

END TERM EXAMINATION

THIRD SEMESTER (MCA) DECEMBER 2024

Paper Code: MCA-227

Subject: Web Intelligence and Big Data

Time: 3 Hours

Maximum Marks: 60

Note: Attempt five questions in all including Q. No.1 which is compulsory. Select one question from each unit.

Q1 Answer the following:- (5x4=20)

- (a) What is Web Mining? Explain Semantic Web in brief. What are the benefits of Intelligent Web?
- (b) State major Vs of Big Data. Discuss how e-commerce is using Big Data to improve Business.
- (c) Explain Precision and Recall in brief. How is it related to Confusion Matrix?
- (d) Differentiate between PIG and HIVE in Hadoop Ecosystem. - 10
- (e) Write a short note on HBASE.

UNIT-I

Q2 (a) What is Stemming? Explain Porter's Stemming Algorithm in detail. (5)

(b) Explain Term-Document Matrix with suitable example. (5)

OR

Q3 (a) Explain Boolean, Vector and Probabilistic Information Retrieval Models in brief. (5)

(b) What do you mean by Web Intelligence? How can we create web Intelligent document and queries? Write any four basic Business Intelligence applications for various sectors? (5)

UNIT-II

Q4 (a) What is Web Crawler? Explain its architecture and working in brief. (5)

(b) What is Multimedia Information Retrieval? What are the challenges of Automated multimedia indexing? (5)

OR

Q5 (a) Explain the process of Page Rank Algorithm in brief and enlist various methods. (5)

(b) Explain Decision Tree and K-means algorithms in brief. (5)

UNIT-III

Q6 What is NoSQL? How is it different from Traditional RDBMS? Explain various data models in brief. What are the advantages of each data model? Explain the concept of CAP Theorem w.r.t. NoSQL databases. (10)

OR

Q7 What is Big Data? Why Big Data is required? What are the major technological challenges in managing Big Data? Suggest a comprehensive Big Data strategy for the CEO of the company mentioned below.

XYZ Stores Inc. is a specialized global retail chain that sells organic food, organic clothing, wellness products, and education products to enlightened (lifestyles of the Healthy and Sustainable) citizens worldwide. The company is 20 years old, and is growing rapidly. It now operates in 5 continents, 50 countries, 150 cities, and has 500 stores. It sells 20000 products and has 10000 employees. The company has revenues of over \$5 billion and has a profit of about 5 percent of its revenue. The company pays special attention to the conditions under which the products are grown and produced. It donates about one-fifth (20 per cent) from its pre-tax profits from global local charitable causes.

UNIT-IV

Q8 (a) What is Map-Reduce? Explain the process of Map-Reduce with suitable example. What happens to Map Reduce program if some of the data nodes fail? (5)

(b) What is SQOOP? What is the use of SQOOP in Hadoop? Explain its architecture, import and export mechanism in brief. (5)

OR

Q9 (a) What are the components of Hadoop Ecosystem? Explain in detail the architecture of Hadoop. How is pseudo-distributed mode different from fully distributed mode? (5)

(b) What is HDFS? How is it different from local file system? Explain five HDFS commands with suitable examples. (5)

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END TERM EXAMINATION

THIRD SEMESTER [MCA] DECEMBER 2024

Paper Code: MCA-253

Subject: Cyber Security & Cyber Laws

Maximum Marks: 60

Time: 03:00 Hrs.

Note: Attempt any five questions in all, including Q.No.1 which is compulsory. Attempt one question from each unit.

- Q1 Attempt the following in brief: (10x2=20)
- a) Enumerate two widely recognized attacks targeting mobile phones.
 - b) How cloud computing is related to cyber-security?
 - c) What are the different types of mail bomb attacks?
 - d) How does a phishing attack work and what are its types?
 - e) What is Buffer Flow Attack and what are its types? *Stack, heap*
 - f) What is HIPS?
 - g) What are the common key challenges in securing web applications?
 - h) Differentiate between stateful and stateless firewalls.
 - i) What are the main threats associated with email communication?
 - j) What is Copyrights law and why it is important?

