

- 
1. Briefly discuss about the state of a transaction with diagram.
2. Define serializability. Explain the cases need to consider avoiding the conflict of serializability.
3. Define deadlock. Discuss the actions need to be taken to avoid recovery from deadlock.

Employee Table

id	name	salary	departmentId
----	------	--------	--------------

1	Ram	85000	1
2	Divya	80000	2
3	Tim	60000	2
4	Kim	90000	1
5	Priya	69000	1
6	Saket	85000	1
7	Will	70000	1

Department Table:

id	name
----	------

1	Marketing
2	HR

④ SELECT *
FROM ET
WHERE D_ID = 1 AND
SALARY > 7000;

⑤ SELECT Name, ID FROM ET
WHERE D_ID = 2;
SELECT *
FROM ET
WHERE salary =
(Select MAX(salary)
WHERE

1. Write a query to figure out how we can find the top 3 high-earner employees.
2. Write a query to obtain the high-earner employees department-wise.
3. Write a query in SQL to retrieve only even rows from the table Employee.
4. Write a query to show all the record of those employee whose department is marketing and salary is greater than 70000.
5. Write a query to show the name and id of HR department.



tb

9. Construct a clean and concise ER diagram for the NHL database. Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):

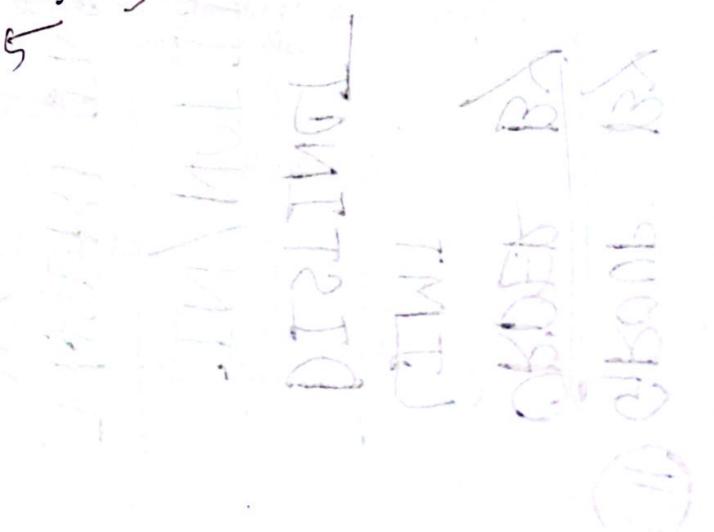
- the NHL has many teams,
- each team has a name, a city, a coach, a captain, and a set of players,
- each player belongs to only one team,
- each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
- a team captain is also a player,
- a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

10. Define: Seek time, Rotational latency, RAID, Hashing, Generalization. 10

11. Which indexing you prefer: Dense or Sparse. Why? 5

12. Differentiate between B tree and B+ tree.

5



3.25 - 3.50

Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200

Department of Computer Science and Engineering

B.Sc.(Engineering) in Computer Science and Engineering (CSE)

Semester Final Examination 2022 (Jan-Jun)

Level 3 Semester I Course Code: CSE 303 Credit: 3.0

Course Title: Database

Duration: 3 Hours

Total Marks: 90

[NB: The figure in the right margin indicates the marks for the respective question and split answer of any question is unacceptable]

Section-A

Answer any 3 (three) questions from the following

1. a) Differentiate between file processing system and DBMS. 6
2. b) Define super key, candidate key and primary key. 3
3. c) Illustrate the need of a database system with suitable examples. 6
4. a) Explain the scenario with appropriate figure for the placement of relationship attribute for one-to-one, one-to-many, many-to-one and many-to-many relationship. 8
5. b) Briefly explain the level of abstraction in database management system with figure. 7
6. a) Consider the following schemas: 9

Customers(cust_id: integer, name: string, address: string, phone: string) Orders(order_no: integer, cid: integer → Ref(Customers: cust_id), order_date: date, product: string, qty: integer, price: float) Shipments(ship_id: integer, oid: integer → Ref(Orders: order_no), ship_date: date, carier_no: integer)

Primary key attributes are shown underlined. Write the SQL statements for the following:

- I. Find the name of the customers along with their phone numbers.
- II. Find the shipment dates of the orders which are placed between 01/12/2020 and 31/12/2020.
- III. Find the addresses of the customers whose names begin with the letter 'M', end with the letter 'N' and are at least 4 characters long.

