CBCS 51: Digital Image Processing Lab Exam

Date: Dec 17, 2018 **Duration: 3 hours**

Set 3

- Implement a histogram equalization function. If using Matlab, compare your implementation with Matlab's built-in function
- Implement a median filter. Add different levels and types of noise to an image and experiment with different sizes of support for the median filter. Compare your implementation with Matlab's.

16MCA047

CSCC53: Machine Learning and Soft Computing Lab Exam

Date: Dec 19, 2018 **Duration: 3 hours**

Set 2

1. Design a classifier for IRIS dataset using FFNN.

2. Apply Perceptron Learning Rule/error correcting learning for a single layer McCulloch-Pitts model to perform the following input-output mapping: Input= $A \vee (B \wedge C) = (A \vee B) \wedge (A \vee C)$

CBCS51: DIP and GPU Programming

Time: 1 Hour

Maximum Marks:15

- Attempt all questions.
- Use of Scientific Calculator is permitted.

Date: November 13, 2018

1. Explain the image Degradation/Restoration model. Explain the Noise Probability Density Functions and Filters associated with Noise-only Spatial Filtering of following Noise model: Gaussian Noise (5)
2. What is edge detection? How can it be achieved using frequency domain filtering? Explain, and write MATLAB program for the same. What is needed to be done for blurring an image using frequency domain filtering? (5)
3. Explain the importance of Bandpass filters in Noise Reduction using Frequency Domain Filtering. Why high and low pass filtering is not very suitable for Noise reduction? Write a complete MATLAB/Python program for band-pass filtering. (5)

MCA(SEM-V) EXAMINATIONS, 2018
MCA-53: Data Mining
Test-II

Time:1 Hour

Max Marks: 15

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt any Two questions in all.
- Use of calculator is allowed.

1. What are various clustering techniques? Explain desired Features for Large Databases.
2. What is Data Warehouse? Differentiate between Data Warehouse and. Operational DBMS. Explain Efficient Processing OLAP Queries
3. What is frequent itemset? Finding frequent itemsets from th following dataset T.

Dataset T minsup=0.5

TID	Items
T100	1, 3, 4
T200	2, 3, 5
T300	1, 2, 3, 5
T400	2, 5

- What is Rare Item Problem?

MCA (SEM-V) Minor IEXAMINATIONS, 2018

CBCS51: DIP and GPU Programming

Time: 1 HourMaximum Marks:15

Date: September 25, 2018

- Attempt all questions.
- Use of Scientific Calculator is permitted.

1. Define the following terms: 4-,8-, m-Adjacency, 4-, 8-Connectivity, Region, Boundary, Foreground, and Background. (3)
2. How relevant is the concept of probability in image processing?Write formulae to define the following: (2)
-probability $p(z_k)$, of intensity level z_k (belonging to 0, 1, 2, ..., L – 1)occurring in a given image
-mean intensity
-variance of intensities
3. Write a MATLAB/Python program to read a color image: (2)
-change it to grayscale
-resize an MXN image to M/2XN/2
-separate out Red, Green, and Blue plane of image and to print them in a 1 X 3 grid
-print the image by halving the intensity of green plane
4. Compare the following: Image enhancement in Spatial v/s Transform domain. (1)
5. Write a Python/Matlab program to prepare a smoothing filter of size 5X5 and use it to filter an input image. How the output image is different from input image? (3)
6. How is Fourier transform relevant in image processing?Write a MATLAB/Python program for image sharpening using Ideal/Box for high pass and low pass filtering. How the two output images are different from the input image? (4)

DEPARTMENT OF COMPUTER SCIENCE, Jamia Millia Islamia, New Delhi-25

M.C.A., V Semester, First Mid Semester Examination, September 24, 2018

CSCC54: Pattern Matching using Python Programming

Time: 50 Minutes **Max. Marks:** 15

Ques. No. 1. Answer the following objective questions in brief. **(7)**

(i) Python String is .....data type. (mutable/immutable)

(ii) What is the output of the following python scripts?

```
>>>str = "Jamia"    >>>del str[1]
```

(iii) What is the output of the following python scripts?

```
>>>import re
>>>searchObj = re.search(r'M.', 'Jamia Millia Islamia is a University')
>>>searchOnj.group()
```

(iv) What is the output of the following python scripts?

```
>>>import re    >>>re.sub(r'\D', "", 'Total Amount = Rs. 32.56')
```

(v) What is the python regular expression in escape sequence to match all decimal digits?

