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14SCS/SCE21

**Second Semester M.Tech. Degree Examination, June/July 2015**  
**Managing Big Data**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. What are the three types of big data that are a big deal for market? Discuss briefly each of them. (10 Marks)
- b. Analyse the operation of Distributed file system and RDBMS. (10 Marks)
- 2 a. What is credit analytics? How does it help in the real world? (08 Marks)
- b. How is it possible to detect brand with Big Data in social network analysis? (06 Marks)
- c. Consider a computer system which has four I/O channels and each channel can record data at 16MB/Sec. What is the time taken to read 2TB of data? What is the number of system required to read all the data if the time given is 5Sec. (06 Marks)
- 3 a. How is NOSQL polyglot persistent? (03 Marks)
- b. How is crowd sourcing a great way to capitalize on the resources that can build algorithms and predictive models? (05 Marks)
- c. What is data aggregation? What are different data models used in NOSQL? Give example and explain. (12 Marks)
- 4 a. What is the main process of operation is master slave replication? What are the pros and cons of maser slave replication. (10 Marks)
- b. What does CAP theory convey? Give an example to support CAP theorem. (10 Marks)
- 5 a. With a diagram explain the sequence of events that takes place when reading a file between the client and HDFS. (10 Marks)
- b. Write two racks with a at least 5 nodes in each rack. Show two data counter and process of pipeline replication placement when replication factor is 3. Show this distance for
  - i) Distance  $(/d^1 / r^1 / n^1, /d^1 / r^1 / n^1)$
  - ii) Distance  $(/d^1 / r^1 / n^1, /d^1 / r^1 / n^2)$
  - iii) Distance  $(/d^1 / r^1 / n^1, /d^1 / r^2 / n^3)$
  - iv) Distance  $(/d^1 / r^1 / n^1, /d^2 / r^3 / n^4)$
 When  $n^1, n^2, n^3, n^4$  nodes  $r^1, r^2,$  and  $r^3$  are racks and  $d^1, d^2$  are data centre. (10 Marks)
- 6 a. What is the function of a combiner in Map reduce? How does it differ from Reduce function? (04 Marks)
- b. What is the procedure to recover from a failed name node? (05 Marks)
- c. What is HDFS Federation? Explain with a diagram how Namenode , Namespace, Block pools and common storage configuration system work. (11 Marks)
- 7 a. List the different failures that need to be considered for MapReduce programs running on YARN. What is the effect of each failure. (10 Marks)
- b. What are different job schedulers available in later version of Hadoop? Explain the merit and demerit of each. (10 Marks)
- 8 a. What is the difference between HBASE and HDFS in Hadoop? (05 Marks)
- b. How is Cassandra considered as distributed decentralized, elastic, fault tolerant and column-oriented? (10 Marks)
- c. What are the main features of Big Latin script. (05 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 4+4=8 = 50, will be treated as malpractice.



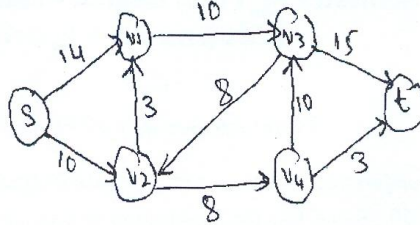
- 5 a. What ARP? Why is it needed? Explain the format of ARP packet and describe how ARP function on the internet. (10 Marks)
- b. Explain the following :  
i) BGP open message  
ii) BGP update message. (10 Marks)
- 6 a. Define spooling? With neat diagram, explain the conceptual components of an electronic mail. (10 Marks)
- b. What is URL? Give example of URL. Explain the GET request command with example. (10 Marks)
- 7 a. Explain the principle of bit – by – bit algorithm under round robin scheme, in Fair queuing for congestion control. (10 Marks)
- b. Explain RED (random early detection) congestion avoidance mechanism. (10 Marks)
- 8 a. Explain the network management architectural model. (10 Marks)
- b. Write notes on following :  
i) Domain hierarchy  
ii) HTTP. (10 Marks)

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- b. Write Ford-Fulkerson method. Run the same to find maximum flow in graph of Fig Q3 (b)

Fig. Q3 (b)



(10 Marks)

