LJ-936

MCA

2nd Semester Examination, Jan.-June, 2021

Paper - II

JAVA Programming

Time : Three Hours] [*Maximum Marks* : 100

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) What is Java Virtual Machine ? Explain the internal process of JVM.

(*b*) Write a program to multiply 3 × 3 matrix.

(*c*) How many types of variable used in Java ? Explain each type and write a suitable example to demonstrate variable types.

Unit-II

2. (*a*) What is Package ? Define its type and write a program to explain user defined package.

(*b*) What is Super keyword ? Explain the purpose of super keyword and write a program to explain its uses.

(*c*) What is nested class ? Explain its different types and write a program to find factorial of given number using nested class.

Unit-III

3. (*a*) What do you mean by Exception ? Explain its type.

(*b*) What is thread synchronization ? How can we synchronize out code ? Explain with example.

(*c*) Write the process of defining user defined thread.

Unit-IV

4. (*a*) Explain string immutability and string Buffer class.

(*b*) What is collection interface ? Define different types of collection interface and differentiate collection and array.

(*c*) What is Array List Class ? Explain its method and write suitable program.

Unit-V

5. (*a*) What is Event Delegation Model ? Explain in brief.

(*b*) Explain any five swing components.

(*c*) What is JDBC ? Write a process to establish connection with JDBC with example.

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LJ-937

MCA

2nd Semester Examination, Jan.-June, 2021

Paper - III

Data Structure and Algorithms

Time : Three Hours] [*Maximum Marks* : 100

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) What is array ? Explain array memory addressing schemes with suitable example.

(*b*) Explain doubly linked list with example.

(*c*) Explain how to derive complexity of algorithm with the help of all notations.

Unit-II

2. (*a*) Explain stack and write algorithms for push and pop operations.

(*b*) What is a circular queue ? Write an algorithm for insertion and deletion operation on circular queues.

(*c*) Convert the following infix expression to prefix expression and give various steps in evaluating using stacks.

$$(5 * 3 \uparrow 2) / (3 + (7 + 3) / 10)$$

Unit-III

3. (*a*) What is a Binary Search Tree ? Explain it with a suitable example.

(*b*) Explain AVL tree with suitable example.

(*c*) Discuss various tree traversal techniques. Give proper example also.

Unit-IV

4. (*a*) Differentiate between depth first search and breadth first search.

(*b*) Write Dijkstra's shortest path algorithm.

(*c*) Explain minimum cost spanning tree with example.

Unit-V

5. (*a*) Explain the various techniques used to build hash function with suitable examples.

(*b*) What is merging ? Explain the merge sort with its algorithm and discuss the complexity for it.

(*c*) Write short notes on any **two** of the following :

(*i*) Binary Search

(*ii*) Radix sort

(*iii*) Heap sort

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Elective - I

Paper - IV

Computer Graphics

Time : Three Hours] [*Maximum Marks* : 100

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) Discuss about different interactive picture construction techniques.

(*b*) Write short notes on the following :

(*i*) Plasma panel display

(*ii*) Input devices for graphics

(*c*) What do you understand by Refresh Cathode-Ray tubes ? Discuss in detail.

Unit-II

2. (*a*) Briefly describe the boundary fill and flood fill algorithm.

(*b*) Discuss about Bresenham's circle algorithms and midpoint circle algorithm.

(*c*) Explain attributes of output primitives.

Unit-III

3. (*a*) Explain the Cohen-Sutherland line clipping algorithm with example.

(*b*) Develop a text clipping algorithm that clips individual characters.

(*c*) Explain the Weiler-Atherton polygon clipping.

Unit-IV

4. (*a*) Obtain a transformation matrix for rotating an object about a specified pivot point.

(*b*) Determine a sequence of basic transformations that are equivalent to the Y-direction shearing matrix.

(*c*) Discuss the various two dimensional basic transformations with suitable example.

Unit-V

5. (*a*) Discuss about different Projection techniques.

(*b*) What do you understand by Homogeneous clipping ? Explain in detail.

(*c*) Write short notes on the following :

(*i*) Depth buffer methods

(*ii*) Scan line method

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LJ-939

MCA

2nd Semester Examination, Jan.-June, 2021

Elective - II

Paper - V

Internet of Things

Time : Three Hours] [*Maximum Marks* : 100

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) Describe IoT architectural view in detail.

(*b*) What do you mean by IoT ? Explain components required to design IoT device with example.

(*c*) Write short notes on any **two** of the following :

(*i*) XaaS

(*ii*) M2M

(*iii*) IoT analytics

Unit-II

2. (*a*) Explain IoT reference model and architecture.

(*b*) Explain the following terms :

(*i*) Functional view and information view

(*ii*) Deployment and operational view

(*c*) Discuss the design constraints in IoT.

Unit-III

3. (*a*) What is IP addressing ? Why IPV6 are required to implement the concept of IoT ?

(*b*) Describe 6LOWPAN and 6TiSCH in IoT.

(*c*) Write short notes on any **two** of the following :

(*i*) Z-Wave

(*ii*) Zigbee smart energy

(*iii*) CORPL

Unit-IV

4. (*a*) Explain with example of MQTT protocol. What is the role of MQTT protocol in IoT ?

(*b*) Explain IoT privacy and security solutions.

(*c*) Write short notes on any **two** of the following :

(*i*) MPTCP

(*ii*) AMQP

(*iii*) CoAP

(*iv*) DTLS

Unit-V

5. (*a*) Explain ETSI M2M functional architecture with a neat diagram.

(*b*) Describe MAC 802.15.4 and BBF security in IoT protocol.

(*c*) Write short notes on any **two** of the following :

(*i*) OMA

(*ii*) RPL

(*iii*) Application of IoT

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LJ-935

MCA

2nd Semester Examination, Jan.-June, 2021

Paper - I

Programming in Python

Time : Three Hours] [*Maximum Marks* : 100

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (*a*) Explain about the python interpreter and IDLE interface.

(*b*) Explain the identifiers, keywords and variables in python with example.

(*c*) Discuss different data types and sequence supported by python.

Unit-II

2. (*a*) What do you understand by operators in python ? Explain with example.

(*b*) Write a python program to check the given year is leap year or not.

(*c*) Write a python program to determine whether the given string is palindrome or not.

Unit-III

3. (*a*) Discuss the relation between tuples and list, tuples and dictionaries in detail.

(*b*) Illustrate the following set methods with example :

(*i*) intersection()

(*ii*) union()

(*iii*) issubclass()

(*iv*) update()

(*v*) discurd()

(*c*) Write a program that accept a sentence and calculate the number of digits, uppercase and lowercase letters.

Unit-IV

4. (*a*) What is function ? Discuss different types of function supported by python with example.

(*b*) Write short notes on the following :

(*i*) Fruitful and void function

(*ii*) Anonymous function

(*iii*) Recursion

(*c*) Write a python program to illustrate diamond problem with the help of function.

Unit-V

5. (*a*) Write a python program to calculate area and perimeter of different shapes using polymorphism.

(*b*) Discuss exceptions handling methods in python with example.

(*c*) What do you understand by inheritance ? Explain with example.

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