USN | | | | | | | | | | 17CS71

Seventh Semester B.E. Degree Examination, July/August 2021
Web Technology and It's Applications

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions.

1   a.   What are HTML Elements and Attributes? Explain.   (06 Marks)
    b.   Explain the different Relative Link Type Referencing with suitable example.   (08 Marks)
    c.   What is CSS? List and explain benefits of CSS.   (06 Marks)

2   a.   Explain ordered and unordered list with example.   (05 Marks)
    b.   With an example explain CSS Box model.   (08 Marks)
    c.   List the different selectors available in CSS and explain in detail.   (07 Marks)

3   a.   Create a table that correctly uses the caption, thead, tfoot and tbody elements. Briefly
         discuss the role of each of these elements.   (10 Marks)
    b.   What is a responsive design? Why it is important?   (05 Marks)
    c.   Explain how rowspan and colspan attributes are used?   (05 Marks)

4   a.   Describe how block level elements are different from inline elements. Be sure to describe
         any two different types of inline elements with simple example.   (10 Marks)
    b.   In what situations would you use a radio button and a checkbox? With an example explain
         briefly.   (05 Marks)
    c.   Explain the role of CSS preprocessors in the web development workflow.   (05 Marks)

5   a.   Define software layer? Explain the various common software design layers in Javascript
         with a neat diagram.   (08 Marks)
    b.   What are form events in Javascript? List and explain different form events.   (05 Marks)
    c.   Demonstrate the use of inline, external and embedded Javascript with an example for each.
                                                                            (07 Marks)

6   a.   What is Fail-Safe design and why does it matters?   (04 Marks)
    b.   Explain Document Object Model. Demonstrate the DOM tree with an example.   (08 Marks)
    c.   What are server-side include files? Why are they important in PHP?   (08 Marks)

7   a.   What are the superglobal arrays in PHP? What function is used to determine if a value was
         sent via Query string?   (10 Marks)
    b.   How do you read or write a file on the server from PHP? Explain with suitable example.
                                                                            (10 Marks)

8 a. Define Class and Object. Interpret the concept of data encapsulation, Inheritance, Polymorphism and Object interface with respect to OOP.   (10 Marks)
   b. Explain _construct( ) and _destruct( ) with example or each.   (10 Marks)

9 a. What are HTTP Cookies? How do you handle them in PHP?   (08 Marks)
   b. Why is state is a problem for web application? Explain.   (08 Marks)
   c. What does $() shorthand stand for in jQuery?   (04 Marks)

10 a. Explain how sessions stored between requests.   (05 Marks)
   b. Write a jQuery selector to get all the <P> that contain the word "Hello".   (05 Marks)
   c. What are the commonly used animations in jQuery? Explain with suitable example.   (10 Marks)

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Seventh Semester B.E. Degree Examination, July/August 2021
Advanced Computer Architecture

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. List the performance factors and system attributes. Explain how performance factors are influenced by system attributes.   **(08 Marks)**
   b. What are the conditions of parallelism? Explain the types of data dependence.   **(06 Marks)**
   c. With a neat diagram, explain the levels of parallelism in program execution on modern computers.   **(06 Marks)**

2 a. Consider the execution of an object code with 2×10^6 instructions on a 400 MHz processor. The program consists of four major types of instructions. The instruction mix and the number of cycles (CPI) needed for each instruction type are given below based on the result of a program trace experiment.

Instruction type	CPI	Instruction mix
Arithmetic and Logic	1	60%
Load/store with cache hit	2	18%
Branch	4	12%
Memory reference with cache miss	8	10%

   i) Calculate the average CPI when the program is executed on a uniprocessor with the above trace results.
   ii) Calculate the corresponding MIPS rate based on the CPI obtained.   **(07 Marks)**
   b. Explain the architecture of vector super computer with a neat diagram.   **(07 Marks)**
   c. Discuss in detail : i) UMA model   ii) NUMA model   iii) COMA model. **(06 Marks)**

3 a. Explain the architecture of VLIW processor and its pipeline operations.   **(08 Marks)**
   b. Distinguish between typical RISC and CISC processor architectures.   **(06 Marks)**
   c. With a neat diagram, explain the hierarchical memory technology.   **(06 Marks)**

4 a. Explain Inclusion, Coherence and Locality properties.   **(06 Marks)**
   b. Briefly explain the virtual memory models for multiprocessor system.   **(06 Marks)**
   c. With a diagram, explain a typical superscalar RISC processor architecture consisting of an integer unit and a floating point unit.   **(08 Marks)**