UNIT-I

- Q2
- a) How do various types of cybercrimes manifest within organizations? Enumerate five specific cybercrimes targeting organizations and provide concise explanations for each. (5)
 - b) What is social engineering? Enlist any three examples of human-based and computer-based social engineering. (5)
- Q3
- a) What do you mean by Cyber security? State the difference between passive and active attacks. Provide examples. (5)
 - b) Define Cyber Stalking. How to prevent Cyber Stalking? (5)

UNIT-II

- Q4
- a) Define Steganography, how does steganography work? Who uses Steganography? (5)
 - b) Elaborate DoS attack. Explain Flood attack, Smurf attack and teardrop attack in DoS. Compare DDos with PDoS. (5)
- Q5
- a) Suppose that you have a message consisting of 2048 bits. Design a method that will extend a key that is 128 bits long into a string of 2048 bits, so that the resulting 2048 bits can be XORed with the message, just like a one-time pad. Is the resulting cipher as secure as a one-time pad? Is it possible for any such cipher to be as secure as a one-time pad? (5)
 - b) Explain keylogging? Enlist types of keyloggers and elaborate their working. Also, identify the tool that can detect keyloggers. (5)

UNIT-III

- Q6 Why is validating system integrity important in preventing security breaches? Discuss methods for ensuring the integrity of critical system components. (10)

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- Q7 Compare and contrast between IDS (Intrusion Detection System) and IPS (Intrusion Prevention System). What are the various intrusion detection methodologies? Also, explain any three types of threats. (10)

UNIT-IV

- Q8 Why do we need Cyber Laws? What is the impact of Cyber Security Regulations on Cyber Crimes? What is the effect of Cyber Crime all over the world? (10)
- Q9 Define Digital Evidence and its types. How to conduct Digital Evidence Acquisition and Analysis? (10)

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END TERM EXAMINATION

THIRD SEMESTER [MCA] DECEMBER 2024

Paper Code: MCA-201

Subject: Design and Analysis of Algorithms

Time: 03:00 Hrs.

Maximum Marks: 60

Note: Attempt Five questions in all including Q.No. 1 which is compulsory. Attempt one question from each unit.

Q1 Answer all the following questions briefly:- (2x10=20)

- a) Define the terms Best case, Worst case and Average case time complexities.
- b) What is the smallest value of n such that an algorithm whose running times is 100n² runs faster than an algorithm whose running time is 2n on the same machine
- c) Analyse the complexity of the following function void function(int n)

```
int count = 0;
for (int i=n/2; i<=n; i++)
  for (int j=1; j<=n; j = 2 * j)
    for (int k=i; k<=n; k = k * 2)
      count++;
```

- d) Write the applications of BFS and DFS.
- e) Define a B-tree. Give an example.
- f) Define spanning tree of a graph. Write the total number of spanning trees possible for a complete graph with 6 vertices.
- g) List and explain the characteristic properties associated with a problem that can be solved using dynamic programming.
- h) Explain Divide and Conquer strategy.
- i) State Master Theorem
- j) Implement UNION using linked list representation of disjoint sets

UNIT-I

- Q2 a) Solve using Masters theorem i) $T(n) = 2T(n/4) + \sqrt{n}$
- ii) $T(n) = 7T(n/2) + n^2$
- b) Write an algorithm to merge 2 sorted arrays into a single sorted array. (5)

- Q3 a) Analyse the complexity of the following functions (5)

```
i) function(int n)
   { if (n==1) return;
     for (int i=1; i<=n; i++)
       for (int j=1; j<=n; j++)
         printf("%*n");
     break; }

ii) void function(int n)
   {
     int i = 1, s = 1;
     while (s <= n)
       { i++; s += i;
         printf("%*n"); }
   }
```

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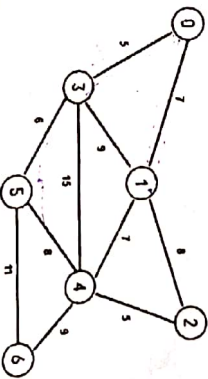
- b) Solve the recurrence using recursion tree method: $T(1) = 1$
 $T(n) = 3T(n/4) + cn^2$ (5)