- b) Describe the single-valued and multi-valued attributes with examples. 3
- c) Differentiate between primary key and foreign key. 3

4. a) Briefly explain about storage device hierarchy with figure. 5
- b) Suppose you are given the following requirements for a simple database for the National Hockey League (NHL): 10

- the NHL has many teams,
- each team has a name, a city, a coach, a captain, and a set of players,
- each player belongs to only one team,
- each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
- a team captain is also a player,
- a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

Construct a clean and concise ER diagram for the NHL database.

Section-B

Answer any 3 (three) questions from the following

1. a) Which type of indexing you prefer: dense index or sparse index? Why? 5
b) Differentiate between hashing and indexing. 5
c) Describe integrity constraints with example. 5
2. a) Define normalization. Explain different types of normal forms used in a database. 10
b) Explain generalization and specialization with proper example. 5
3. a) Define RAID. Describe different RAID levels with example. 1+4
b) Why is B+ tree more efficient than B tree? Explain how data retrieval, insertion and deletion are done in B+ tree indices. 2+3
c) Describe the ACID properties of a Transaction. 5
4. a) Explain the steps involved in processing a query with figure. 5
b) Define deadlock. Describe the methods for dealing with the deadlock problem. 1+4
c) What is concurrency control? Briefly explain two types of locking modes. 1+4

Hajee Mohammad Danesh Science and Technology University, Dinajpur
Department of Computer Science and Engineering
B. Sc. (Engg.) in Computer Science and Engineering
Mid-Semester Examination 2022
Level 3, Semester I, Credit: 3.0
Course Code: CSE 307, Course Title: Microprocessor and Interfacing

Time: 50 Minutes

Total Marks: 30

[N.B. The figure in the right margin indicates the marks allocated for the respective question. The split answer to any question is not allowed.]

(Answer any 03(three) from the following questions)

1. (a) What is a microprocessor? Briefly describe how does microprocessor differs from a microcontroller and microcomputer. 5
- (b) Why addressing modes are required in microprocessors? Discuss different types of addressing modes of 8085 with suitable examples. 5
2. (a) How can you implement pipelining in the basic microprocessor? Explain it with a diagram. 5
- (b) Explain the following instructions: JMP, CALL, IN, OUT, CMP. 5
3. (a) What is polling? Explain with proper diagram, decoding of 8-Bit I/O port addresses ending with F7H address. 5
- (b) Given that DS = 2472H, DI = 2188H, and BX = F194H. Show the contents of memory locations after the execution of the following instruction and identify the addressing mode. 5
35A44
 $MOV [BX+DI+08], CL$
4. (a) Explain the application of flags in the microprocessor. Discuss different types of flags with suitable examples. 5
- (b) State the step of converting a decimal number to its corresponding floating-point number for 8087 coprocessor and convert 100.35 to its corresponding floating-point. 5

133

2X2X2X2X2

36044 10892
000101

Quiz

Time: 20 Minutes

Marks: 15

~~X~~ What is addressing mode? Identify the following addressing modes.

- a. ADD CX, 0875H ✓
- b. MOV [DI], [AX] ✓
- c. MOV DX, [BX+SI+0586H] ✓
- d. IN AX, [SI]

Input - output Addressing mode.

~~X~~ 2. What is segmented memory? What are the different segments of memory with which Intel 8086 can work?

Explain how does segmentation provides an effective task switching mechanism.

~~X~~ 3. Describe the three modes of operations for 8255 using relevant diagrams. If port B and upper port C must be initialized as input ports and lower port C and port A as output ports (all in mode 1), then draw the control word format of 8255.

Read write cycle

1. a) Define normalization. Explain different types of normal forms used in a database.
b) Explain generalization and specialization with proper example.

2. a) Define RAID. Describe different RAID levels with example.

3. a) Define normalization. Explain different types of normal forms used in a database.
b) Explain generalization and specialization with proper example.

Time: 03 hours

Total Marks: 90

[N.B. The figure in the right margin indicates the marks allocated for the respective question.
The Split answer to any question is not allowed.]

