

Roll No.

TMC-401

M. C. A. (FOURTH SEMESTER)

END SEMESTER EXAMINATION, May, 2022

GRAPHICS AND VISUAL COMPUTING

Time : Three Hours

Maximum Marks : 100

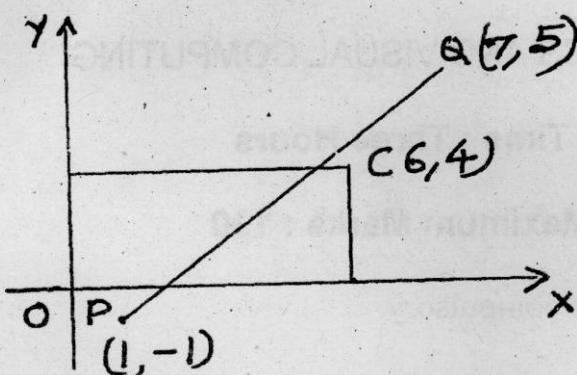
Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
- (iii) Total marks in each main question are **twenty**.
- (iv) Each sub-question carries 10 marks.

1. (a) Discuss the shearing. Find the transformation equations for shearing about both the axes in 2 dimension. (CO1)
- (b) What is homogenous coordinate system ? Discuss the case of successive scaling and successive rotation. (CO1)
- (c) Give Bresenham's circle generation algorithm. How do we generate the entire circle ? (CO1)

P. T. O.

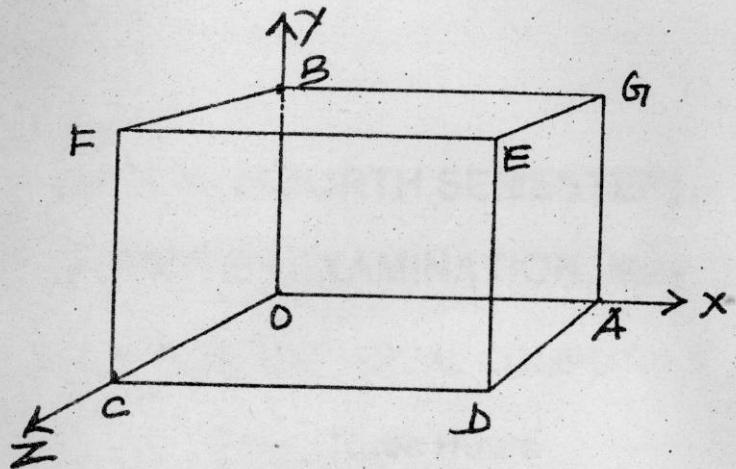
2. (a) Discuss Cohen-Sutherland line clipping algorithm. (CO2)
- (b) Show that equation $ax + by + cz + d = 0$ represents a plane. (CO1)
- (c) Write a short note on viewing transformation. (CO2)
3. (a) Digitize line from (10, 12) to (20, 16) using Bresenham's algorithm, plot points on Cartesian graph. (CO1)
- (b) Use Liang Barsky algorithm to clip the line shown in figure : (CO3)



- (c) Find the 30° rotation of the triangle ABC about origin in anti-clockwise direction, where the coordinates of A, B and C are (1, 1), (6, 2) and (4, 5) respectively. (CO3)
4. (a) Give architecture of the frame buffer. Define Aliasing and Anti-aliasing. How long would it take to load a 1024×1024 frame buffer with 12 bit per pixel, if 10^3 bits can transfer per second ? (CO2)
- (b) Find the reflection of the triangle ABC about line $Y = X$, where the coordinates of A, B and C are (3, 5); (7, 10) and (6, 8) respectively. (CO3)
- (c) Give Z-buffer algorithm for elimination of hidden surface. Why is removal of hidden surface required ? (CO4)

(3)

5. (a) The unit cube shown in figure is projected on to the XY-plane. Find Cabinet projection of unit cube on X- plane, angle ϕ is 30. (CO4)



- (b) Determine six point on the Bezier curve with equidistant parametric value, having control points $(x_0, y_0) = (50, 180)$, $(x_1, y_1) = (250, 100)$, $(x_2, y_2) = (600, 300)$ and $(x_3, y_3) = (500, 50)$ distributed over a screen of resolution 640×350 . (CO4)
- (c) What are Shading methods ? Discuss the Gouraud Shading method. (CO5)

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2

Roll No.

TMC-402

M. C. A. (FOURTH SEMESTER)
END SEMESTER EXAMINATION, May, 2022

INTERNET OF THINGS

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
- (iii) Total marks in each main question are **twenty**.
- (iv) Each sub-question carries 10 marks.

