Roll Number: 003

MCA SEMESTER IV/M.Sc. SEMESTER II - EXAMINATION 2018-19
Computer Applications/Computer Science

Paper No.: CS319-Compiler Design

Full Marks: 70

Time: 3 hours

Note: Question 1 is compulsory, attempt any four questions from the remaining five questions.

1. a) Specify the functionality of linker, loader, and compiler. 2
   b) What is an ambiguous grammar? Give an example. 2
   c) Write the regular expression that derive all the strings of a's and b's where the length is at most 3. 2
   d) What is a handle in bottom up parsing? 2
   e) Define Syntax Directed Translation. 2
   f) Compute the FIRST Set of the following grammar. 2
      $E \rightarrow T E' \quad E' \rightarrow +T E' \mid \in \quad T \rightarrow F T' \quad T' \rightarrow * F T' \mid \in \quad F \rightarrow (E) \mid id$
   g) What is symbol table? 2

2. a) Discuss the phases of a compiler indicating the inputs and outputs of each phase in translating the following statement: 8
      "amount = principle + rate * 36.0"
   b) What is LL(k) grammar? Check whether the following grammar is LL(1) or not? 6
      $E \rightarrow E+T, \quad T \rightarrow T*F/F, \quad F \rightarrow id/(E)$

3. a) Define a Parser. What is the role of grammar in Parser construction? Construct the predictive parsing table for the grammar G : 10
      $E \rightarrow E+T \mid T, \quad E \rightarrow T*F \mid F, \quad F \rightarrow (E) \mid id$
   b) Remove the left recursion from the following grammar. $S \rightarrow Aa \mid b \quad A \rightarrow Ac \mid Sd \mid \in$ 4

4. a) Discuss the working principle of LR parser. Also construct the LR parse table for the following grammar. 8
      $E \rightarrow E + T \mid T, \quad T \rightarrow T * F \mid F, \quad F \rightarrow (E) \mid id$
   b) Consider the grammar with the following translation rule and E is a start symbol. 6

E →	E1 # T	{E.Value = E1.Value * T.Value}
	T	{E.Value = T.Value}
T →	T1 & F	{T.Value = T1.Value + F.Value}
	F	{T.Value = F.Value}
F →	num	{F.Value = num.Value}

Compute E. Value for the root of the parse tree for the following expression :

2 # 3 & 5 # 6 & 4

5. a) What is L-attributed syntax directed definition? Give an example. 4

P.T.O.

b) Convert the following expression into three address code. $-a+b/c\uparrow d\uparrow e*f/g$ 4

c) Construct LL(1) parse table for the following expression grammar. Remove left recursion before constructing parse table if exists. 6

bexpr →bexpr or bterm | bterm
bterm →bterm and bfactor | bfactor
bfactor →not bfactor | (bexpr) | true | false

6 a) What do you mean by attributed grammars? Discuss the translation scheme for converting an infix expression to its equivalent postfix form. 8

b) Explain the following code optimization techniques with examples. 6
i) Constant propagation ii) Strength reduction ii) Code motion

REFN0018130

MCA Semester IV/ MSC Semester II Examination 2018-19

Computer Science

Paper: CS-303 T: Data Mining

Time: Three Hours **Full Marks: 70**

(Write your Roll No at the top immediately on the receipt of this question paper)

Note: Answer any five questions, including Question No 1 which is compulsory.

1. (a) Distinguish between data mining and data ware housing with examples. 4

   (b) Explain CRISP data mining with illustrations. 4

   (c) What do you mean by Probabilistic interpretation in data mining? Explain with an example. 4

   (d) Define Type I and Type II errors with suitable examples. 4

   (e) Define Precision and Recall with an example. 4

   (f) Discuss the Architecture of typical data mining system. 5

   (g) Distinguish Minkowski distance, Manhattan distance and Euclidian distance with their important properties. 5

2. (a) Define binary variables. Discuss the contingency table for binary data. 5

   (b) Explain dissimilarity function between binary variables with suitable examples. 5

3. (a) Define feature selection and extraction in data mining? Illustrate through an example. 4

   (b) Discuss any five pre-processing data mining algorithms with their important features. 6

4. (a) Explain data modelling with an example. Distinguish Two dimensional VS Multidimensional data modelling with suitable examples 6

   (b) Discuss market basket analysis and rule induction method with an example. 4

5. (a) Define KDD process. Draw the typical view of KDD process from Machine Learning and Statistics with illustrations. 5

   (b) Discuss the characteristics of data warehouses with example. 5

P.T.O.

(2)

6. Explain the following terms with suitable example: 2.5x

a. Loose coupling

b. No coupling

c. Semi tight coupling

d. Tight coupling

Roll No. _____

M.Sc. Semester II/ MCA Semester IV Examination 2018-19

Subject: *Computer science/Computer Applications*

Paper No.: *CS-307: Artificial Neural Networks*

Time: *Three hours* **Full Marks:** *70*

Note: *Question No. 1 is compulsory and attempt any four questions from the rest. All questions carry equal marks.*

1. a) Draw the structure of a typical biological neuron and explain its function. 4

   b) What is Learning Process in the context of neural networks? Explain Hebbian Learning. 4

   c) What is the role of bias unit in the function and performance of a Back-propagation neural network? 3

   d) Describe the Mc Culloch and Pitts model for Artificial Neuron. 3

2. a) Explain the architecture and the training of a two layer Perceptron. 7

   b) What is the chief functional limitation of a single layer Perceptron? and explain how it is overcome by a Multilayer Perceptron with an illustration 7

3. a) Describe the basic architecture of Backpropagation neural network and also mention the possible role of multiple hidden layers. 6

   b) Explain the forward step and backward step in the training of Backpropagation neural network through a simple illustrative example. 8

4. a) Explain the architecture of Fully Recurrent Neural Networks and how it can be trained using suitable illustration. 8

   b) Mathematically prove that a Hopfield network always converges to a stable state. 6

5. a) Mention few problems that can only be solved through Competitive learning networks and also discuss the competitive aspect of the network. 6

   b) Explain the architecture and training of Kohonen's self organizing network. 8

6. Write short notes on any two of the followings: 2 x 7 = 14

   a. Implementation of Associative Memory using Neural Networks

   b. Radial Basis Function network

   c. Steps involved in the Classification Problem Solving using ANN

MSc/Master of Computer Applications, 2019, March 09, 2019

Mid Semester

MCA Vth semester/ MSc IIIrd Semester

DATA MINING

Time : One Hour **Full Marks : 20**

1. Define data mining and data warehousing. Discuss the important applications of data mining and ware housing with illustrations. 10
2. (a) Distinguish OLAP and DBMS with illustrations.
   (b) Discuss any five data cleaning algorithms. 10

Department of Computer Science

Mid-Semester Test

CS-307: Artificial Neural Networks

Time: 1Hour Max. Marks: 20

1	Explain the Structure and function of a typical biological neuron.	3
2	Give a mathematical model of artificial neuron with necessary descriptions	3
3	What is the role bias unit? And explain its functionality with suitable diagram.	3
4	How the associative memory can be implemented with Hopfield networks	4
5	Provide the complete description about both the forward and the backward steps involve in the training of the Back-Error propagation Network	7