Section-A

(Answer any 03/three from the following questions)

1. (a) Define microprocessor. Briefly describe how does microprocessor differs from microcontroller and microcomputer. Distinguish between OV (overflow) flag and CF (carry) flag. 1+2+2
- (b) Name the different addressing modes supported by Intel 8085 instruction set and explain each of them with the help of suitable examples. 1+4
- (c) Explain detail about the following addressing modes of 8086 microprocessors with examples. 2+3
- i. Register Indirect addressing ii. Based indexed addressing with displacement.
2. (a) State the step of converting a decimal number to its corresponding floating-point number for 8087 coprocessor and convert 130.25 to its corresponding floating-point. 2+3
- (b) Briefly explain basic input and output interface circuits. 2+3
- (c) Given that DS = 1120H, DI = 2098H, and AX = 17FFH. Show the contents of memory locations after the execution of the following instruction and identify the addressing mode. 4+1

MOV [DI], AX

3. (a) Differentiate between isolated I/O and memory mapped I/O. In which mode you can connect more I/O devices and why? 2+3
- (b) What is handshaking? Explain with proper diagram, decoding of 8-Bit I/O port addresses ending with F8H address. 1+4
- (c) List and explain the purpose of the maximum mode of 8086 signals. 1+4
4. (a) Given that CS = 1120H, IP = 2098H. Calculate the original memory locations after the execution of the following instruction and identify the addressing mode. 4+1

JZ 0AH

- (b) Sketch and explain the 8086 bus activities during machine activity cycle. 5
- (c) Briefly explain the function of various flags of 8086 microprocessor. 5