1. (a) Describe the components of IoT in detail. (CO1)
(b) What is the role of IPv6 in IoT ? Explain its features. (CO1)
(c) Explain the following :
 - (i) Object Classification
 - (ii) Object Properties
2. (a) Discuss Communication models of IoT in detail. (CO2)
(b) What is Network Protocols ? Explain any *four* IoT Network Protocols. (CO2)
(c) Describe IoT Enabling techniques in detail. (CO2)

P. T. O.

(2)

3. (a) Tabulate the different types of Data Synchronization Architectures.

(CO3)

- (b) Explain in detail about Software agents in IoT.

(CO3)

- (c) What is the role of IoT in Home Automation ? List out the *three* Level of Home Automation System.

(CO3)

4. (a) How Python is used in IoT development ? List out the advantages of Python.

(CO4)

- (b) Describe in detail about MQ Telemetry Transport (MQTT) sensor simulator.

(CO4)

- (c) How will you develop applications through IoT tools ? Explain with example.

(CO4)

5. (a) Demonstrate in detail about Bluetooth Low Energy Protocol. (CO5)

- (b) Differentiate between OSI Model Architecture and Z-Wave Protocol Stack.

(CO5)

- (c) Explain Object Classifications and their characteristics of IoT. (CO1)

3

Roll No.

TMC-403(A)

M. C. A. (FOURTH SEMESTER) END SEMESTER EXAMINATION, May, 2022 CRYPTOGRAPHY AND NETWORK SECURITY

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
- (iii) Total marks in each main question are **twenty**.
- (iv) Each sub-question carries 10 marks.
1. (a) Distinguish between passive and active attacks. Which type of security attack is in each of the following cases ? (CO1, CO2, CO4)
- (i) A student breaks into a professor's office to obtain a copy of the next day's test.
- (ii) A student gives a check for ₹ 100 to buy a book. Later he finds that the check was cashed for ₹ 1,000.
- (iii) A student sends hundreds of e-mails per day to another student using a phony return e-mail address.
- (b) Enumerate the security services and mechanisms defined by X.800. Explain each. (CO1, CO2, CO4)

P. T. O.

- (c) Using the positional value of alphabets, represent them in 5 bit binary. Apply the transformation $C_i = K_i \text{ XOR } P_i$, $P_i = C_i \text{ XOR } K_i$, where P_i = "scheme" and K_i = "cipher". Find the cipher text.
 (CO1, CO2, CO4)
2. (a) Users A and B use the Diffie-Hellman key exchange technique a common prime $p = 11$ and primitive root $a = 7$.
 (CO5, CO4, CO6)
- (i) If user A has private key $X_A = 4$, what is A's public key Y_A ?
 - (ii) If user B has private key $X_B = 8$, what is B's public key Y_B ?
 - (iii) What is the shared secret key ?
 - (iv) Why Diffie-Hellman key exchange will work ?
- (b) Encrypt the message "This is an exercise" using the following cipher. Ignore the space between words. Decrypt the message to get the plaintext :
 (CO5, CO4, CO6)
- (i) Vigenere cipher with key : "dollars"
 - (ii) Autokey cipher with key = 7
- (c) Use a brute-force attack to decipher the following message enciphered by Amit using an additive cipher. Suppose that Amit always uses a key that is close to his birthday, which is on the 13th of the month :
 (CO5, CO4, CO6)
- NCJAEZRCLASJLYODEPRLYZRCLASJLCPEHZDTOPDZQLNZTY
3. (a) What is double DES ? What kind of attack on double DES make it useless ? What is triple DES ? What is triple DES with two keys ? What is triple DES with three keys ?
 (CO3, CO6, CO2)

(3)

- (b) Explain the RSA key generation algorithm. For given $p = 19$, $q = 23$ and $e = 3$, find n , $\phi(n)$ and d . (CO3, CO6, CO2)
- (c) Explain the various key management techniques used for public key distribution. (CO3, CO6, CO2)
4. (a) Apply the MAC on the cryptographic checksum method to authenticate build confidentiality of the message where the authentication is tied to the message : (CO4, CO5, CO2)
- $M = 0 \times A3A1, K1 = 0 \times C402, K2 = 0 \times 5C1A5093.$
- (b) Explain the various cryptographic Hash function criteria must be satisfied by a cryptographic Hash function with an example. (CO5, CO4, CO2)
- (c) What is IPSec ? Explain the structure of Authentication Header (AH) and Encapsulating Security Payload (ESP). (CO3, CO6, CO2)
5. (a) What is Pretty Good Privacy (PGP) protocol. Also explain how receiver finds that what the cryptographic algorithm sender has used when he receives a PGP message from him. (CO3, CO4, CO5)
- (b) What protocols comprise SSL ? What is the difference between an SSL connection and an SSL session ? (CO3, CO4, CO5)
- (c) What is an IDS ? What is a difference between is Signature-based IDS and Anomaly-based IDS ? (CO3, CO4, CO5)

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4
Roll No.