- 4 a. Write EXTENDED-EUCLID algorithm and compute the values (d, x, y) that the call EXTENDED-EUCLID (99, 78). (10 Marks)
- b. Define group. Draw the group operation tables for the groups  $(\mathbb{Z}_4, +_4)$  and  $(\mathbb{Z}_5^*, \cdot_5)$  (08 Marks)
- Write modular linear equation survey (a, b, n). (02 Marks)
- 5 a. Write Chinese remainder theorem. (08 Marks)
- b. Find all Solutions to the equation  $x \equiv 2 \pmod{5}$  and  $x \equiv 3 \pmod{13}$ . (10 Marks)
- c. Write modular exponentiation (a, b, n) algorithm. (02 Marks)
- 6 a. Construct the string matching automation for the pattern P = aabab and illustrate its operation on the text string T = aababaabaabababab. (08 Marks)
- b. Write naive string matching algorithm. (02 Marks)
- c. Compute the prefix function  $\pi$  for the pattern babaca and illustrate its operation on the text string.  
T = aababaabababbabacaa (10 Marks)
- 7 a. Write Boyer-More string algorithm Apply Boyer-More algorithm to search for the pattern BARBER in the text.  
JIM-SAW-ME-IN-A-BARBERSHOP (10 Marks)
- b. Explain Aggregate and Accounting methods with example. (10 Marks)
- 8 a. Explain Monte Carlo and Las Vegas algorithms with appropriate examples. (10 Marks)
- b. Explain randomizing deterministic algorithms taking linear search algorithm as an example. (10 Marks)

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**Second Semester M.Tech Degree Examination, June/July 2015**  
**Artificial Intelligence and Agent Technology**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

1.
  - a. Define AI and discuss any two applications of AI. (05 Marks)
  - b. You are given two water jugs, a 6 – gallon one and 8 – gallon one. Neither of the jugs has measuring marks on them. There is a pump that can be used to fill the jugs with water. How can you get exactly 4 – gallons of water into 8 – gallons jug? Define the problem as a state space and solve the problem using state space approach. (09 Marks)
  - c. Discuss any two characteristics of AI problems in detail with examples. (06 Marks)
2.
  - a. With examples, describe any three properties of task environments. (06 Marks)
  - b. Given the following initial and goal configuration of 8 – puzzle problem, use the Best – First search method to obtain solution path from initial to goal configuration. Specify the heuristic function used. (06 Marks)

2	8	3
1	6	4
7		5

Initial State

1	2	3
8		4
7	6	5

Goal State

- c. Explain in detail the following issues in representation of knowledge.
    - i) Relationship among attributes
    - ii) Finding right structures as needed. (08 Marks)
3.
  - a. Consider the following set of sentences. Represent them in predicate logic, convert them to clause form and prove the statement hate (marcus, Caesar) using resolution.
    - i) Marcus was a man
    - ii) Marcus was a Pompeian
    - iii) All Pompeian's were Romans.
    - iv) Caesar was a ruler
    - v) All Romans were either loyal to Caesar or hated him
    - vi) Everyone is loyal to someone
    - vii) People only try to assassinate ruler's they are not loyal to
    - viii) Marcus tried to assassinate Caesar. (12 Marks)
  - b. Explain in detail construction of circuit based agents that operate using propositional logic. (08 Marks)
4.
  - a. With a diagram, describe non – monotonic reasoning. (04 Marks)
  - b. Describe the following types of non – monotonic reasoning, with an example for each :
    - i) Abduction
    - ii) Inheritance. (06 Marks)
  - c. State Baye's theorem and describe with an example how to perform reasoning using Baye's network mechanism. (10 Marks)
5.
  - a. Explain probabilistic inference using full joint distribution with an example. Also write algorithm for the same. (10 Marks)
  - b. Describe in detail representation of knowledge as a Frame, considering an example. (06 Marks)
  - c. Write algorithm for property inheritance used in weak slot - & - filler structures. (04 Marks)
6.
  - a. Write a script for going to a restaurant. (10 Marks)
  - b. With an example show that Alpha – Beta pruning method saves the search space. (10 Marks)

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- 7 a. List various types of learning methods and briefly explain them.  
b. With an example, discuss learning from decision trees.

(10 Marks)

(10 Marks)

- 8 Write short notes on the following :

- a. Conjunctive Normal Form.  
b. Implementation issues in non – monotonic reasoning.  
c. EM algorithm.  
d. Goal based agents.

(20 Marks)

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