5 a. Explain bus arbitration and its types in multiprocessor systems.   **(08 Marks)**
   b. Explain Prefetch buffer and Internal data forwarding mechanism used in instruction pipelining.   **(06 Marks)**
   c. Explain Sequential and Weak consistency models.   **(06 Marks)**

6 a. Explain with diagram, the Backplane bus specification.   **(06 Marks)**
   b. Explain multiply pipeline design to multiply two 8 bit integers
       X = 10110101 , Y = 10010011.   **(06 Marks)**

c. For the reservation table of a non linear pipeline shown below :

	0	1	2	3	4
S_1	X				X
S_2			X		
S_3				X	

    i) What are the forbidden latencies? Write initial collision vector.
    ii) Draw the state transition diagram.
    iii) List all simple cycles and greedy cycles.
    iv) Determine MAL. **(08 Marks)**

7 a. Explain briefly different vector access memory schemes. **(06 Marks)**
   b. Explain four context switching policies. **(08 Marks)**
   c. Explain routing in Omega network. **(06 Marks)**

8 a. Explain Snoopy protocols, with its approaches. **(10 Marks)**
   b. With a diagram, explain the architecture of the connection machine CM - 2. **(10 Marks)**

9 a. Explain the fairness policies and sole access protocols in the principles of synchronization. **(07 Marks)**
   b. What are the major hurdles of pipelining? Illustrate the branch hazards in detail. **(07 Marks)**
   c. Define Parallel programming model. Explain any 2 models. **(06 Marks)**

10 a. What are the issues in using shared variable model? **(07 Marks)**
   b. With the help of a neat diagram, explain compilation phases in code generator. **(07 Marks)**
   c. Explain different language features for parallelism. **(06 Marks)**

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Seventh Semester B.E. Degree Examination, July/August 2021
Machine Learning

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions.

1   a.   Explain the designing of a learning system in detail.   **(10 Marks)**
    b.   Define learning. Specify the learning problem for handwriting recognition and robot driving.   **(05 Marks)**
    c.   Explain the issues in machine learning.   **(05 Marks)**

2   a.   Write the steps involved in find-S algorithm.   **(05 Marks)**
    b.   Apply candidate elimination algorithm to obtain final version space for the training set shown in Table.Q2(b) to infer which books or articles the user reads based on keywords supplied in the article.   **(10 Marks)**

Article	Crime	Academes	Local	Music	Reads	
a_1	True	False	False	True	True	
a_2	True	False	False	False	True	Table.Q2(b)
a_3	False	True	False	False	False	
a_4	False	False	True	False	False	
a_5	True	True	False	False	True	

    c.   State the inductive bias rote-learner, candidate-elimination and Find-S algorithm.   **(05 Marks)**

3   a.   Define the following terms with an example for each:
      (i)   Decision tree   (ii) Entropy   (iii) Information gain
      (iv) Restriction Bias   (v) Preference Bias   **(10 Marks)**
    b.   Construct decision tree for the data set shown in Table.Q3(b) to find whether a seed is poisonous or not.   **(10 Marks)**

Example	Colour	Toughness	Fungus	Appearance	Poisonous	
1	Green	Soft	Yes	Wrinkled	Yes	
2	Green	Hard	Yes	Smooth	No	
3	Brown	Soft	No	Wrinkled	No	Table.Q3(b)
4	Brown	Soft	Yes	Wrinkled	Yes	
5	Green	Soft	Yes	Smooth	Yes	
6	Green	Hard	No	Wrinkled	No	
7	Orange	Soft	Yes	Wrinkled	Yes	

4   a.   Explain ID3 algorithm. Give an example.   **(10 Marks)**
    b.   Explain the issues and solutions to those issues in decision tree learning.   **(10 Marks)**

5   a.   Derive an expression for gradient descent rule to minimize the error. Using the same, write the gradient descent algorithm for training a linear unit.   **(10 Marks)**
    b.   Write back propagation algorithm that uses stochastic gradient descent method. What is the effect of adding momentum to the network?   **(10 Marks)**

6   a.   List the characteristics of the problems which can be solved using back propagation algorithm.   **(05 Marks)**
    b.   Design a perceptron to implement two input AND function.   **(05 Marks)**
    c.   Derive expressions for training rule of output and hidden unit weights for back propagation algorithm.   **(10 Marks)**

