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47/02/2022

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Roll No.....

FIFTH SEMESTER-B. TECH

END-SEMESTER EXAMINATION, DECEMBER, 2021

Course Code: CACSC14/ COCSC14

Course Title: Principles of Compiler Construction

Time:3hrs.

Max.Marks:40

Note: - Attempt all five questions. Missing data/information (if any), may be suitably assumed and mentioned in the answer.

Q1.	Attempt any two parts of the following a) Draw and explain the block diagram of a Compiler. Indicate the output of every stage corresponding to input z = x + y * v. Differentiate pass and phase of a compiler. b) Explain the language processing system and the role of linker, loader and assembler. c) Explain compiler construction tools.	(4+4)	CO1
Q2.	Attempt any two parts of the following a) Construct the minimized DFA from regular expression a(a|b)*ab using Thompson's construction. b) List out the functions of a Lexical Analyzer? State the reasons for the Separation of Analysis phase into Lexical, Syntax, and Semantic Analysis. Write regular expression for the language containing all strings of 0's and 1's that do not contain 011. c) Write a lexical analyzer for keywords in 'C' language and show it using LEX.	(4+4)	CO2
Q3.	Attempt any two parts of the following a) Differentiate between regular expressions and Context free grammar. Consider the following grammar S–>SS+|SS*|a Show how the string aa+a* can be generated by this grammar. Construct parse tree for this string. Find whether this grammar is ambiguous or not. b) Construct the SLR parsing table for the given grammar and show the parsing moves for the input string "zxxx" S –> AxB S –>Bc A –> yA A –> z B –> xB B –> ε c) Construct unambiguous context-free grammar for Arithmetic Expressions in postfix notation show it using YACC.	(4+4)	CO3

Q4.	Attempt any two parts of the following
	a) What is basic block? How do you construct basic blocks? Construct basic block and flow graph for the following code
	i=0;
	s=0;
	while (i<10)
	{ s=s+i;
	i=i+1;
	}
	b) Explain Syntax directed definition and Syntax directed Translation scheme by taking suitable example. Write SDT for converting infix to postfix.
	c) Explain the different components of activation record. Translate the expression into quadruples, triples and indirect triples.
	-(a+b) * (c+d) + (a+b+c)
		(4+4)	CO4

Q5.	Attempt any two parts of the following a) What are the issues in generation of target code? Draw directed acyclic graph (DAG) for the following expression. What are the advantages of using DAG. e = (a+b) * (b-c) + (a+b) * (b-c)	(4+4)	CO4, CO5

	b) Using the Sethi Ullman algorithm generate target code for the following expression assuming only two registers r1 and r2 are available. Explain the steps. ((a+b) - (c*d)) + ((e-f) * (u-v)) c) What is code optimization? What are the issues associated with code optimization? Explain various code optimization techniques		

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Roll No:_____
Semester: _____5th_____
B.Tech. (CSE)

END SEMESTER EXAMINATION: December-2021

114/44
02/2022

Course Title: Distributed Computing
Course Code: CACSC15
Time: 3.00 Hours

Max. Marks: 40

Note: All questions carry equal marks, Suitably assume any missing Data (if any)and mention that in your answer

Q.No	Question	Marks	CO
1	**Attempt any 2 parts**		
1. a	Differentiate between Peer to peer and client server Architectural model.	4	CO1
1.b	Explain 4 the types of transparencies considered for designing scalable distributed system for Railways?	4	CO1
1.c	Explain Message passing in DS with the help of Diagram and Types of Events involved?	4	CO1
2	**Attempt any 2 parts**		
2. a	What do you mean by Virtualization? What are the types and the role of hypervisor in Virtualization?	4	CO2
2.b	What is private and public cloud ? Explain the Fallowing types of cloud models SAAS IAAS , PAAS ?	4	CO2
2.c	Why global clock is important in distributed system? Why this is an issue? How this can be realized?	4	CO2
3	**Attempt any 2 parts**		
3. a	Why global clock is important in distributed system? Why this is an issue? How this can be realized?	4	CO3
3.b	How Lamport logical clocks resolve the need of ordering of events?	4	CO3
3.c	Prove that vector clock condition is strong. What is the significance of this condition?	4	CO3
4	**Attempt any 2 parts**		
4. a	Give implementation rules of Lamport's logical clock and vector clock.	4	CO4
4.b	What is the necessity of INQUIRE and RELINQUISH message in Maekawa's DME algorithm?	4	CO4
4.c	Differentiate between strict two-phase locking Rigorous 2 Phase Lock	4	CO4
5	**Attempt any 2 parts**		
5.a	What is RSA algorithm .Explain with steps involved ?	4	CO5
5.b	Let p=11 , q= 3 , e= 3 given as respectively then find the value of d?	4	CO5
5.c	Encrypting a message (M) with Private key (P_k) ? what can we say about Confidentiality, Authentication and digital Signature?	4	CO5