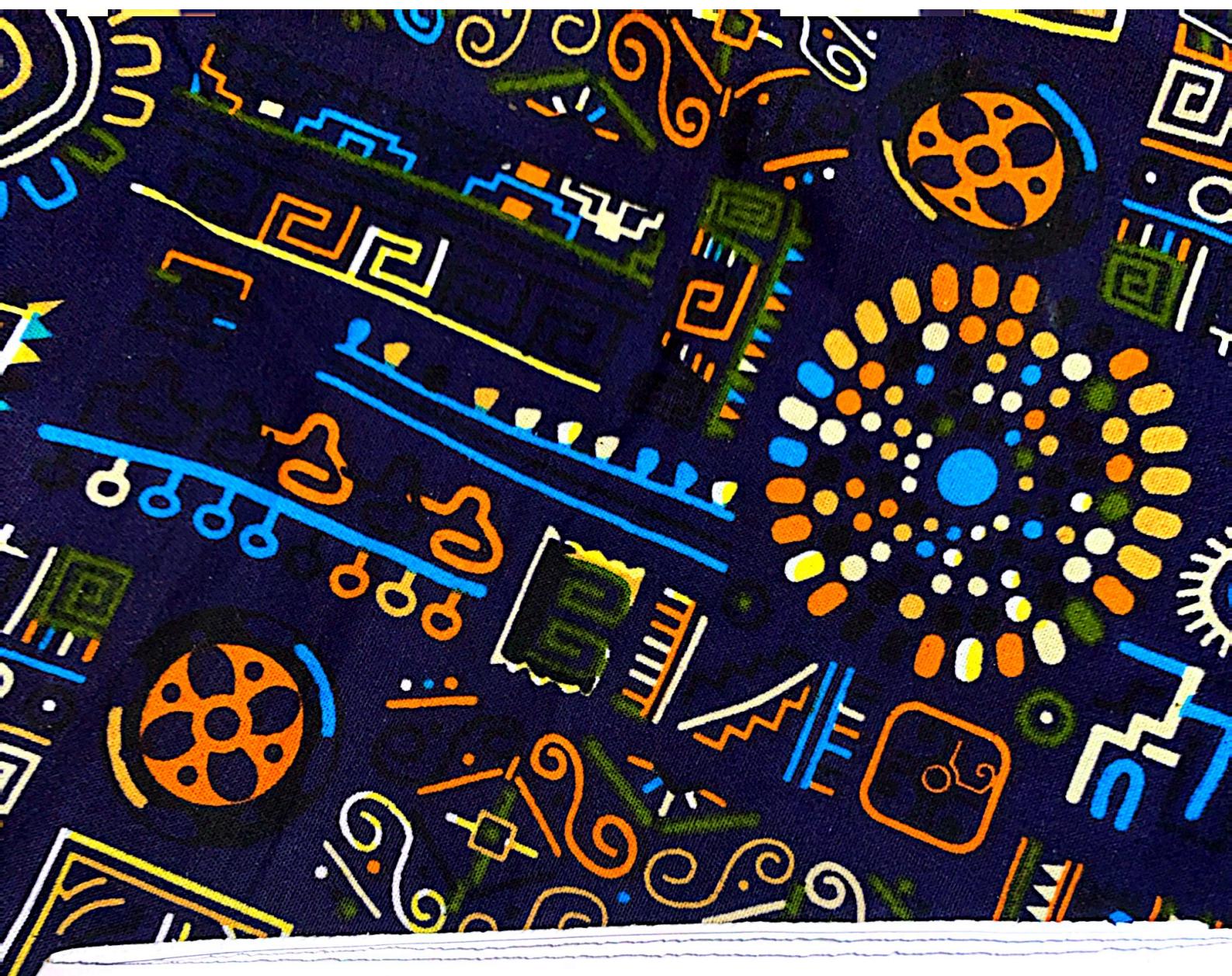
Section-B

(Answer any 03(three) from the following questions)

1. (a) Briefly explain different types of interrupt in 8086 microprocessor. 5
(b) Explain the interfacing of a 5×5 matrix keyboard with 8086 using 8255 PPI. 5
3 (c) Describe the three modes of operations for 8255 using relevant diagrams. If port B and upper port C must be initialized as input ports and lower port C and port A as output ports (all in mode 1), then draw the control word format of 8255. 5

2. (a) Explain the sequence of operation and sequence of signals generated during DMA operation for memory access. What is the significance of using DMA over normal data transfer operation between CPU and memory. 3+2
8 (b) Explain the purpose of ALE , BHE , DT/R and DEN pins of 8086. Show their timing in the system bus cycle of 8086 microprocessors. 3+2
(c) Draw the control word format of the 8254 programmable interval timer and explain. 5

3. (a) Why is the internal architecture of the 8086 divided into BIU and EU? How does it implement the pipelining concept? 3+2
(b) Explain the mode (0-4) of operations of 8254 programmable interval timer. 5
(c) What is segmented memory? Why is multiplexing technique used in 8086 microprocessors? Mention its advantages. 1+4



B. Sc. (Engineering) in Computer Science and Engineering, HSTU, Quiz#1 Exam, Level 3 Semester I

Course Title: Software Engineering Course Code: CSE 305 Credit: 3.0

[Examinees are suggested to write the answers by their own words.]

Time: 25 Minute

Total Marks: 15

2+3

3+2

1+2+2

a) What is the difference(s) between data and information? Shortly describe the main activities in the requirements engineering process.

b) Briefly discuss SDLC. In your view, which SDLC model is the best to apply in s/w development?

c) List the SDLC models. Write the advantage(s) along with drawback(s) of Waterfall and Prototype s/w development model.

d) Define DFD and discuss its components. Draw one.

2+3

e) What is Pair programming? Discuss its advantage(s) in s/w development.

Total Marks: 90

Course Code: CSE 305, Course Title: Software Engineering

Total 3 Hours

[Note: The figure in the right margin indicates the marks allocated for the respective question.]