7 a. Define Maximum a Posteriori (MAP) hypothesis. Derive an equation for MAP hypothesis using Baye's theorem. **(04 Marks)**

    b. Given $P(A = \text{True}) = 0.3$, $P(A = \text{False}) = 0.7$, $P(B = \text{True} \mid A = \text{True}) = 0.4$, $P(B = \text{False} \mid A = \text{True}) = 0.6$, $P(B = \text{True} \mid A = \text{False}) = 0.6$, $P(B = \text{False} \mid A = \text{False}) = 0.4$. Calculate $P(A = \text{False} / B = \text{False})$ using Baye's rule. **(06 Marks)**

    c. Given the previous patient's data in the Table.Q7(c). Use Naïve Baye's classifies to classify the new data (Chills = Y, Runny nose = N, Headache = Mild, Fever = Y) to find whether the patient has flue or not. **(10 Marks)**

Chills	Runny nose	Headache	Fever	Flue
Y	N	Mild	Y	N
Y	Y	No	N	Y
Y	N	Strong	Y	Y
N	Y	Mild	Y	Y
N	N	No	N	N
N	Y	Strong	Y	Y
N	Y	Strong	N	N
Y	Y	Mild	Y	Y

Table.Q7(c)

8 a. Describe the features of Bayesian learning methods. **(05 Marks)**

    b. A patient takes a lab test and the result comes back positive. It is known that the test returns a correct positive result in only 98% of the cases and a correct negative result is only 97% of the cases. Furthermore only 0.008 of the entire population has this disease.
      (i)   What is the probability that this patient has cancer?
      (ii)   What is the probability that he does not have cancer? **(05 Marks)**

    c. The Table.Q8(c) provides a set of 14 training examples of the target concept 'Play Tennis' where each day is described by the attributes, outlook, temperature, humidity and wind.

Day	Outlook	Temperature	Humidity	Wind	Play Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Table.Q8(c)

Use the Naïve Bayes classifier and the training data from this table to classify the following novel instance: <Outlook = Sunny, Temperature = Cool, Humidity = High, Wind = Strong> **(10 Marks)**

9 a. Explain binomial distribution and write the expressions for its probability distribution, mean, variance and standard deviation. **(04 Marks)**

b. Define the following terms:
   (i) Sample error
   (ii) True error
   (iii) N% confidence interval
   (iv) Random variable
   (v) Expected value
   (vi) Variance   (06 Marks)

c. Write K-Nearest Neighbour algorithm for approximating a discrete values target function. Apply the same for the following three-dimensional training data instances along with one-dimensional output.
   $x_1 = 5, x_2 = 7, x_3 = 3, y = 4$
   $x_1 = 2, x_2 = 4, x_3 = 9, y = 8$
   $x_1 = 3, x_2 = 8, x_3 = 1, y = 2$
   $x_1 = 7, x_2 = 7, x_3 = 2, y = 4$
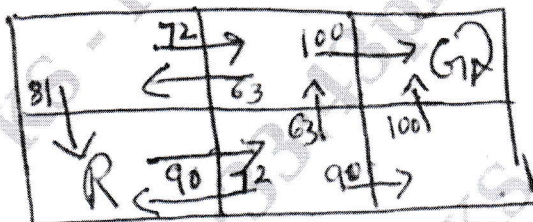 $x_1 = 1, x_2 = 9, x_3 = 7, y = 8$
   Consider the query point ($x_1 = 5, x_2 = 3, x_3 = 4$) and K = 3.   (10 Marks)

10 a. List the steps used for deriving confidence intervals.   (04 Marks)
   b. Explain CADIT system using case based reasoning.   (06 Marks)
   c. Write Q learning algorithm. Consider the following state s_1. Find $\hat{Q}(s_1, a_{right})$ for R given immediate reward as 0 and $\gamma = 0.9$.   (10 Marks)

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USN ☐☐☐☐☐☐☐☐☐☐ 　　　　17CS743

Seventh Semester B.E. Degree Examination, July/August 2021
Information and Network Security

Time: 3 hrs. 　　　　　　　　　　　　　　　　　　　Max. Marks: 100

Note: Answer any FIVE full questions.

1　a. Encrypt the message: "Do Something Great". Using double transposition cipher with 4 rows and 4 columns using the row permutation. (1, 2, 3, 4) → (2, 4, 1, 3) and column permutation (1, 2, 3, 4) → (3, 1, 2, 4) 　　　　　　　　　　　　　　　**(06 Marks)**
　　b. Describe Simple Substitution cipher method with an example. 　　　**(06 Marks)**
　　c. Differentiate between:
　　　(i)　Substitution and transposition cipher
　　　(ii)　Plaintext and ciphertext
　　　(iii)　Block and stream cipher
　　　(iv)　Cryptography and cryptanalysis 　　　　　　　　　　　　　　**(08 Marks)**

2　a. Discuss on the taxonomy of cryptography. 　　　　　　　　　　　**(06 Marks)**
　　b. Write short notes on:
　　　(i)　Code book cipher
　　　(ii)　Cipher of the election of 1876. 　　　　　　　　　　　　　　**(06 Marks)**
　　c. Using Vernam cipher encrypt the plaintext "knowledge" to cipher text and from cipher text to plaintext using the key.

