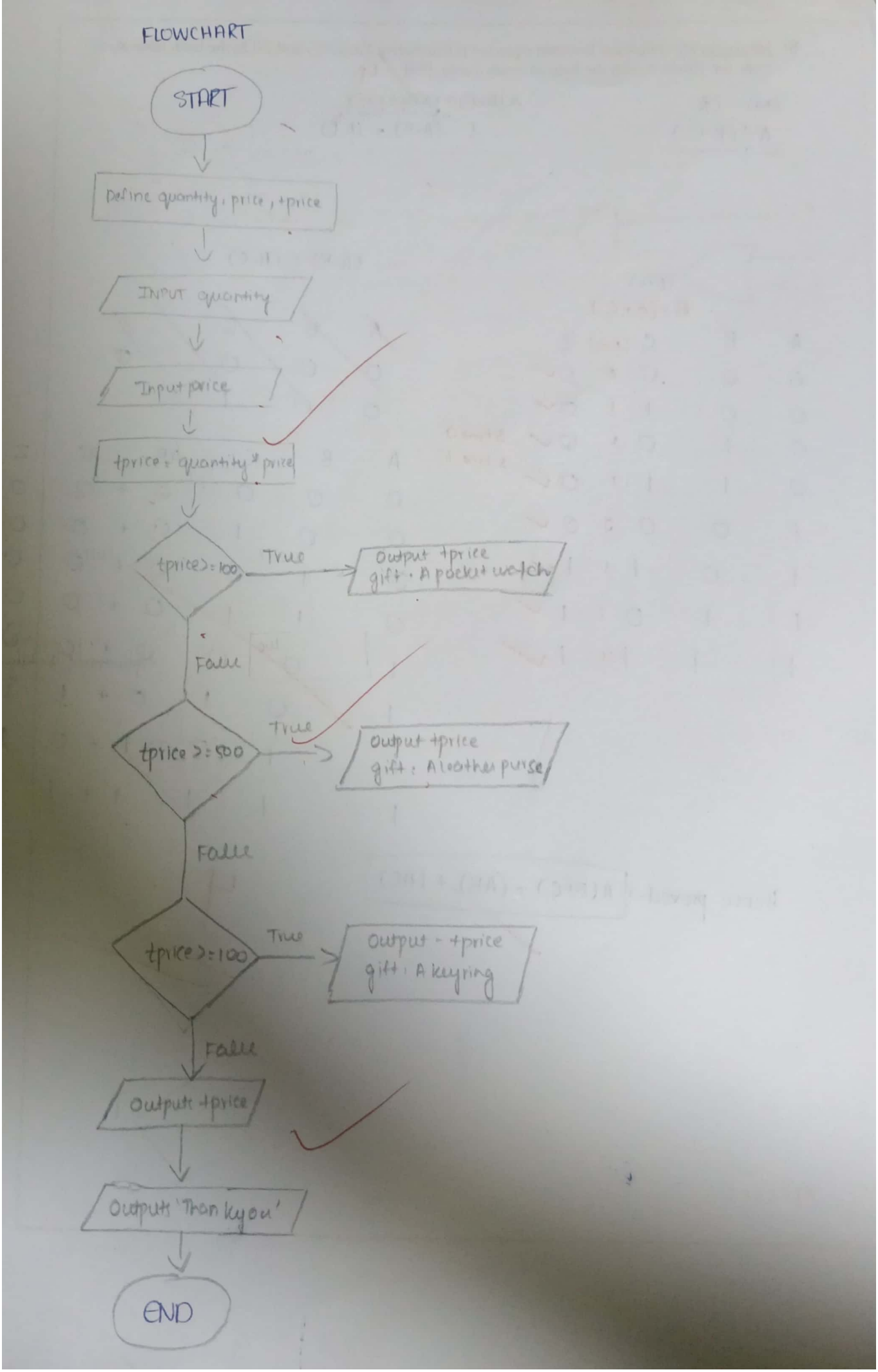
5 time 0
3 time 1

A	B	C	Z
0	0	0	0
0	0	1	0
0	1	0	0

A	B	C	AB	AC	Z
0	0	0	0 + 0		0
0	0	1	0 + 0		0
0	1	0	0 + 0		0
0	1	1	0 + 0		0
1	0	0	0 + 0		0
1	0	1	0 + 1		1
1	1	0	1 + 0		1
1	1	1	1 + 1		1

Hence proved → $A(B+C) = (AB) + (AC)$

4



Question No 4. **[CLO-4]** **<Bloom Taxonomy C3: Applying>** **Marks: [05]** /5

Implement the following scenario's and write and implement the logic in form of C++ code / Pseudocode. [Estimated Time: 15 minutes]

Fatima wants to write a Pseudocode/code in C++ that calculates total purchasing price of an item and a gift to be presented along with it. Before writing a code, she has to write an algorithm. The algorithm should first takes the value of item quantity and unit price from the user. The algorithm will then calculate total purchasing price and display it along with the gift to be presented. The gifts to the customer are given under the following condition.

Amount of purchase (in $)	Gift
100 and above but less than 500	A keyring
500 and above but less than 1000	A leather purse
1000 and above	A pocket watch

Lastly, a "thank you" message should also be displayed. Identify inputs and outputs of the above given scenario. Also, draw a flowchart.

```
#include <iostream>
using namespace std;
int main()
{ int quantity;
  double price;        ---> double tprice;
  cout << " Please enter the quantity of the item: ";
  cin >> quantity;
  cout << " Please enter the unit price of the item: ";
  cin >> price;
  tprice = quantity * price;
  if(tprice >= 1000)
  { cout << "Total purchase price: " << tprice << endl;
    cout << " Your gift is: A pocket watch." << endl; }
  else if ( tprice >= 500)
  { cout << " Total purchase price: " << tprice << endl;
    cout << " Your gift is: A leather purse." << endl; }
  else if (tprice >= 100)
  { cout << " Total purchase price: " << tprice << endl;
    cout << " Your gift is: A keyring " << endl; }
  else
  { cout << " Total purchase price: " << tprice << endl; }
  cout << " Thankyou! "; }
```

4 quantity 5 price 20

```
if (tprice >= 1000)
{cout << "Total purchase price: " << tprice
cout << " Your gift is: A pocket watch";
(tprice >= 500)
(tprice >= 100)
```

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Do your own work, some One is watching!

Best of Luck!

Algorithm

Purpose - to calculate total purchasing price and displaying the suitable output with gift.

Step 1 - Define variables - quantity, unit, tprice.

Step 2 - We will ask the user to input the values of quantity and unit price.

Step 3 - We will calculate the total purchasing price by multiplying quantity and unit price together.

Step 4 - If the total price is greater than or equal to 1000, we will display the users calculated total purchasing price and also display a gift which will be a pocket watch.

Step 5 - If the total price is greater than or equal to 500 but less than 1000, we will display users calculated total purchasing price along with a gift which will be a leather purse.

Step 6 - If the total price is greater than or equal to 100 but less than 500, we will display users calculated total purchasing price along with a gift which will be a keyring.

Step 5 - If the total price does not match any of the above conditions, we will display only the users calculated purchasing price.

Step 6 - At the end, we will display a thankyou message.