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Roll No. _____

END SEMESTER EXAMINATION December 2021

Course Code: CACSC16
Course Title: Game Theory and Applications

Time: 3 Hours

Max. Marks : 40

Note: - **Attempt all the five questions. Missing data/ information if any, maybe suitably assumed & mentioned in the answer.**

Q. No.	Question	Marks	CO
Q1	**Attempt any 2 parts of the following.**		
1a	List Four different game or scenarios where prisoner's dilemma can fit and deployed to find Nash Equilibrium.	4	CO1
1b	Taking the example of Cold-War game, demonstrate: Why two developing competing countries invest their money in Defense /military engagements instead of Health of their citizens. (Assume any payoff)	4	CO1
1c	Consider the Game, tragedy of commons where two agencies are putting efforts for forest wood management, say, E_1 and E_2. The number of trees cut by each agency is proportional to their respective efforts say, e_1 and e_2. Let, the payoff function is: $U_1=e_1(1-(e_1+e_2))$. Demonstrate: The joint/collaborative effort is optimal that their individual efforts.	4	CO1
Q2	**Attempt any 2 parts of the following.**		
2a	Define Rationality and common knowledge each with suitable examples. Provide the rationale and significance behind these terms.	4	CO1
2b	Consider a modified battle of sexes game in which boy and girl respectively can choose C, H. The various payoffs are as follows. (C, C) = (4,2), (H, H) = (2,4), (C, H) = (1,0), (H, C) = (0,1). What would be the pure strategy Nash Equilibrium of this game.	4	CO2
2c	Consider a modified battle of sexes given in **Q. 2b**, Evaluate: (i) What are the mixed strategies employed by the boy and the girl at the Nash equilibrium? (ii) What are the payoffs to the boy and girl at the mixed strategy Nash equilibrium?	4	CO1
Q3	**Attempt any 2 parts of the following.**		
3a	Consider the following game table. Find the mixed strategy Nash Equilibrium of this game. What would be the expected payoff to both the players?	4	CO4

Player 1	Player 2		
	X	Y	Z
X	8, 6	0, 0	4, 2
Y	0, 0	6, 8	2, 2

3b	Define strictly dominated and weakly dominated strategies with appropriate examples. What is the key difference between them? Why is the elimination of dominated strategies required?	4	CO
3c	Consider the following 2-player game as below. Evaluate: (i) Strictly dominated action of player 1 (ii) Strictly dominated action of player 2 (iii) Evaluate the action pair that survived the iterated elimination of strictly dominated strategies.	4	CO

Player 1	Player 2		
	X	Y	Z
X	15, 5	0, 0	-5, 10
Y	0, 0	5, 15	0, 10

Q4	**Attempt any 2 parts of the following.**		
4a	Suppose there are 2 parties, L and R. In this case, the unique equilibrium is both parties choose position median voter position (*m*). Extending the same concept, suppose there is a continuum of voters, with favorite policies uniformly distributed on [0, 1], and the number of parties is 3 (L, C, R). Do we still have the equilibrium that all parties choose median voter position (m)? What would be the Nash Equilibrium in this case?	4	CO2
4b	Demonstrate and prove that Bidding truthfully is always a best choice under Vickery's Auction.	4	CO3
4c	Consider 2 players P_1 and P_2 in a first price sealed bid auction. P_1 and P_2 consider their valuation as V_1 and V_2, respectively where $V_1 > V_2$, Find the Nash Equilibrium of this game.	4	CO3
Q5	**Attempt any 2 parts of the following.**		
5a	Poker Bluff: Two players are in a card game. A card is dealt to player I and it is either an Ace or a Two. Player I knows the card but player II does not. Player I has the choice now of either Betting (B) or Folding (F). Player II, without knowing the card I has received, may either Call (C), Raise (R), or Fold (F). If player II raises, then player I may either Call (C), or Fold (F). The game is then over and the winner takes the pot. Initially the players ante $1 and each bet or raise adds another dollar to the pot. Construct the game tree for this game.	4	CO4
5b	Consider a version of a prisoner's dilemma game with matrix given by:	4	CO4