(vi) Write the all possible matches by the python pattern *r'ba{1,2}t'*.

(vii) What is the output of the following python script?

```
>>>"India"*2
```

Ques. No. 2. Define the literal with the help of three types of literals. **(4)**

Ques. No. 3. Write a python program to print each word of the text file 'C:\abc.txt' in separate lines. **(4)**

MCA(SEM-V) EXAMINATIONS, 2018
MCA-53: Data Mining
Test-1

Time:1 Hour

Max Marks: 15

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt any Two questions in all.
- Use of calculator is allowed.

1. What is a Data Mining Model? Explain Data Preprocessing.

2. (a) What is Supervised Learning? Explain **Data Reduction Strategies**

(b) How to Handling Redundancy in Data Integration?

Suppose that the data for analysis includes the attribute age. The Indian voter age values for the data tuples are (in increasing order) 12, 14, 17, 17, 19, 20, 20, 21, 22, 22, 25, 25, 26, 26, 30, 33, 33, 35, 35, 35, 36, 36, 42, 45, 47, 59, 65, 70. Use smoothing by bin means to smooth the above data, using a bin depth of 4. Illustrate your steps. Comment on the effect of this technique for the given data.

3 What is Naïve Bayesian Classification? Consider the following given example in tabular form.

Outlook	Temperature	Humidity	Windy	Class
sunny	hot	high	false	N
sunny	hot	high	true	N
overcast	hot	high	false	P
rain	mild	high	false	P
rain	cool	normal	false	P
rain	cool	normal	true	N
overcast	cool	normal	true	P
sunny	mild	high	false	N
sunny	cool	normal	false	P
rain	mild	normal	false	P
sunny	mild	normal	true	P
overcast	mild	high	true	P
overcast	hot	normal	false	P
rain	mild	high	true	N

This example classifying X an unseen sample X=(rain , cool, high, True), then find the following:

(i) $P(X|p)\cdot P(p)$

(ii) $P(X|n)\cdot P(n)$

In which class Sample X is classified.

Code: CSOC54

Roll No. 16MCA047

MCA (SEM-V) EXAMINATIONS – 2018

Pattern Matching using Python Programming

Time: 2 Hours **Max Marks: 75**

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions by selecting any TWO parts. All questions carry equal marks.*

1. (a) Define the literal of a programming language and discuss different types of python literals in brief.

   (b) Describe the *while* statement of Python. Write a python program to read a positive integer and reverse its digits.

   (c) What is the benefit of opening a file, in python, using *with* statement? Write a python program to read content of text file 'doc.txt' and print each word in a separate line.

2. (a) Differentiate single quote, double quote, and triple quote python strings with examples. Suppose `s="Ph:011-26113211"` be a python string. Write the outputs of following python scripts: (i) `>>>x.count('11', 5)`, and (ii) `>>>x.center(25, '*')`.

   (b) Describe the string formatting operator % in python with suitable example. Suppose that `sn=7`, `name="Mohammad Aman"`, and `age=21` are three python variables. Write a python script using string formatting operator % to get the string `"insert into person values(7, 'Mohammad Aman', 21)"`.

   (c) Describe the escape sequence metacharacter `\d`, `\D`, `\w`, and `\W` with suitable examples. Suppose `ph="PoneNo: 2004-959-559 # This is Phone Number"` is a Python string write Python script to get output `'2004959559'`.

3. (a) Define `Matrix` class in python with `constructor`, `read()`, and `print()` methods, and overload `*` operator for `scalar` as well as `matrix` multiplication operations i.e. it can perform the scalar multiplication operation `5 * A`, and matrix multiplication operation `A * B`, on matrix objects `A` and `B`.

   (b) What is `dictionary` data type in Python? Suppose `x="Jamia Millia Islamia is a central university"` is a Python string. Write a python program to get frequency of each character of the above string using `dictionary` data type.

