International Islamic University Chittagong

Department of Computer Science & Engineering

Final Examination, Spring 2018

Course Code: CSE-4705 Course Title: Artificial Intelligence

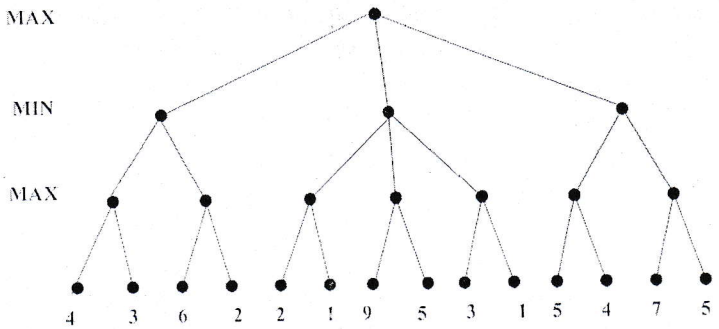
Total marks: *50* Time: *2* hours 30 Minutes

[Answer any *two* questions from Group-A and any *three* questions from Group-B; Separate answer script must be used for Group-A and Group-B]

Group-A

1.a) Describe the minimax search procedure. 3

b) Consider the following game tree in which static scores are all from the first player's point of view: 7



i) Suppose the first player is the maximizing player. What move should be chosen?

ii) In the game tree, what nodes would not need to be examined using the alpha-beta pruning procedure?

2.a) Briefly explain why FOL is considered as the generalization of PL. 3

b) Consider the following axioms: 7

1) Every child loves Santa.
2) Everyone who loves Santa loves any reindeer.
3) Rudolph is a reindeer, and Rudolph has a red nose.
4) Anything which has a red nose is weird or is a clown.
5) No reindeer is a clown.
6) Scrooge does not love anything which is weird.
7) (Conclusion) Scrooge is not a child.

A) Convert the above sentence into FOL.

B) Prove (7) by using resolution.

3. a) What is Natural Language Processing? What are the challenges of NLP? 2

b) Define Unification and lifting with appropriate example. 2

c) Define forward and backward chaining. 6

Consider the following sentence:

i) John likes all kind of food.
ii) Apples are food.
iii) Chicken is food.
iv) Anything anyone can eat and isn't killed by is food.
v) Bill eats Peanuts and is still alive.
vi) Rose eats everything bill eats

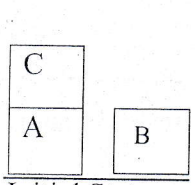
Prove that john like peanuts using forward and backward chaining.

Group-B

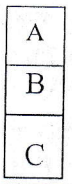
4.a) What is planning? Write the steps for formulation of planning? 3

b) What do you know about partial order planning? Explain it with an example. 3

c) Develop an effective and complete plan of the following block world problem using Partial-Order Planning/STRIPS approach from the initial state to goal state. 4

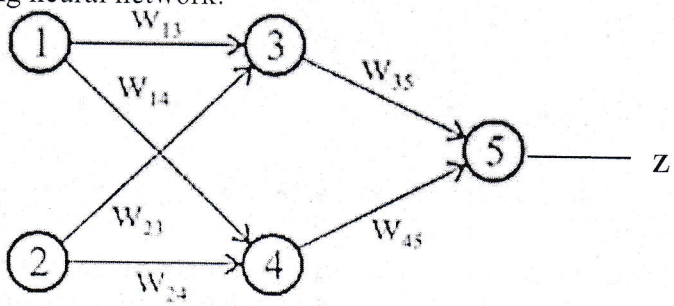


Initial State:
ON(C,A) ^
ONTABLE(A) ^
ONTABLE(B)
ARMEMPTY



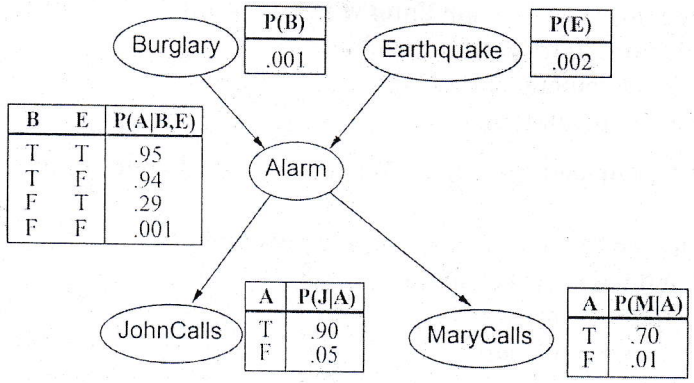
Goal State: ON(B,C) ^
ON(A,B) ^
ONTABLE(C)

5.a) What is Machine Learning? Write the application of machine learning. 2
b) Discuss supervised, semi supervised and unsupervised learning. 3
c) Review the following neural network: 5



Where 1=15, 2=8, $W_{1,3}$=0.5, $W_{1,4}$=0.3, $W_{2,3}$=0.2, $W_{2,4}$=0.4, $W_{3,5}$=0.5 $W_{4,5}$=0.4
i) Calculate Hidden node values
ii) Compute the value of Z Without transfer function

6.a) What is Bayes's theorem? 1.5
b) A doctor knows that the meningitis causes the patient to have a stiff neck 50% of the time. The doctor also knows some unconditional facts the prior probability that a patient has meningitis is 1/50,000 and the prior probability that any patient has a stiff neck is 1/20.Find the probability of patients with stiff neck to have Meningitis. 2.5
c) 6



In the above Bayesian network B, E, A, J, M stands for Burglary, Earthquake, Alarm, Johncalls and Marycalls respectively.
i) Express the joint distribution (B,E,A,J,M) in terms of conditional probabilities.
ii) Compute the probability of the event: the alarm sounds but neither Burglary nor earthquake took place and both John and Mary calls.
iii) Compute the probability of the event: the alarm sounds, a fire has occurred, an earthquake has not occurred and both John and Mary calls.

7.a) What is uncertainty? What are the different source of uncertainty? 3
b) Make a comparison on STRIPS and ADL language for representing planning problems. 3
c) Define forward and backward chaining? What are the factors that determine whether it is better to reason forward and backward? 4