TMC-403(B)

M. C. A. (FOURTH SEMESTER)

END SEMESTER EXAMINATION, May, 2022

DATA MINING AND WAREHOUSING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
- (iii) Total marks in each main question are **twenty**.
- (iv) Each sub-question carries 10 marks.

1. (a) What is Data Warehouse ? Explain the three-tier architecture of data warehouse. (CO1)
- (b) Briefly explain the common types of data transformation techniques with suitable examples. (CO1)
- (c) Explain the different schemes used for multi-dimensional databases. (CO1)

P. T. O.

2. (a) A databases has nine transactions. Let $\text{min_sup} = 30\%$:

TID	List of Items
1	a, b, e
2	b, d
3	b, c
4	a, b, d
5	a, c
6	b, c
7	a, c
8	a, b, c, e
9	a, b, c

Find all frequent item sets using the Apriori algorithm. (CO3)

- (b) Explain the relevance of data preprocessing in data mining. Explain the methods to handle missing values in a data set before mining process. (CO3)
- (c) How can the data be prepared in classification and prediction ? State various evaluation criteria that are essential for classification and prediction methods. (CO3)
3. (a) What does clustering mean ? Define the different types of clustering methods. (CO4 and CO5)

- (b) Explain K-means clustering algorithm. Apply K-means algorithm for the following data set = {15, 15, 16, 19, 20, 21, 22, 28, 35, 40, 41, 42, 43, 44, 60, 61, 65}. Divide the data into three clusters. (CO4 and CO5)
- (c) What is spatial data mining ? Explain the application areas, where it is used. (CO4 and CO5)
4. (a) What is text mining ? Discuss the various text mining approaches. (CO2)
- (b) What is information retrieval ? Define the measures used for information retrieval. (CO2)
- (c) Apply the Naive-Bayes classifier algorithm for buys computer classification and classify the tuple = X (age "young", income = "medium", student = "yes" and credit-rating = "fair") : (CO2)

ID	Age	Income	Student	Credit Rating	Buys Computer
1	Young	High	No	Fair	No
2	Young	High	No	Good	No
3	Middle	High	No	Fair	Yes
4	Old	Medium	No	Fair	Yes
5	Old	Medium	No	Fair	Yes
6	Old	Low	Yes	Good	No
7	Middle	Low	Yes	Good	Yes
8	Young	Medium	No	Fair	Yes

Roll No. []

Paper Code: TMI -401

(M.Sc. (IT)) End Semester Examination 2022

IV. Semester

Paper Name: Design and analysis of Algorithms.

Time: Three Hours

Marks: 100

Note:

- i) All questions are compulsory.
- ii) Answer any two sub questions in each main question.
- iii) Total marks for each main question is twenty.

Q1.

Marks)

(2X10=20

a) Prove that if $t_1(n) \in O(g_1(n))$ and $t_2(n) \in O(g_2(n))$ then show that $(t_1(n) \cdot t_2(n)) \in O(\max\{g_1(n), g_2(n)\})$

[C.O.1 & 2]

b). Write down the short notes on any two

- i) Asymptotic Notations
- ii) Heap Sort Algorithm
- iii) Complexity of Insertion sort

c). Compare the order of growth of functions $7n$, $n^2 \log n$ and 2^n

Q2.

(2X10=20 Marks)

a): What Branch and Bound method? Solve the given Assignment problem using Branch and Bound techniques?

[C.O-2]

	J ₁	J ₂	J ₃	J ₄
F ₁	4	6	2	3
F ₂	5	2	1	6
F ₃	3	9	6	4
F ₄	2	6	8	5

b): Discuss the depth first search traversal technique; explain it with help of an example.

[C.O-3]

c). Give the Prims algorithm to find minimal spanning tree in given connected weighted graph.

[C.0 - 3]

Q3.

(2X10=20 Marks)

a.: If $n \geq 1$, then for any n key B tree T of height h and minimum degree $t \geq 2$
 $h \leq \log_t (n+1/2)$

[C.0 - 4]

b). what is Max flow- Min cut theorem? Give ford-Fulkerson algorithm to maximize the flow in flow network

[C.0 - 4]

c). Compute the minimum number scalar multiplication required to find the product of matrices A(4x4) ,B(4x6) and C(6x2) using D. P. P. Approach also give optimal parenthesization scheme.

[C.0 - 3]

Q4:

(2X10=20 Marks)

a):What is Binomial Heap? Write a procedure to find minimum element in a binomial heap.

[C.0 - 4]

b). Explain Class P, NP and NP Complete Problems, Give a non deterministic algorithm for clique decision problem.

