

(8)

M. Tech.(Computer Engineering) II Semester
First Sessional Test 2018
INTELLIGENT SYSTEMS

MM:15 (4+6+5)

Time: 1 Hour

Q1: Translate the following statements into first order logic statements.

- i. Some students took French in spring 2001.
- ii. Every student who takes French passes it.
- iii. Only one student took Greek in spring 2001.
- iv. The best score in Greek is always higher than the best score in French.
- v. Every person who buys a policy is smart.
- vi. No person buys an expensive policy.
- vii. There is an agent who sells policies only to people who are not insured.
- viii. Every mammal has a parent.

OR

Q1': From "Horses are animals," it follows that "The head of horse is the head of an animal". Demonstrate that this inference is valid by carrying out the following steps:

- a) Translate the premises and the conclusion into the language of first order logic. Use three predicates; Headof(h,x), Horse(x) and Animal(x).
- b) Negate the conclusion and convert the premise and the negated conclusion into conjunctive normal form.
- c) Use resolution to show that the conclusion follows from the premise.

Q3: Translate the following statements into first order logic statements.

- i. There is a barber who shaves all men in town who do not shave themselves.
- ii. A person born in the UK, each of whose parents is a UK citizen or a UK resident, is a UK citizen by birth.
- iii. A person born outside the UK, one of whose parents is a UK citizen by birth, is a UK citizen by descent.
- iv. Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time.
- v. All Greeks speak the same language.

Q4: Suppose we are working with the following knowledge base

- 1 f(a).
- 2 f(b).
- 3 g(a).
- 4 g(b).
- 5 h(b).
- 6 $k(X) :- f(X), g(X), h(X).$

Suppose we then pose the query
k(Y)?

Draw the Proof Search Tree for the above query.

First Sessional Examination 2018

M.Tech(Computer Engineering)-Semester I- Parallel Computing

Max Marks-15

Time Allowed-one hour

Attempt all questions. All carry equal marks.

Q1. Consider the following reservation table for a four stage pipeline with a clock cycle of 20ns.

	1	2	3	4	5	6
S1	X					X
S2		X		X		
S3			X			
S4				X	X	

You are allowed to insert one non compute delay stage into this pipeline to make a latency of 1 permissible in the shortest greedy cycle. The purpose is to yield a new reservation table leading to an optimal latency equal to the lower bound.

- (i) find the modified reservation table
- (ii) Draw state transition diagram for scheduling the pipeline.
- (iii) find out all simple cycles and greedy cycle.
- (iv) Prove that the MAL equals the lower bound
- (v) What is the optimal throughput of this pipeline.

05

(5)

Q2. Consider the following

N= no. of instructions to be executed

M= No. of segments in pipeline

P= probability that a given instruction is a unconditional branch instruction

Q= probability that a given instruction is a conditional branch instruction

R= probability that a given conditional branch instruction will cause branching.

Calculate the followings

- (i) speedup
- (ii) throughput
- (iii) efficiency
- (iv) Average no. of Instructions executed per Instruction cycle.

(3)

04

02

Q3. Derive an expression for optimal number of stages in a pipeline.

(2)

02

Q4. Q2. Explain the data structures used in Tomasulo Algorithm

(1)

02

Q5. Q3 Explain the most advanced Tournament Branch Predictor used in Alpha 21264 ?

(2)

02

M.Tech (2nd Semester) Computer Engineering (2018)
DATA MINING & ANALYTICS SESSIONAL - 1

9

Time : 1 Hour

Max. Marks : 15 (4+4+2+5)

1. Most frequent pattern mining algorithms consider only distinct items in a transaction. However, multiple occurrences of an item in the same shopping basket, such as four cakes and three books, can be important in transactional data analysis. How can one mine frequent itemsets efficiently considering multiple occurrences of items? Propose modifications to the well-known algorithms, such as Apriori and FP-growth, to adapt to such a situation and generate frequent patterns based on decreasing support.
- ✓ Answer any 2 from the following.

2. i) Prove that all nonempty subsets of a frequent itemset must also be frequent.
 ii) Prove that the support of any nonempty subset s' of itemset s must be as great as the support of s .
 iii) Given two k -itemsets $X_s = \{x_1, \dots, x_{k-1}, x_k\}$ and $X_b = \{x_1, \dots, x_{k-1}, x_b\}$ that share the common $(k-1)$ -itemset $X = \{x_1, x_2, \dots, x_{k-1}\}$ as a prefix, prove that $\text{sup}(X_{ab}) = \text{sup}(X_s) - |d(X_{ab})|$ where $X_{ab} = X_s \cup X_b$ and $d(X_{ab})$ is the diffset of X_{ab} .
3. Give example from real world for the following
- ✓ i) Low confidence and low support ✓ ii) high confidence and low support
 ✓ iii) Low confidence and high support ✓ iv) high confidence and high support
4. Apply FP-Tree algorithm to generate frequent patterns from the following dataset given as (Transaction, Items) pairs. Assume minimum support of 2. Also mention the closed itemsets.

(T1, ABCD) (T2, ACDF) (T3, ACDEG) (T4, ABDF) (T5, BCG) (T6, DFG) (T7, ABG) (T8, CDFG)

d, a, c, g, b, f

A, B, C, D, E, F, G

$x \rightarrow y \quad \frac{\text{sup}(xy)}{\text{sup}(x)}$

M.Tech. Computer Engineering – IInd Semester, 2018

First Sessional Test

Subject: Mobile Computing

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

- | |
|---|
| 4 |
| X |
| |
- ✓ Q1. Explain the concept of mobile computing. Draw a block diagram of a cell phone and explain each 3 components.
- ✓ Q2. Explain the concept of free space propagation. If a 100 watt applied to a unit gain antenna with 4 600 MHz carrier frequency, find the received power in dBm at a free distance of 200 m from the antenna.
- ✓ Q3. A cellular service provider decides to use a GSM scheme which can tolerate a signal to interference 4 ratio of 15dB. Find the optimal value of N for
- i. Omnidirectional antenna 2
 - ii. three sectored antenna 3
 - iii. six sectored antenna 4
- ✓ Q4. Give a brief description of various stages of GSM. Also explain the concept of duplex distance. 4 Calculate the radio channels for GSM 900 and GSM 1800.

Dated: 09/03/18

1st Sessional Test
Soft Computing Techniques
M. Tech, Comp 2nd Sem, JMI

Max Marks: 15

- ✓ Q1) Using suitable examples, differentiate between the Hard Computing & Soft Computing paradigms. (3)
- ✓ Q2) Using a suitable diagram, explain the mathematical model of an artificial neuron? (3)
- ✓ Q3) Explain the various activation functions generally used in ANNs along with their description & graphs, and the description & graphs of their derivatives. (3)
- ✓ Q4) Implement a Hebb's Neuron for the NAND logic function. Show the final weights linearly separate the inputs (3)
- ✓ Q5) Construct a ADALINE network for the NOR logic function. (1½)

M.Tech. Computer Engineering – IInd Semester, 2018

Second Sessional Test

Subject: Mobile Computing

Time: 1 Hour

Max. Marks: 15

Note: Attempt all questions.

- Q1. Explain the concept of CDMA with its architecture block diagram.. Also give a list of channels used in CDMA. 4
- Q2. What is PN sequence generator in CDMA? Explain. If the CDMA demux received the code (-1, -1, -3, +1), find the bits sent by the different stations. 4
- Q3. What do you mean by Adhoc mobile network protocol? Explain and differentiate between AODV and DSR routing algorithm. 4
- Q4. What is mobile payment system? Explain its properties and security issues with suitable example. 3