

Total No. of Questions : 09

MCA (Sem-2)
WEB TECHNOLOGIES
 Subject Code : PGCA-1909
 M.Code : 79615
 Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 70

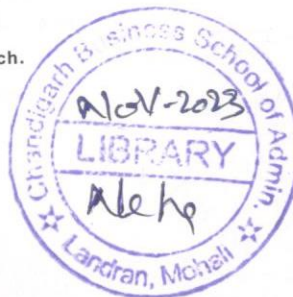
INSTRUCTIONS TO CANDIDATES :

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1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
 2. SECTION - B & C. have FOUR questions each.
 3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
 4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer briefly :

- List the services of the TCP/IP model.
- What is color coding in HTML?
- What are unordered lists?
- What is the use of COLSPAN attribute?
- What are hyperlinks?
- What is the use of <FRAME> tag?
- What do you mean by Interpreted language?
- What are user defined objects?
- What is the role of cascading style sheets?
- What are paired tags?



SECTION - B

2. How IP address is assigned to a system? Explain the role of IP addresses in internet in detail.
3. Explain various HTML tags for text formatting with suitable examples.
4. Explain `<img>` tag and various attributes associated with it to add graphics to HTML documents.
5. Illustrate the process to create and insert tables in a HTML document with suitable example.

SECTION - C

6. How database connectivity is done in JavaScript? Explain the advantages of using JavaScript in web pages.
7. Explain the use of <FRAMESET> tag in detail with an example.
8. List and explain various methods used with the Form object in HTML. Also, mention the properties of the Form object.
9. **Write short notes on :**
 - a) Platform Independence
 - b) The Select and Option element.

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39

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

MCA (Sem-2)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 21-11-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A**1) Answer briefly :**

- a. Define Recursion.
- b. Explain divide and conquer method.
- c. State Heap sort with example.
- d. What is lower bound on sorting?
- e. How does the time complexity of splitting/dividing an array vary with size of the array?
- f. Given an array arr = {15, 16, 27, 38, 59} and key = 38; How many iterations are done until the element is found? Show the steps.
- g. An array containing the elements 6,5,4,3,2,1 needs to be sorted. Out of merge sort and quick sort, which one is the best sorting algorithm in this case? Why?
- h. In what manner is a state-space tree for a Branch and Bound algorithm constructed?
- i. What happens when the backtracking algorithm reaches a complete solution?
- j. Write the complexity of of the recurrence relation $T(n)=T(n-1)+1$.

SECTION-B

2. What are algorithms? What do you mean by polynomial time complexity and logarithmic complexity? Which one is higher? What is the smallest value of n such that an algorithm whose running time is $100n^2$ runs faster than an algorithm whose running time is $2n$ on the same machine?
3. a. $f(n)=3n^{vn}$ $g(n)=2^{vn \log n}$ prove that $f(n)=O(g(n))$.
b. Analyze the running time of the following recursive pseudo-code as a function of n .

```
Void function(int n){  
    if (n<2) return;  
    else counter = 0;  
    for I = 1 to 8 do  
        function(n/2);  
    for I = 1 to  $n^3$  do  
        counter = counter + 1;  
}
```

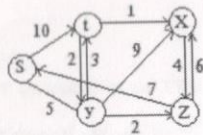
Explain two real life scenario of dynamic programming. How can the optimal solution to the 0-1 knapsack problem be found with Dynamic Programming? Explain in brief characteristics of dynamic algorithms. Explain how to find Longest Common Subsequence of two strings using Dynamic Programming Method?

5. Explain partial 0/1 Knapsack problem. A thief enters a house for robbing it. He can carry a maximal weight of 60 kg into his bag. There are 5 items in the house with the following weights and values. Which items should thief take if he can even take the fraction of any item with him?