[C.0 - 5]

c). what are approximation algorithms? Give an approximation algorithm for vertex cover problem

[C.0 - 5]

Q5.

(2X10=20 Marks)

a): Prove that a red-black tree with n internal nodes has height at most $2\log(n+1)$.

[C.0 - 5]

b): Write a short note on randomized algorithms.

[C.0 - 6]

(c) : If $n \geq 1$, then for any n key B tree T of height h and minimum degree $t \geq 2$
 $h \leq \log_t (n+1/2)$

[C.0 - 6]

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End Semester Examination 2022

Name of the Course: M.Sc.(IT)

Semester: 4th

Name of the Paper: Advance Java Programming

Paper Code: TMI 402

Time: 3Hours

Maximum Marks: 100

Note:-

- (i) All questions are compulsory.
- (ii) Answer any two sub questions among a, b & c in each main question
- (iii) Total marks in each main question are twenty.
- (iv) Each question carries 10 marks

Q1	(20marks)	CO2 CO1 CO2
(a)	What different type of JDBC Drivers ? Write a program to differentiate execute ,executeQuery and executeUpdate method.	
(b)	What is the use of Different type of Statements in JDBC API? Write a program to show the use of setString() method using PreparedStatement.	
(c)	What is the use of ResultSetMetaData and DatabaseMetaData?What is role of savepoint ? Explain by the help of proper example.	CO2
Q2	(20 marks)	CO2
(a)	What is SQL exceptions? Write a program to insert and retrieve an image to and from a database table.	CO2
(b)	Define and explain servlet life cycle . What is the use of ServletConfig? Explain by the help of proper example.	CO6
(c)	Write a hibernate program to insert your details into a database table.	CO5
Q3	(20 marks)	CO3
(a)	What is the use of POJO class in Hibernate Framework?What are getter and setter methods in java?	CO5
(b)	What is the role of RequestDispatcher interface?Define and explain working of include and forward method with proper example.	CO2
(c)	What is the meaning of A Session Bean ? Define and explain working of execute method in Struts 2 framework.	CO2
Q4	(20 marks)	CO5
(a)	How we can say servlet works as a controller? What are different components of MVC ?	CO5
(b)	What are get and post requests in servlets? What is difference between 1. application and web server 2. J2EE and J2SE	CO4
(c)	How we can develop 3 tier application in java?Write a program to save your name in database using servlet as servlet receiving parameter from a html page.	CO6

Q5	(20 marks)	
(a)	What are different scripting elements used to create a jsp page?Explain some implicit objects used in JSP page.	CO6
(b)	How we can use Bean class object in a JSP Page?Explain properly by the help of example.	CO3
(c)	What is session management ? What is the need of handling session using HttpSession interface?	CO1

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End Semester Examination 2022

Name of the Program: M.Sc. IT

Semester: 4

Name of the Course: .NET Programming using C# Language

Course Code: TMI 403

Time: 3 Hours

Maximum Marks: 100

Note:-

- (i) All questions are compulsory.
- (ii) Answer any two sub questions among a, b & c in each main question
- (iii) Total marks in each main question are twenty.
- (iv) Each question carries 10 marks

Q1	(20marks)	CO1
(a)	What is .NET? Explain the components of .NET Framework.	
(b)	What is assembly? What is GAC how to install assembly in Global Assembly Cache.	
(c)	Write short notes on any three: i. Garbage Collector ii. Managed and Unmanaged code iii. DLL Hell iv. NameSpaces	CO2
Q2	(20 marks)	
(a)	Explain Boxing and unboxing in C# with the help of its code.	
(b)	Explain the difference between for loop and foreach loop	
(c)	What are the two ways for writing into console? What is the difference between Console.Read(), Console.ReadLine(), Console.ReadKey()	CO3
Q3	(20 marks)	
(a)	What is class and what is the purpose of class constructor? Explain static class member by calculating area of circle.	
(b)	What are properties write a program in C# which is having get and set accessor with the following business rule <ul style="list-style-type: none">• ID should always be non negative numbers• Name cannot be set to null• If student name is missing "No name should be returned"• Passmarks should be read only	
(c)	What is inheritance explain with example.	CO4
Q4	(20 marks)	
(a)	What is Unit Testing? How to Automate Testing with Visual Studio Explain the Process with Example.	
(b)	Why we use validation controls? Explain different types of validation controls in ASP.NET.	
(c)	What is Master Page and content page? Explain steps for creating master page.	CO5, CO6
Q5	(20 marks)	
(a)	What is ASP.NET MVC? Explain Model, View and Controller.	
(b)	What is ADO.NET? Explain all the important classes(Connection, Command, DataReader, DataAdaptor, DataSet) used in ADO.NET in brief.	
(c)	Write a program to retrieve data in Grid View with ADO.NET.	