Player 1	Player 2	
	Q	C
Q	5,5	2,6
C	6,2	4,4

In simultaneous version move, the main feature of a prisoner's dilemma in that the players can each do better if they keep Quiet, but since they each have an incentive to confess they will end up at (C,C). Model this game with sequential choices, and solve it using backward induction.

5c	Consider the game in **Q.(5b).** What would be the Nash equilibrium of this game.	4	CO4

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B.Tech., V Semester, Computer Engineering, CSAI
END SEMESTER EXAMINATION December 2021

Course Code: COCSC17/CACSC17
Course Title: Machine Learning

Time: 3 Hours Max. Marks : 40

Note: - Attempt all the five questions. Missing data/ information if any, maybe suitably assumed and mentioned in the answer.

Q. No.	Question	Marks	CO
Q1	**Attempt any 2 parts of the following.**		
1a	Elaborate on the following ML tasks and their type, describe suitable performance metrics, and explain how the system can gain experience for learning: (i) a handwriting recognition system (ii) forecasing the network traffic (throughput in bps) during different times of a day.	4	CO1
1b	For the following training dataset, find the linear regression model parameters for Y=aX+b. Round the parameters to two decimal places. For the derived model, calculate R^2 and adjusted R^2.	4	CO1

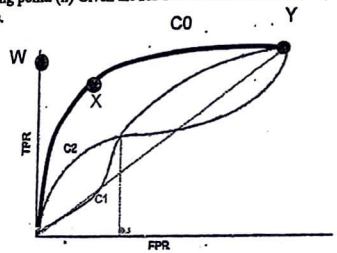
X:	1	2	3	4	5
Y:	4	5	7	10	13

1c	Distinguish between logistic regression as a discriminative classifier and Naïve Bayes as a generative classifier in terms of their probabilistic assumptions. Suppose you train a logistic regression classifier, and the learned hypothesis function is: $h_\theta(X) = \sigma(\theta_0 + \theta_1 X_1)$, where, $\theta_0 = 6$, $\theta_1 = -1$. Draw a graph to show the output probability. What is the log-odds when x=7?	4	CO2
Q2	**Attempt any 2 parts of the following.**		
2a	Consider the following set of training examples: (Age range in the dataset is 16 to 30 years)	4	CO3

Instance	Have Laptop	Age	Buy new laptop
1	T	16	Y
2	T	19	Y
3	T	18	N
4	F	27	N
5	F	24	Y
6	F	28	Y

Derive the Decision Tree (DT) for the above dataset showing information gain at each node split.

2b	Describe the working of the Random Forest Algorithm, explaining why aforest of stubs (collection of very small Trees) is preferred rather than a single Tree? How will the performance of the ensemble be affected if the attributes and the training examples are not distributed randomly?	4	CO3
2c	Explain how boosting can reduce both bias error and variance error. In an Adaboost ensemble, there are three DTs (1,2,3). They give the odds (probability of no-error / probability of error) as: $odds_1 = 1.6$, $odds_2 = 2.7$, $odds_3 = 0.5$. Their predictions for a given datapoint are: $\hat{y_1} = -1, \hat{y_2} = 1, \hat{y_3} = -1$. Calculate the final prediction of the ensemble.	4	CO3
Q3	**Attempt any 2 parts of the following.**		
3a	(i) Given the ROC curve C0 and the operating points W, X and Y, justify which of the three is the best operating point. (ii) Given the ROC curves for two classifiers C1 and C2, compare their performance.	4	CO2