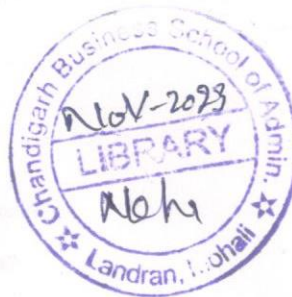
Item	Weight	Value/Profit
1	5	30
2	10	40
3	15	45
4	22	77
5	25	90

SECTION-C

6. Write the algorithm of quick sort. Find worst case complexity of it using iterative method.
7. Write Dijkstra's algorithm. Output the sequence of vertices identified by the Dijkstra's algorithm for single source shortest path when the algorithm is started at node s for the given weighted directed graph.



8. a. What are NP, P and NP-complete problems?
b. State the difference between internal sorting and external sorting.
9. Which algorithmic approach traverses the state space tree only in DFS manner? Why? Justify your answer with the help of an example.



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Roll No.

Total No. of Pages : 02

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MCA (Sem-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M.Code : 79618
Date of Examination : 28-11-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer briefly :

- a. What is the key difference between Linux and Windows kernels?
- b. Explain the role of the root directory in a Linux file system.
- c. How can you change file permissions in Linux?
- d. Describe the Linux boot process briefly.
- e. What tasks are involved in managing packages on a Linux system?
- f. What are the main steps for configuring a DNS server in Linux?
- g. How does the Apache HTTP server work, and how do you configure it?
- h. What is the purpose of SMTP in email communication?
- i. Describe the basic differences between POP and IMAP.
- j. Explain the role of the Samba server and its key tasks in administration.

1 | M-79618

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SECTION-B

2. Explain the process of installing a Linux distribution. Discuss the considerations and steps involved in choosing the right distribution for specific use cases. Provide examples of popular Linux distributions and their characteristics.
3. Describe the Linux booting and shutting down processes in detail. Include the role of the bootloader, kernel initialization and essential steps during system shutdown. Discuss the significance of the runlevels in the boot process.
4. Discuss the concept of root in the Linux file system. Explain its privileges, responsibilities, and potential risks. How does the root user differ from other users and what are the best practices for managing the root account securely?
5. Explore the vi text editor in-depth. Explain its various modes, common commands, and advantages in text editing. Provide practical examples of using vi for file editing and manipulation and discuss how it compares to other text editors?

SECTION-C

6. Discuss the mechanism of the Samba server in enabling file and print services in a network. Explain the role of Samba Administration (SWAT) in configuring and managing Samba. Provide practical examples of creating shares and using SWAT for network file sharing.
7. Explain the significance of DNS in modern internet usage. Discuss the components of a typical DNS configuration and how it helps in domain name resolution? Provide detailed steps on how to set up a DNS server and configure DNS clients?
8. Describe the key concepts of the HTTP protocol and its role in web communication. Explain the installation, startup and shutdown processes of the Apache HTTP server. Discuss how Apache is utilized for hosting websites?
9. Explore the basics of email protocols, SMTP, POP, and IMAP, in email communication. Describe the installation and configuration of the UW IMAP and POP3 servers. Discuss their functions in email retrieval and storage.

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2 | M-79618

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Roll No.

Total No. of Pages : 02

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MCA (Sem.-2)
INFORMATION SECURITY AND CYBER LAW

Subject Code : PGCA-1932

M.Code : 79619

Date of Examination : 30-11-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- a) What is the purpose of a firewall in network security?
- b) What are the three fundamental principles of information security represented by the acronym CIA?
- c) What role do security functional requirements play in the development of secure software and systems?
- d) What are the different types of user authentication methods commonly used in information security?
- e) What are the common security issues associated with password-based authentication methods?
- f) Explain the main security challenges in securing a database.
- g) Define the terms "worms" in the context of malicious software.
- h) Define the terms "trojans" in the context of malicious software.
- i) What are the primary functions of an Intrusion Detection System (IDS)?
- j) What are cyber laws, and how do they address legal issues related to the internet and information security?