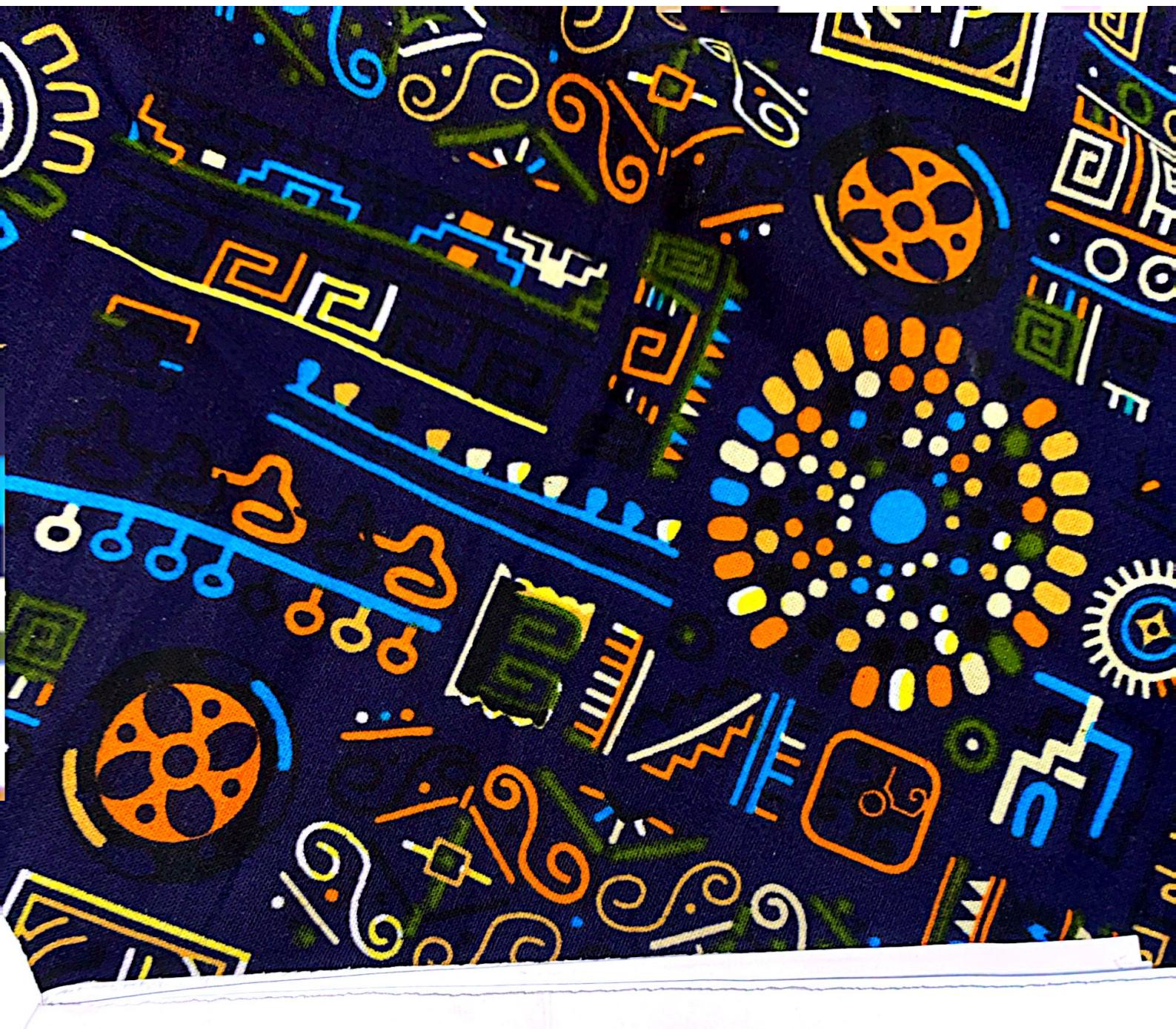
[Split answer to any question is not allowed.]

Section-A

(Answer any 03(three) from the following questions)

1. Define Software Engineering. What are the attributes of a good software?

1+



B. Sc. (Engineering) in Computer Science and Engineering, HSTU. Mid Term Exam, Level 3 Semester I

Course Title: Software Engineering Course Code: CSE 305 Credit: 3.0

(It will be highly appreciated if examinees write the answers by their own words.)

Time: 50 Minute

Total Marks: 30

1. a) What is SRS? Describe the steps of requirements engineering process.

1+4

3+2

1+4

b) Discuss JAD. Write its drawbacks.

c) What is UML? Draw the class diagram for HSTU Student Enrollment System.

1+4

3+2

2+3

2. a) Define velocity in Scrum. Discuss the Scrum sprint cycle.

1+4

b) Define DFD and discuss its components. Draw a level 0 DFD for ATM system.

3+2

c) What is Pair programming? Discuss its advantage(s) in s/w development.

2+3

Time: 3 Hours

Total Marks: 90

[N.B. The figure in the right margin indicates the marks allocated for the respective question.
Split answer to any question is not allowed.]

Section-A

(Answer any 03 (three) from the following questions)

Hajee Mohammad Danesh Science and Technology University, Dinajpur

Department of Computer Science and Engineering

B.Sc. (Engineering) in Computer Science and Engineering

Semester Final Examination 2022 (January-June)

Level 3 Semester I, Credit: 3.0

Course Code: CSE 305, Course Title: Software Engineering

Time: 3 Hours

Total Marks: 90

[N.B. The figure in the right margin indicates the marks allocated for the respective question.
Split answer to any question is not allowed.]