　　　110　　101　　110　101　111　　100　　000　　101　　110

Letter	k	o	n	e	ℓ	w	d	g
Binary	000	001	010	011	100	101	110	111

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(08 Marks)

3　a. Define cryptographic hash function. Explain the properties of hash function. 　**(06 Marks)**
　　b. Demonstrate birthday problem with an example. 　　　　　　　　　　**(06 Marks)**
　　c. Explain secret sharing in detail and its types with an example. 　　　　**(08 Marks)**

4　a. Discuss HMAC function in detail with an example. 　　　　　　　　　**(08 Marks)**
　　b. Explain Tiger hash outer round and inner round for 'F' with a neat diagram. 　**(08 Marks)**
　　c. Describe the techniques used in information hiding. 　　　　　　　　**(04 Marks)**

5　a. Describe the basic model of a deterministic generator. 　　　　　　　**(06 Marks)**
　　b. Differentiate hardware and software based non-deterministic generator. 　**(06 Marks)**
　　c. Briefly describe the first candidate protocol in detail. 　　　　　　　**(08 Marks)**

6　a. Illustrate Diffie-Hellman key agreement protocol. 　　　　　　　　　**(08 Marks)**
　　b. Explain the stages of cryptographic protocol design and its challenges. 　**(08 Marks)**
　　c. Describe cryptographic password protection with an example. 　　　　**(04 Marks)**

7 a. Discuss a three-level key hierarchy with a neat diagram. (06 Marks)
   b. Illustrate the key life cycle with suitable diagram. (06 Marks)
   c. Explain closed and connected certification model with a neat diagram. (08 Marks)

8 a. With a neat diagram, explain identity based public key cryptography. (07 Marks)
   b. Describe quantum key establishment method in detail. (07 Marks)
   c. Explain reputation based certification model. (06 Marks)

9 a. Explain the application of cryptography for secure payment card transactions. (08 Marks)
   b. Explain the applications of cryptography in
      (i)   File protection
      (ii) E-mail security (08 Marks)
   c. Discuss the serious problem with WEP management. (04 Marks)

10 a. Describe the use of cryptography in eID cards and also explain its security and design issues.
      (10 Marks)
   b. Explain GSM Authentication and encryption with a neat diagram. (10 Marks)

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Seventh Semester B.E. Degree Examination, July/August 2021
Storage Area Networks

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Describe with suitable diagram RAID 0+1 and RAID 5. Computer the number of disk required in RAID 6 and RAID 1 when an application generates 5200 IOPS with 60% of them being reads, if 15K RPM drive is rated to perform 180 IOPS per drive were used.
                                                                    (10 Marks)
   b. Explain core elements of data center and the key characteristics of classical data center.
                                                                    (10 Marks)

2. a. Explain the logical component of a host
       i)   Operating system
       ii) Volume manager
       iii) File system
       iv) Device drivers.   (10 Marks)
   b. List all the benefits of an intelligent storage system and explain Read and Write operation in cache.   (10 Marks)

3 a. Discuss the process of handling I/O in a NAS environment with help of a diagram. (10 Marks)
   b. Explain Fibre channel architecture with suitable diagram.   (10 Marks)

4 a. Explain zoning and its type.   (10 Marks)
   b. Explain with diagram the process of storing and retrieving objects in OSD. (10 Marks)

5 a. Explain briefly the following terminologies.
       i) Disaster recovery
       ii) RPO
       iii) RTO
       iv) Hot and Cold site
       v) Data vault.   (10 Marks)
   b. List and explain different back up topologies with help of diagram. (10 Marks)

6 a. Describe source based data deduplication and Target based data deduplication with the help of diagram.   (10 Marks)
   b. Discuss Array based synchronous and Asynchronous Remote Replication mode with help of diagram.   (10 Marks)

7 a. Explain the different cloud service model.   (10 Marks)
   b. Explain the characteristics of cloud computing.   (10 Marks)

8 a. Explain the steps involved in transitioning from classic data center to cloud computing environment services.   (10 Marks)
   b. Explain cloud deployment model.   (10 Marks)

9 a. Explain how authentication and authorization can be provided to NAS file sharing using Kerberos.   (10 Marks)
   b. Explain storage infrastructure management challenges.   (10 Marks)

10 a. Explain the monitoring parameters and components monitored for storage management.
                                                                    (10 Marks)
   b. Explain how IPSAN can be secured using CHAP authentication technique. (10 Marks)

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