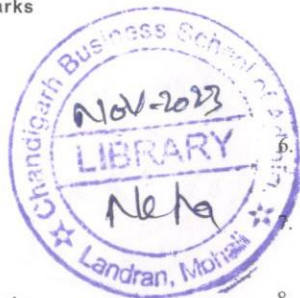
SECTION-B

2. Describe the potential impact of a keylogger on a user's security and privacy.
3. What role do cryptographic algorithms play in ensuring the confidentiality and integrity of data?
4. What is the role of access control in information security and how can it be implemented to protect sensitive data?
5. How do security functional requirements help ensure that software and systems are secure and can you provide an example of one such requirement?

SECTION-C

6. How does an Intrusion Prevention System (IPS) differ from an IDS and why is it valuable in network security?
7. Discuss the key provisions in Indian cyber laws for the investigation and prosecution of cybercrimes.
8. Explain the primary objectives of a firewall in the context of network security. What are the main types of firewalls and how do they operate?
9. What are the key features and purposes of SSL and TLS in ensuring secure communication over the internet? How do they differ and which is more commonly used today?

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MCA (Sem-2)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 21-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :
 - a. Define algorithm. List the criteria that an algorithm should follow.
 - b. Define time complexity and space complexity of an algorithm.
 - c. What are asymptotic notations? List various asymptotic notations used in the analysis of algorithms.
 - d. Prove that if $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$ then $f_1(n) + f_2(n) = O(g_1(n) + g_2(n))$.
 - e. Give the recurrence relation for worst case behavior of quick sort algorithm.
 - f. What is the difference between backtracking and branch-and-bound algorithm design techniques?
 - g. What are the applications of BFS and DFS?
 - h. What are NP-hard and NP-complete problems?
 - i. In context of backtracking, define the following terms: implicit constraints, explicit constraints, e-node and live node.
 - j. In context of dynamic programming, define principle of optimality.



SECTION-B

2. What is all-pairs shortest path problem? Write an algorithm that makes use of dynamic programming to solve all-pairs shortest path problem. Analyze its time complexity.
3. What do you mean by control abstraction? Using the control abstraction, describe in detail divide- and-conquer algorithm design strategy.
4. What is 8-queens problem? Describe and write an algorithm that makes use of backtracking for solving 8-queens problem.
5. What is 0/1 Knapsack problem? How it is different from fractional knapsack problem? Describe how 0/1 knapsack problem can be solved using Branch-and-Bound technique of algorithm design?

SECTION-C

6. Describe how an array of elements can be sorted using Quicksort algorithm. Show that the running time of Quicksort is $O(n^2)$ when the array A contains distinct elements and is sorted in decreasing order.

What is the basic assumption in binary search algorithm? Write binary search algorithm. Using binary search algorithm, find the number of comparisons required to find key value 9 in the given list: -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151.
8. Describe bubble sort algorithm for sorting. Why is it named "Bubble sort"? Analyze its time complexity.
9. Define and describe NP, P, NP-hard and NP-complete problems. Give an example of each class of problem.

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MCA (Sem-2)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 21-06-2023

Time : 3 Hrs.

Max. Marks : 70

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- Define time complexity and space complexity of an algorithm.
- What are asymptotic notations? List various asymptotic notations used in the analysis of algorithms.
- Prove that if $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$ then $f_1(n) + f_2(n) = O(g_1(n) + g_2(n))$.
- Give the recurrence relation for worst case behavior of quick sort algorithm.
- What is the difference between backtracking and branch-and-bound algorithm design techniques?
- What are the applications of BFS and DFS?
- What are NP-hard and NP-complete problems?
- In context of backtracking, define the following terms: implicit constraints, explicit constraints, e-node and live node.
- In context of dynamic programming, define principle of optimality.



SECTION-B

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SECTION-C

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What is the basic assumption in binary search algorithm? Write binary search algorithm. Using binary search algorithm, find the number of comparisons required to find key value 9 in the given list: -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151.

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29

Roll No.