   (c) Define `Person(id, Name, age)` class in Python with a constructor method and override the `str()` method. Thereafter, write a python program to read information of `n` persons in a list and sort it in ascending order of their age using list's `sort()` method.

4. (a) What is default argument in a python function? Define *greet(name, msg)* python function by assigning default values to both arguments and call them by passing different number of arguments.

   (b) Describe the variable length arguments in python function by defining *sum(...)* function such that we can pass different number of arguments to this function. For example, if `a =10, b=20, c=30`, then `sum(), sum(a), sum(a, b), sum(a, b, c)` return `0, 10, 30, 60` respectively.

   (c) Write the steps to define a Python module. Define a python module `string` with `strlen(s)` and `strcpy(s1, s2)` functions.

5. (a) Write a python program to create `student(Rn, Name, Class)` table in oracle and insert five records in it.

   (b) What is GET and POST method? Write python CGI that accept person name and age from a client and return adult or minor message based on age. Call this CGI using url by passing `name="Aisf Jmi"` and `age=19`.

   (c) Write client program (.html) and Python CGI (.py) for discount calculation. In client program, there should be a text filed to accept total cost of the items, two radio buttons for getting the gender of the customer, and a command button "Calculate Discount". The Python CGI accept inputs from client and calculate the 10% discount for female and 5% for male customers.

❖ ❖ ❖

Code: CSCC54

Roll No... 16MCA047

MCA (SEM-V) EXAMINATIONS – 2018

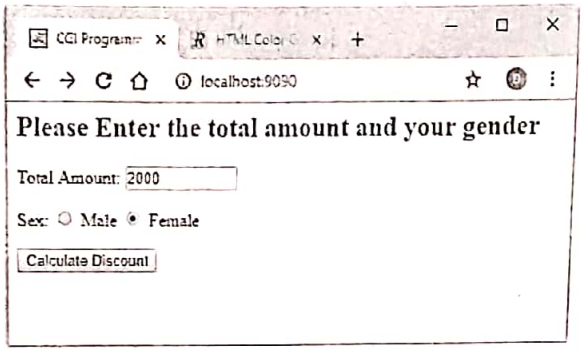
Pattern Matching using Python Programming (Lab)

Time: $1\frac{1}{2}$ **Hours**

Max Marks: 10

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Question one is compulsory. Attempt any one question from question no. 2-12.*

1. Write client program (.html) and Python CGI (.py) to calculate the discount on sale of items using rules that female customers purchased amount greater than or equal to 2000 discount is 10% and less than 2000 discount is 8% and for male customers the discount is only 7%. In client program, there should be a text field to accept total amount, two radio buttons "Male" and "Female" and a command button "Compute Discount" as shown below. The Python CGI accept inputs from client and compute the discount accordingly and return back the result as html codes to client.



OR

Define `Matrix` class in python with `constructor`, `read()`, `print()`, `inverse()`, and `determinant()` methods, and overload * operator for `scalar` as well as `matrix` multiplication operations i.e. it can perform the scalar multiplication operation `5 * A`, and matrix multiplication operation `A * B`, on matrix objects `A` and `B`. Also overload the `*=` operator in this class.

2. Write an efficient python program to print all prime numbers and their sum between 1 and n.
3. Write a python program that accept a text file and print all unique words and their frequencies.
4. Define a python class for complex number by overloading + and * operators.
5. Define `Person(id, Name, age)` class in Python with a constructor method and override the `str()` method. Thereafter, write a python program to read information of `n` persons in a list and sort it in ascending order of their age using list's `sort()` method.
6. Define sum() function using variable length arguments and call it with different number of arguments.
7. Write a python function that accepts a positive integer and return positive integer that is obtained by reversing its digits.
8. Write a python CGI and html client that accept weight and height of a person and return his/her BMI in kg/m^2.
9. Write a python program that remove all python comments from a python program file.
10. Write a python program that performs 'find and replace' operation in a text file.
11. Write a python program that create Student(RollNo primary key, Name, 40 > age > 18 , class in MCA/PGDCA) table in MySQL or oracle DBMS and insert five records then display them.
12. Write a python program to define stack class and implement the gcd() recursive function using stacks.