Section-A

(Answer any 03(three) from the following questions)

1. (a) Define Software Engineering. What are the attributes of a good software? 1+3
- (b) What is the purpose of SDLC in software engineering? Discuss the fundamental software engineering activities. 2+3
- (c) Briefly describe SDLC model (any two): 3+3
 - i. Agile Model
 - ii. Prototype Model
 - iii. V-Model
2. (a) What is MIS? Write the metrics used for assessing the quality of information. 1+2
(b) Explain the traditional and iterative waterfall models. 3+3
(c) Define DFD and discuss its characteristics. Draw the sequence diagram of cash withdrawal from an ATM system. 3+3
3. (a) Define sprint. Describe the scrum sprint cycle. 1+4
(b) What is SRS? Briefly discuss different requirement elicitation techniques. 1+4
(c) Define JAD. Write its benefits and drawbacks. 1+4
4. (a) What is user testing? Concisely describe its different types. 1+3
(b) Why project management is crucial? Discuss several stages of risk management. 2+4
(c) What is project scheduling? Design PERT chart from the following project schedule: 2+3

Task	Dependencies	Duration (days)
A	-	6
E	A	7
C	B	6
D	B	9
E	C	5
F	D, E	11

Section-B

(Answer any 03(three) from the following questions)

1. ~~(a)~~ What is CASE? What are the key challenges faced in software engineering? 1+3
- ~~(b)~~ What are the features of good coding style? Describe the key tools used in a programming supported environment. 3+3
- ~~(c)~~ Design an ER model for HSTU student information management software system considering different key attributes and relationships. 5
2. ~~(a)~~ What is software reuse? What is the difference(s) between data and information? 1+2
- ~~(b)~~ Define software testing. Explain different software testing approaches. 1+5
- ~~(c)~~ What is Test Case? Design a test case for LinkedIn user account login. 1+5
3. ~~(a)~~ What is UML? Draw the activity diagram of purchasing a product from an online shop. 1+4
- ~~(b)~~ Define validation and verification. Write the importance of UML. 2+3
- ~~(c)~~ What is user stories? Write the difference(s) between XP and Scrum. 1+4
4. (a) What is the critical path method? Find the critical path of the following project: 2+8

Task	Predecessor	Duration (Weeks)
T1	-	3
T2	T1	4
T3	T1	2
T4	T2	5
T5	T3	1
T6	T3	2
T7	T4, T5	4
T8	T6, T7	3

- (b) Briefly clarify SQA in software development. Discuss the quality management plan. 2+3

Hajee Mohammad Danesh Science and Technology University, Dinajpur
B. Sc (Engineering) in Computer Science and Engineering
Level 3 Semester I Final Examination 2022
Course Code: ECE 311 Credit: 3.00
Course Title: Data Communication

Time :50 Minutes

Total Marks: 30

Separated answers of a question is not allowed
Answer any 2(three) of the followings

1. (a) Define message and information. Draw the block diagram of a general communication system. 4
(b) Write the difference between analog communication system and digital communication system 5
(c) Define the term network, networking and internetworking. How every people use networking in their general life? Describe your opinion. 6
2. (a) Why the signal at the beginning of the medium is not the same as the signal as the end of the medium? Describe in details the various causes of this impairments that affect during the transmission of digital signal 5
(b) How QAM is related to ASK and PSK? Explain with appropriate figure. 4
(c) What is meant by line coding? Draw the line coding signal of the following bit stream using manchester, differential manchester and unipolar coding. 1101010111. 6
3. (a) For n devices in a network, how many cables links are required for a mesh, ring, bus and star topology? 5
~~(b)~~ Shortly explain the responsibility of physical layer, application layer, link layer. 5
~~(c)~~ Distinguish among circuit switching, datagram and virtual circuit approach with appropriate diagram. 5