Total No. of Pages : 02

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MCA (Sem-2)
INFORMATION SECURITY AND CYBER LAW

Subject Code : PGCA-1932

M.Code : 79619

Date of Examination : 17-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- a) What is the CIA triad in information security?
- b) What is information security?
- c) What is a vulnerability in information security?
- d) What is a threat in information security?
- e) What is a risk in information security?
- f) What is an exploit in information security?
- g) What is a patch in information security?
- h) What is an encryption in information security?
- i) What is a decryption in information security?
- j) What is a password policy in information security?



28

SECTION-B

2. What is the concept of defense in depth in cyber security and how does it help organizations protect against a variety of threats? What are the different layers of defense in depth, and what security technologies are commonly used to implement each layer?
3. What are the different types of user authentication methods used in information security, and what are the advantages and disadvantages of each method? How can multi factor authentication improve the security of user authentication and what are some best practices for implementing multi-factor authentication in an organization?
4. What is access control in information security and what are the different types of access control mechanisms used to restrict user access to resources in an organization?
5. What are some common methods used by malware creators to distribute and infect systems with malware and what are some best practices for preventing malware infections in an organization? How can malware be detected and removed from infected systems?

SECTION-C

6. What is the difference between a firewall and an Intrusion Detection System (IDS) in information security, and how do they complement each other to protect against security threats? How does a firewall work to control access to a network and what are the different types of firewalls used in modern information security?
7. What are some best practices for implementing an effective intrusion detection system in an organization and how can the results of IDS analysis be used to improve overall security posture?
8. How do encryption and decryption processes work and what are some best practices for implementing cryptography in an organization? What are some common attacks on cryptographic algorithms and how can they be prevented or mitigated?
9. What is the importance of security policies in information security and how do they help organizations establish clear guidelines and procedures for protecting sensitive information? What are some common elements of security policies, such as access control, incident response and data retention and how do they help organizations comply with relevant laws and regulations?

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MCA (Sem-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M.Code : 79618
Date of Examination : 15-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Answer briefly :

- a) Differentiate Linux and Windows?
- b) What is the concept of root in Linux?
- c) How do you move or rename a file in Linux?
- d) How can you save and exit the *vi* editor in Linux?
- e) What is the purpose of the *chmod* command in Linux?
- f) What is Package Manager?
- g) Discuss the purpose of DNS records?
- h) What is the role of SMTP in email communication?
- i) Write a short note on HTTP protocol?
- j) Write a short note on SWAT?



SECTION-B

2. How do you install Linux in a server configuration?
3. Define following :
 - a. Insert mode in *vi* editor.
 - b. Deleting the character in *vi* editor.
4. Discuss the basic file structure and hierarchy in Linux?
5. Explain how can you manage users in Linux by creating or deleting user accounts?

SECTION-C

6. What is the process for configuring DNS clients to use a specific DNS server?
7. Explain the purpose of the Apache HTTP server configuration? How it is used in web?
8. Explain the basic differences between POP and IMAP protocols? How they are used in Email accounts?
9. What are the advantages of using Samba for remote sharing in Windows and Linux environment?

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MCA (Sem-2)
WEB TECHNOLOGIES
Subject Code : PGCA-1909
M.Code : 79615

Date of Examination : 02-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

I. Answer Briefly :

- a) Define Internet.
- b) How HTML color coding is used?
- c) What is <hr>tag used for?
- d) Define IP address.
- e) How to preserve white space in XHTML?
- f) Define instance of operator in Javascript.
- g) What are <div> and tags ? '8. What is an internal CSS style?
- h) Where can we place Javascript ?
- i) Define XML.
- j) What is the use of <noscript>tag?



SECTION-B

2. What are the different levels of heading in HTML?
3. Give a brief overview of TGP/IP and services offered.
4. How table is created and how COLSPAN AND ROWSPAN is used?
5. How ordered and unordered list are created in HTML? Explain with an example.