Set-1

M.C.A (Vth Semester), 2018

Semester Practical Examination

Time: 2 Hours

maximum Marks: 15

Instructions: (i) Attempt any two:

(ii)Each question carries equal marks.

1. Overview

You are to construct a decision tree for the given data set (tennis.arff – see course website) using the ID3 decision tree algorithm in the Weka toolset. The dependent variable for the tree is 'play'. Once you have constructed the tree use the tree and the data Weka provides about the tree to answer the questions below.

Questions

1. Does the tree adequately describe the data? Why? Why not?
2. Use the decision tree to figure out the value for the dependent variable for the following instance:

outlook	*temperature*	*humidity*	*windy*	*play*
rainy	hot	high	false	?

Justify your answer!

Instructions

- Start the Weka explorer.
- Load the tennis.arff file using the 'preprocess' tab.
- Switch tabs to 'classify' and select the ID3 algorithm with the 'choose' button (you will find ID3 under trees)
- Set the 'test options' to 'use training set'.
- Make sure that 'play' is the attribute that shows below the test options.
- Hit the 'start' button – the big pane should display information about the decision tree built.

2. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm http://storm.cis.fordham.edu/~gweiss/data-mining/weka-data/contact-lenses.arff

3. Demonstration of Association rule process on dataset segment-test.arff using apriori algorithm. http://storm.cis.fordham.edu/~gweiss/data-mining/weka-data/segment-test.arff)

e: CBSE52

Roll No. 16MCA047

MCA (SEM-V) EXAMINATIONS - 2018
Data Mining and Data Warehousing

Time: 2 Hours

Max Marks: 75

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt all questions. Each question carries equal marks. Attempt two parts out of three.*

1.

(a) What is Data preprocessing? Discuss Evolution of Database Technology.

(b) What is a Data Mining Model? Discuss Data Mining Techniques.

(c) What are various major tasks in Data preprocessing? Explain data transformation normalization with a suitable example.

2.

(a) What is a data warehouse? Differentiate between data warehouse and operational DBMS.

(b) What are various typical OLAP Operations? Discuss Data Warehouse Design Process.

(c) What is the need of a separate Data Warehouse? Discuss Efficient Data Cube Computation.

3.

(a) What is aassociation rule mining? Explain Rule strength measures.

(b) What do you mean by Apriori algorithm? Find frequent itemsets from the following database of Transaction.

TID	Items
T100	1, 3, 4
T200	2, 3, 5
T300	1, 2, 3, 5
T400	2, 5

(c) What are the Problems with the association mining? Explain Multiple minimum class supports. The 'database' below has four transactions. What association rules can be found in this set, if the minimum support (i.e coverage) is 60% and the minimum confidence (i.e. accuracy) is 80% ?

Trans_id	Itemlist
T1	{K, A, D, B}
T2	{D, A C, E, B}
T3	{C, A, B, E}

4.

(a) What is a Decision Tree? Explain Estimating a-posteriori probabilities.

(b) What is Naïve Bayesian classification? Consider the following given example in tabular form.

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
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

Draw decision tree by selecting humidity as root.

5. (c) What is independence hypothesis? Explain the problem of regression using example.

(a) What are various types of Clustering? Write an algorithm for agglomerative clustering.

(b) What is genetic algorithm? Use single and complete link agglomerative clustering to group the data described by the following distance matrix. Show the dendrograms.

	A	B	C	D
A	0	1	4	5
B		0	2	6
C			0	3
D				0

(c) What are desired Features for Large Databases? Compare various Clustering Techniques.

Code: CBCS51

Roll No. 16MCA047

M.C.A. (SEM V) EXAMINATIONS- 2018

Digital Image Processing and GPU Programming

Time: 2 Hours **Max Marks: 75**

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions by selecting any TWO parts. All questions carry equal marks.*

1. (a) Briefly explain different tasks of image processing: low-level, mid-level, and high-level

   (b) Explain the following color models with their usefulness: RGB, HSV, CMYK

   (c) Explain the following and give MATLAB/Python commands for the same:
   (i) Log transformation (ii) Contrast stretching (iii) Bit-plane slicing

2. (a) Explain the usefulness of discrete Fourier transform and inverse transform in image processing. Write MATLAB/Python program for Gaussian high pass filtering of an input image.