1, 2, 3
1

Time: 3 Hours

Total Marks: 90

Separated answers of a question is not allowed

Section - A

Answer any 3(three) of the followings

1.
 - (a) "Digital communication system is more efficient than analog communication system"-justify the statement. 2
 - (b) What is inter-symbol interference? How does it occur in communication system? How can you overcome inter-symbol interference? 5
 - (c) Draw a hybrid topology with a ring backbone and two bus networks, three-star networks. 4
 - (d) Why is modulation technique used in communication? Derive the expression of modulated signal of frequency modulation and sketch the waveforms of modulating signal, carrier signal and modulated signal of FM. 4
2.
 - (a) Suppose a computer sends a frame to another computer on a bus topology (LAN). If the physical destination address of the frame is corrupted during the transmission. What happens to the frame? How can the sender be informed about the situation? 4
 - (b) Write down the differences among port, logical layer and physical layer. 2
 - (c) Derive the expression of modulated signal of BASK. Sketch the waveforms of modulating signal, carrier signal and modulated signal of BASK. 5
 - (d) What do you mean by transmission impairment? How does jitter occur? Discuss different types of transmission impairment. 4
3.
 - (a) Explain Persistence Methods: 1-persistent, non-persistent, p-persistent. 3
 - (b) Discuss the frequency division multiplexing and demultiplexing process with appropriate figure. 4
 - (c) Draw the line coding of the bit stream 1100010111 for the following scheme: 6
 - i. NRZ-L 111
 - ii. Manchester
 - iii. Differential Manchester
 - (d) Describe the optical fiber structure and the light sources for fiber. 2
4.
 - (a) What does the Nyquist theorem say about the transmission rate of digitized rate of digital signals, which are originally in the analog form? 3
 - (b) Define bit rate and baud rate. Assume we need to download text elements at the rate of 100 pages per minute. What is the required bit rate of the channel? 3
 - (c) Discuss the hierarchy and addressing issues surrounding the construction of large networks. 4
 - (d) Define routing protocol. Write the mechanism of shortest path routing algorithm. 5

ESTD. 5/18/20

Section - B
Answer any 3(three) of the followings

1. (a) Define channelization. When is the multiple access technique needed in communication system? 3
(b) Explain generation mechanism of binary frequency shift keying (FSK) modulation with proper diagram. 6
(c) Describe the principle operation of pulse code modulation (PCM) with proper diagram. Write its advantages and disadvantages. 6
2. (a) Possible choices for data communication infrastructure for long distance data transfer include microwave, optical fiber and radio transmission. Discuss the advantages and disadvantages of each of these media in terms of cost, ease of installation and adaptability in providing a range of services to the users. 6
(b) What are the types of connectors used in twisted-pair cable, coaxial cable and fiber-optic cable? Draw each connector figure. 4
(c) Define IP addressing and subnetting. What are the purposes of Class D and class E type of IP? 3
(d) Make a distinguishing table between IPv4 and IPv6. 2
3. (a) Describe the terms FDMA, TDMA and CDMA. 3
(b) Explain the concept of pure and slotted Aloha. 3
(c) Which propagation model is typically used in the satellite communication system? Discuss the different types of propagation method used in digital communication system. 6
(d) How the situation is handled using fragmentation where the IP datagram contains more data than the maximum transmission unit (MTU)? 3
4. (a) Explain how a message sent by an application layer on one host reaches the application layer on another host on a different network via one or more routers using TCP/IP. 5
(b) Why is FHSS (Frequency Hopping Spread Spectrum) used? Discuss the operating principle of FHSS with appropriate diagram. 5
(c) How many satellites are required to cover the earth orbit in GEO satellite system? Write the function of GEO, MEO, and LEO satellite system. 5

ding the conflict of serializability.

Aid recovery from deadlock.

select *
from employee
where salary =
(Select MAX
WHERE

the top 3 high-earner employees.

employees department-wise.

rows from the table Employee.

employee whose department is marketing

HR department.



DEPARTMENT OF CSE ,HSTU

Fundamentals of Economics

Mid Term Examination

Time: 45 minutes, Marks: 30

Answer the following questions:

1.
 - a) Differentiate between frictional unemployment and disguised unemployment.
 - b) Explain the following concepts:
 - i) GDP and GNP
 - ii) NNP and NDP
 - c) What is meant by Hyperinflation? Explain
 - d) Explain the costs of inflation.
 - e) Differentiate between cost push inflation and demand-pull inflation with graph.

4. Write a query to show all the record of those employees whose department and salary is greater than 70000.

5. Write a query to show the names of all students.