UNIT-II

- Q4 a) Construct a Red Black tree by inserting 10,20,30,15,16 and 27 into an initially empty tree and also delete 15,16 and 30 from the tree (5)
- b) Explain Strassen's matrix multiplication and analyze its complexity (5)
- Q5 a) Give a control abstraction for Divide and Conquer method. Explain with an example. (5)
- b) Explain the advantages of using Height Balanced Trees? Explain AVL Rotations (5)

UNIT-III

- Q6 a) Formulate Fractional Knapsack Problem. Write Greedy Algorithm for fractional Knapsack Problem. (5)
- b) Find the optimal solution for the following fractional Knapsack problem. Given number of items(n)=4, capacity of sack(m)=60, $W = \{40, 10, 20, 24\}$ and $P = \{280, 100, 120, 120\}$ (5)
- Q7 a) Compute the Minimum Spanning Tree and its cost for the following graph using Kruskal's Algorithm. Indicate each step clearly. (5)



- b) Write down Bellman Ford algorithm and analyze the complexity. What is the time complexity of Bellman-Ford single-source shortest path algorithm on a complete graph of n vertices? (5)
- Q8 a) With examples explain polynomial time reducibility (5)
- b) How Travelling Salesperson Problem can be solved using Branch and bound (5)
- Q9 a) Draw the state space tree for 4 Queens problem. (5)
- b) Define NP-Hard and NP-complete problems. (5)

UNIT-IV

- Q8 a) With examples explain polynomial time reducibility (5)
- b) How Travelling Salesperson Problem can be solved using Branch and bound (5)

- Q9 a) Draw the state space tree for 4 Queens problem. (5)
- b) Define NP-Hard and NP-complete problems. (5)

(Please write your Exam Roll No.)

Exam Roll No.

2017704423

END TERM EXAMINATION

THIRD SEMESTER [MCA] DECEMBER 2024

Paper Code: MCA-223

Time: 03:00 Hrs.

Subject: Cloud Computing

Maximum Marks: 60

Note: Attempt any five questions in all, including Q. No. 1 which is compulsory. Attempt one question from each unit.

Q1 Answer the following questions, briefly: (2×10=20)

- What is Distributed computing
- Differentiate Containerization and virtualization
- Explain Service - Oriented Architecture (SOA)
- Describe amazon EC2 with its features.
- What is Big Data?
- Analyze the pay per use pricing business model in regards to utility computing.
- Examine and explain docker
- Differentiate between Grid computing and Cloud computing.
- Explain data center and its components. *Coolest, access control*
- Differentiate between authorization and authentication

UNIT-I

- Q2 a) Differentiate between IaaS and PaaS (2.5)
- b) Discuss the IDAAS's different illustrations (2.5)
- c) Illustrate the Cloud architecture with a neat diagram and examples. (5)

OR

- Q3 a) Apply map reduce algorithm to solve a word count problem. Discuss the file system where we can apply map reduce. (5)
- b) Discuss the various cloud deployment scenarios in detail. (5)

UNIT-II

- Q4 a) Binary Translation is a method for achieving Full Virtualization. Discuss about the statement. Also compare Full Virtualization with Para Virtualization. (5)
- b) Discuss about hypervisor and its type with their pros and cons. (5)

OR

- Q5 a) While we are implementing virtualization in any hardware architecture, Discuss the levels of virtualization? (5)
- b) Discuss the usefulness and impact of Containerization. (5)

UNIT-III

- Q6 a) Data center performance requirements are growing and facilities available in data center becomes top concern? So, what are the data center doing to manage between both IT requirement and Facility. Justify your answers (5)

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- b) Illustrate the key components of Amazon AWS (5)
- OR**
- Q7 a) Examine and compare the 5 phases of industry direction? (5)
b) Suppose you are requested to design and develop the Data Center for Microsoft. Discuss what challenges you would face as an IT staff and what architectural principles are there to support this technology? (5)

UNIT-IV

- Q8 a) "Salesforce is the world's number one cloud-based CRM platform". Illustrate your answer. (5)
b) Explain Web service applicable for mobile computing. (5)
- OR**
- Q9 a) Describe the essential components of Mid-market cloud. Discuss how it is different from cloud services which an individual's obtain. (5)
b) Summarize on cloud load balancing? How load balancing is implemented in AWS. (5)

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