   (b) Explain the use of first and second order derivatives for image sharpening. Give an example of Laplacian filter. Use it for image sharpening.

   (c) Briefly explain the characteristics of the following noise probability density functions: Gauss, Salt and Pepper, also suggest at least two denoising filters for both of these models.

3. (a) For an image, define the following: 8- and m-connected regions, foreground, background with example.

   (b) What is thresholding in an image? Explain how it can be used for image segmentation.

   (c) Define the following: Edge-based segmentation, Region-based segmentation

4. (a) Explain run length coding scheme and its usefulness.

   (b) Explain the following terms with example in the context of image compression:
   (i) Relative Data Redundancy (RDR) and Coding redundancy, (ii) Spatial/Temopral redundancy, (ii) Irrelevant Information

   (c) What is Discrete Cosine Transform? How is it useful in Image Compression?

5. (a) Explain the steps needed for designing of an image classifier by choosing a suitable machine learning algorithm.

   (b) Briefly explain the following jargans: GoogleNet, AlexNet, Transfer Learning

   (c) Explain the use of K-means algorithm for color image segmentation.

Code:CSCC53

Roll No. 16MCA047

M.C.A. (SEMV) EXAMINATIONS- 2018

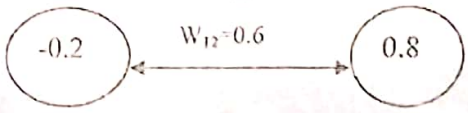
Machine Learning and Soft Computing

Time: 2 Hours **Max Marks: 75**

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions by selecting any TWO parts All questions carry equal marks.*

1. (a) Whether A.I. will everreach human like intelligence? Where is it lacking? Give one real life example demonstrating that the best A.I. programs can be unreliable when faced with situations that differ, even to a small degree, from what they have been trained on.
   (b) What is the need for evaluating a learning algorithm? Explain the following terms: Confusion matrix, ROC plot
   (c) What is machine learning? Compare and contrast: regression and classification

2. (a) Define Gradient descent rule. Derive a Gradient descent training rule for a single unit with output O, where $O = w_0 + x_1 w_1 + x_1 w_1^2 + \cdots \ldots \ldots x_n w_n + x_n w_n^2$
   Extend gradient descent rule for multi-layer network.
   (b) Train a McCulloch and Pitts model of neural network for learning PVQ logic gate function. Assume random initial weights as (W_0, W_1, W_2) = (-1, 1, 1) where W_0 is bias. Show training upto 6 steps only.
   (c) Consider the following Hopfield network (bipolar i.e. a unit signals output in 1 or -1) with 2 units only. Find all stable states or patterns of this network and also compute energy of stable and other states. Assume binary units. What you observe about energy of different configurations of this network.



3. (a) Define the following learning methods: Hebbian learning, Agglomerative clustering. Are these methods supervised?
   (b) Explain neighborhood for rectangular grid feature map with radius R=0, 1 and 2, Competition, Cooperation, and Adaptation for Self Organizing Map (SOM).
   (c) What is good clustering? Define internal and external measures for finding quality of clusters.

4. (a) Define Genetic Algorithm. Apply it for training of a feed-forward neural network.
   (b) Define the following: Order-based crossover, Roulette wheel selection, fitness function
   (c) Write a complete MATLAB program for solving any optimization problem using genetic algorithm.

5. (a) Define the following: Fuzzy Logic, Fuzzy inferencing mechanism. Briefly explain steps of designing a fuzzy logic-based system.
   (b) Consider the following fuzzy sets:

   Tall men = {0/165, 0/175, 0/180, 0.25/182, 0.5/185, 1/190}

   Short men = {1/160, 0.5/165, 0/170}

   Average men = {0/165, 1/175, 0.5/180, 0.25/182, 0/185, 0/190}

   Using fuzzy set operations, obtain the following fuzzy sets:

   i. very tall men

   ii. tall and average men

   iii. not very tall men and not very short men

   iv. not very very tall and not very very short men

   v. α-cuts of tall men for values of α=0.2 and 0.7

   (c) Define the following: degree of membership for Trapezoidal and Guassian, linguistic, Cardinality, Union, Intersection of fuzzy sets

MCA(SEM-V) EXAMINATIONS, 2019
CBAE52: Data Mining and Data Warehousing
Test-1

Time:1 Hour

Max Marks: 15

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt any Two questions in all.
- Use of calculator is allowed.