SECTION-C

6. Write a Javascript code which checks the contents entered in a forms text element. If the text entered is in the lower cases convert to upper case.
7. Explain pattern matching. What are the different meta characters used in pattern matching?
8. a) How FRAMESET is used in CSS? Give example.
b) Write a Java Script code to find factorial of a number.
9. Explain any 10 elements used in forms of a website.

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MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA-1918
M.Code : 79617
Date of Examination : 30-05-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION B & C carrying **TEN** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

1. Answer Briefly :
 - a) What is a servlet?
 - b) What is a session?
 - c) Name the directive tags available as per JSP specifications.
 - d) What is MVC architecture in struts framework?
 - e) List the various components of struts framework.
 - f) What is RMI?
 - g) Why are stubs used in RMI?
 - h) List the CORBA services.
 - i) What are the different functionalities supported by Hibernate?
 - j) What do you mean by Java Beans?



SECTION-B

2. a) How is the Get method different from the post method? Write a program in support of your answer.
b) How cookies are used to track a session? Explain in detail.
3. What are the stages of the JSP lifecycle? Explain in detail.
4. How applications are deployed in struts? Explain in detail.
5. How HTTP requests and responses are handled in Servlets? Explain in detail.

SECTION-C

6. Write a program to show the distributed object model using remote method invocation
7. Explain the architecture of CORBA in detail.
8. What is a Pojo file? Why do we create a Pojo class? Explain in detail.
9. How Java Bean is created? Explain with the help of a program.

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MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA1918
M.Code : 79617
Date of Examination : 23-11-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :
1. SECTION A is compulsory.

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION - B & C have **FOUR** questions each.
3. Attempt any **FIVE** questions from SECTION B & C carrying **TEN** marks each.
4. Select atleast **TWO** questions from SECTION - B & C.

SECTION-A

1. Answer briefly :

- a) What is the life cycle of a Java servlet?
- b) How is the Servlet API used in servlet development?
- c) Explain the key components of Java Server Pages (JSP) architecture.
- d) What are session management techniques in JSP?
- e) Provide an overview of the Struts framework.
- f) Explain the basic architecture of Hibernate for database connectivity.
- g) Discuss the concept of Enterprise Java Beans (EJB).
- h) What is CORBA, and how does it support distributed computing?
- i) What are implicit objects in JavaServer Pages (JSP)?
- j) Describe the process of creating a Java Bean and its application in Java programs.

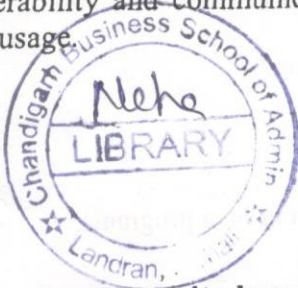
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SECTION-B

2. Write a Java servlet that demonstrates how to use cookies for session tracking. Explain the role of cookies in maintaining user sessions and how they contribute to security in web applications.
3. Discuss the syntax and basic structure of Java Server Pages (JSP). Explain the purpose of standard actions and custom tag libraries in JSP. Provide examples of both standard actions and custom tags.
4. Explain the concept of object scope in JSP. Discuss the different object scopes available in JSP and provide scenarios in which each scope is typically used.
5. Describe the process of connecting to a database in a Java web application. Explain how the Java Servlet API facilitates database connectivity? Provide a practical example of database interaction within a servlet.

SECTION-C

6. Write a Java Bean class that implements the remote interface. Explain how remote method invocation works in Java. Provide an example of using this Java Bean in a client-server application.
7. Describe the role of JAR (Java Archive) files in Java development. Explain how JAR files are created and used in packaging Java applications? Provide a practical example of creating and using JAR files.
8. Discuss the concept of reverse mapping in Hibernate. Explain how it is used to generate Java objects from a relational database schema. Provide an example of reverse mapping in Hibernate.
9. Explain the importance of the Common Object Request Broker Architecture (CORBA) services in distributed computing. Discuss how CORBA services contribute to interoperability and communication in a distributed system. Provide examples of CORBA service usage.



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