3b	Given below are the test results of two classifiers developed to detect COVID patients. Derive their confusion matrices given that the threshold for output is at 0.6. Which of the two would a doctor use if she/he does not want to miss people with COVID, even if it means some normal people are diagnosed as COVID positive?	4	CO1

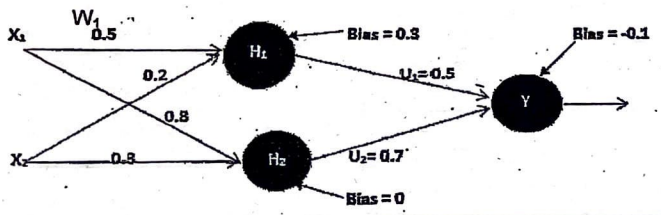
Prediction 1

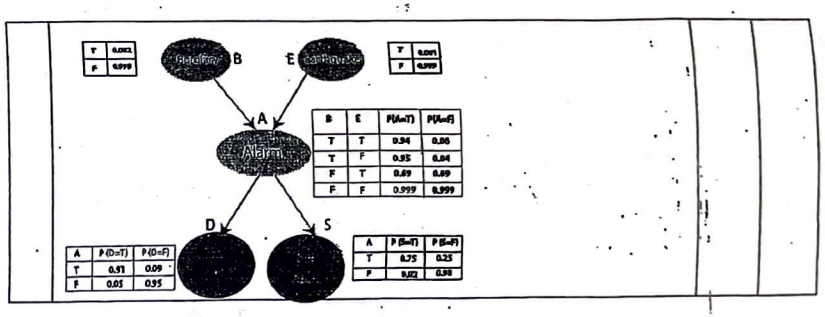
y	y pred
0	0.5
1	0.9
0	0.7
1	0.7
1	0.3
0	0.4
1	0.5

Prediction 2

y	y pred
0	0.6
1	0.9
0	0.7
1	0.7
1	0.3
0	0.8
1	0.5

3c	What is the purpose of performing cross validation. Given the dataset {(x,y)}: { (0.1,1)(0.4,1)(0.5,0) (0.4,0) (0.9,1) (0.3,0) (0.8,1) (0:8,0) (0.2,1) (0:6,1) (0.9,1) (0.2,0) (0.3,0) (0.6,1) (0.5,1) (0.7,0) }, construct the decomposition of runs using 4-fold cross validation. Calculate the overall accuracy if the predictions for the four cycles are: (1010), (1110), (0111), (0101).	4	CO1
Q4	**Attempt any 2 parts of the following.**		

4a	*Explain any two of the following:* *- Any one Recurrent Neural Network architecture and its application* *- Any one Long Short Term Memory network architecture, and its activation equations* *- Dropout Regularization in Convolutional Neural Networks*	4	CO1
4b	Given the MLP FNN below with sigmoid activations and training data, calculate the signal values at the input and output of each neuron, the error at the output and weight adjustment of U1 and W1 after a cycle of back-propagation. Training data = {X1= 0.2, X2=0.4, Y=0.6}  	4	CO3/5
4c	For a CNN architecture, explain the need for (i) stride >1, (ii) Maxpool layer, (iii) higher dropout rate at output classification layers, (iv) use of ReLU in inner feature learning layers.	4	CO5
Q5	**Attempt any 2 parts of the following.**		
5a	Classify a Red Domestic SUV using Naïve Bayes classification using the dataset given below:	4	CO4

Example No.	Color	Type	Origin	Stolen?
1	Red	Sports	Domestic	Yes
2	Red	Sports	Domestic	No
3	Red	Sports	Domestic	Yes
4	Yellow	Sports	Domestic	No
5	Yellow	Sports	Imported	Yes
6	Yellow	SUV	Imported	No
7	Yellow	SUV	Imported	Yes
8	Yellow	SUV	Domestic	No
9	Red	SUV	Imported	No
10	Red	Sports	Imported	Yes

5b	Derive the dual form of the optimized SVM, explaining its advantage over the original form. Explain how the "Kernel trick" handles non-linearly separable data.	4	CO3
5c	Given the Bayesian network shown in the Fig. below, calculate the probability that the alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and Hari received a call only from Dev, but not from Sita.	4	CO4