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15CS72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Advanced Computer Architectures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is Computer Architecture? Give Flynn's classification of computer architecture.
(06 Marks)

   b. A 400MHz processor was used to execute a benchmark program with the following instruction mix and clock cycle count:

Instruction type	Instruction count	Clock cycle count
Integer arithmetic	450000	1
Data transfer	320000	2
Floating point	150000	2
Control transfer	80000	2

   Determine the effective CPI, MIPS rate and execution time for this program. (04 Marks)

   c. With a neat diagram, explain the operational model of SIMD computers. (06 Marks)

OR

2 a. Explain how digital bus and cross bar network can be used as dynamic interconnection networks. (10 Marks)

   b. State Amdahl's law. Define system efficiency, redundancy, utilization and quality of parallelism. (06 Marks)

Module-2

3 a. Compare the Architectural design and various parameters in RISC and CISC processors. (05 Marks)

   b. Explain the use of translation Look aside Buffer (TLB) and page tables for address mapping. (06 Marks)

   c. Explain the inclusion property and data transfer between adjacent levels of memory hierarchy with an example. (05 Marks)

OR

4 a. With a neat diagram, explain the architecture of a Very Long Instruction Word (VLIW) processor and its pipeline operations. (10 Marks)

   b. Explain the memory page replacement policies. (06 Marks)

Module-3

5 a. What is an arbitration? Explain the three arbitration schemes. (08 Marks)

   b. Explain the following block placement schemes:
   i) Direct mapping
   ii) Set associative caches. (08 Marks)

OR

6   a. Explain the Branch Handling techniques. (08 Marks)
    b. With a neat diagram, explain the design of a pipelined floating point unit built as on chip features in Motorola M68040 processor. (08 Marks)

Module-4

7   a. What is Snoopy bus protocol? Explain write through, write back and write-once cache protocol. (08 Marks)
    b. Explain the different types of message routing schemes. (08 Marks)

OR

8   a. Define vector processor. Explain different vector instruction types by mathematical mappings between their working register or memory where vector operands are stored. (08 Marks)
    b. Explain multithreaded architecture and its computation model for a massively parallel processing system. (08 Marks)

Module-5

9   a. Explain the compilation phases in parallel code generation. (08 Marks)
    b. Explain the principle of synchronization. (08 Marks)

OR

10 a. Explain the processor design with reorder buffer. (06 Marks)
    b. What is Data Dependences? Explain the different types of data dependence. (07 Marks)
    c. Write the state transition diagram of 2-bit branch predictor. (03 Marks)

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CBCS SCHEME

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Machine Learning

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What do you mean by a well posed learning problem? Explain the important features that are required to well-define a learning problem. **(08 Marks)**

b. Explain Find-S algorithm with given example. Give its application.

Table 1.

Example	Sky	Air Temperature	Humidity	Wind	Water	Forecast	Enjoy Sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(08 Marks)

OR

2 a. What are the basic design issues and approaches to machine learning? **(08 Marks)**

b. Explain the various stages involved in designing a learning system (Checkers learning system). **(08 Marks)**

Module-2

3 a. Greedy learn a decision tree using ID$_3$ algorithm and draw the tree. **(08 Marks)**

b. Compare Entropy and Information gain in ID$_3$ with an example. **(08 Marks)**

OR

4 a. Describe hypothesis space search in ID$_3$ and contrast it with candidate elimination algorithm. **(08 Marks)**

b. List the issues in Decision Tree learning. Interpret the algorithm with respect to overfitting the data. **(08 Marks)**

Module-3

5 a. Define ANN. Explain the concept of a perceptron with a neat diagram. **(08 Marks)**

b. What do you mean by Gradient Descent? Derive the Gradient Descent Rule. **(08 Marks)**

OR

6 a. Derive the Back propagation rule considering the training rule for output unit weights and training rule for hidden unit weights. **(08 Marks)**

b. Explain how to learn multilayer networks using Gradient Descent Algorithm. **(08 Marks)**

Module-4

7 a. Explain the concept of Baye's theorem with an example. **(08 Marks)**

b. Explain the K-means algorithm with an example. **(08 Marks)**

OR

8 a. Explain Naïve Baye's classifier with an example.   **(08 Marks)**
   b. Explain Bayesian belief networks and conditional independence with example.   **(08 Marks)**

Module-5

9 a. What is Reinforcement Learning? Explain the Q function and Q Learning algorithm.
                                                                                       (08 Marks)
   b. Describe K-nearest Neighbour learning algorithm for continuous valued target function.
                                                                                       (08 Marks)

OR

10 a. Explain locally weighted linear regression.   **(08 Marks)**
    b. Explain Binomial Distribution with an example.   **(08 Marks)**

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15CS754

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Storage Area Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. With a neat diagram, explain the key characteristics of data centre. **(05 Marks)**
    b. Explain with a neat diagram, how Storage Centric IT Architecture can overcome the limitations of Server Centric IT Architecture. **(05 Marks)**
    c. Describe the RAID levels with reference to RAID0, RAID1, RAID3 and RAID5. **(06 Marks)**

OR

2   a. With a neat diagram, explain the components of intelligent storage system. **(07 Marks)**
    b. Compare traditional and virtual storage provisioning with an example. **(05 Marks)**
    c. An application generates 5200 IOPS with 60% being read operation with disk handling capacity of 180 IOPS. Determine the disk load and number of disks required in RAID5 and RAID1 configuration (given write penalty for RAID5 and RAID1 are 4 and 2 respectively). **(04 Marks)**

Module-2

3   a. Briefly explain the layers of Fibre channel protocol stack. **(05 Marks)**
    b. Define storage virtualization. List the different network based virtualization techniques. Explain block level storage virtualization. **(06 Marks)**
    c. List and explain the different topologies of iSCSI connectivity. **(05 Marks)**

OR

4   a. Define NAS. List the benefits of NAS. Explain the different NAS implementations in detail. **(08 Marks)**
    b. Illustrate the steps for storage and retrieval of data objects in OSD system. **(08 Marks)**

Module-3

5   a. What is business continuity? Explain the different stages in BC planning life cycle with a neat diagram. **(08 Marks)**
    b. Describe in detail the different topologies are used in backup environment. **(08 Marks)**

OR

6   a. What is Local Replication? With a neat diagram, explain Host-based and Network-based Local Replication. **(07 Marks)**
    b. With a neat diagram, explain Three-site replication methods. **(05 Marks)**
    c. Illustrate two approaches for performing a backup in virtualized environment. **(04 Marks)**

Module-4

7   a. Define cloud computing. Explain the characteristics of cloud computing. **(05 Marks)**
    b. List and explain different cloud service models. **(06 Marks)**
    c. Describe in detail In-Band virtualization appliances. **(05 Marks)**

OR

8	a.	Illustrate any two Deployment Models of Cloud Infrastructure.	(06 Marks)
	b.	Explain the layers in cloud computing infrastructure with a neat diagram.	(05 Marks)
	c.	Describe in detail policy based storage management.	(05 Marks)

Module-5

9	a.	Mention the different SAN security mechanisms. Explain them in detail.	(05 Marks)
	b.	Explain the basic security implementations for IP-SAN with CHAP authentication.	
			(05 Marks)
	c.	Describe in detail storage management activities.	(06 Marks)

OR

10	a.	Explain the different threats and vulnerabilities in storage infrastructure.	(04 Marks)
	b.	With a neat diagram, explain the steps of Kerberos authorization process.	(07 Marks)
	c.	Explain Information Life Cycle Management (ILM).	(05 Marks)

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