1. Why are people Use Data Mining Today?. Explain Evolution of Database Technology.

2. What is Knowledge Discovery Process? Discuss various Data Mining Techniques.

3. What are various Major Tasks in Data Preprocessing? Why is Data Preprocessing Important?
Suppose that the data for analysis includes the attribute age. The Indian voter age values for the data tuples are (in increasing order) 12, 14, 17, 17, 19, 20, 20, 21, 22, 22, 25, 25, 26, 26, 30, 33, 33, 35, 35, 35, 36, 36, 42, 45, 47, 59, 65, 70. Use smoothing by bin means to smooth the above data, using a bin depth of 4. Illustrate your steps. Comment on the effect of this technique for the given data.

4. What is *Spearman Rank Correlation Coefficient (r)*? In a study of the relationship between level education and income the following data was obtained. Find the relationship between them and comment.

Sample numbers	level education (X)	Income (Y)
A	Preparatory.	25
B	Primary.	10
C	University.	8
D	secondary	10
E	secondary	15
F	illiterate	50
G	University.	60

MCA(SEM-V) EXAMINATIONS, 2019
CBAE52: Data Mining and Data Warehousing
Test-2

Time:1 Hour

Max Marks: 15

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt any Two questions in all.
- Use of calculator is allowed.

1. What is Data Warehouse? Differentiate between OLTP and OLAP.

2. What do you mean by Efficient Data Cube Computation? Discuss Data Warehouse Design Process.

3. What is Association rule mining? Finding frequent itemsets from the Dataset T given below
minsup=0.5

TID	Items
T100	1, 3, 4
T200	2, 3, 5
T300	1, 2, 3, 5
T400	2, 5

Code: CSCC54

Roll No.....

MCA (SEMESTER- V) EXAMINATIONS - 2019
Pattern Matching Using Python Programming

Time: 2 Hours **Max Marks: 75**

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions by selecting any TWO parts. All questions carry equal marks.*

1. (a) Discuss the important features of python programming language in detail.

   (b) List out the rules of naming identifiers. Write a program to display sum of all numbers from 1 to 10.
   (i) By Using sum function,
   (ii) Without using sum function

   (c) Describe any five modes of opening a file. Write a program to show the use of file object attributes.

2. (a) What are regular expressions? List out different objectives for using regular expressions. Explain regular expression functions findall() and split() with suitable example of each.

   (b) (i) Write a program for generating five-digit numeric OTP (one-time password) and display it.
   (ii) Write a program to generate alpha-numeric OTP.

   (c) Describe the special sequence used in regular expressions \A, \b, \B, \d and \D with suitable examples. Suppose "Jamia Millia Islamia" is a given string, and then write a python program to get the output as ['ia', 'ia', 'ia'].

3. (a) Describe the term 'List' used in Python. How list can be accessed in python? Explain different functions which can be used for creating / updating /appending the list with suitable example of each respectively.

   (b) Describe the term 'tuple' used in Python. How new tuple can be created? Explain the creation of tuple with the existing tuples. Describe different built in tuple functions used in python. How it is different from the list?

   (c) Describe the term 'dictionary' used in Python. How new dictionary can be created? Describe different properties of dictionary. How it is different from tuple? Explain different built in dictionary functions.

4. (a) What is package in Python? How package is created and used in python? Explain with a suitable example.

   (b) Discuss different types of arguments in a function. Write in brief about anonymous functions.

   (c) What are modules? How will you create a module and use it in a python program. Explain with an example.

5. (a) What is the use of GET and POST method? Explain it with suitable example of each in detail.

   (b) Explain the term CGI in Python. Discuss various CGI environmental variables. Create a simple CGI script to demonstrate the use of CGI?

   (c) Explain the process of database connectivity in Python. Write a python program to create employee (empid, empname, designation) table in MYSQL and insert two records in it.

MCA (SEM-V) Minor IEXAMINATIONS, 2019

CSCC53: **Machine Learning and Soft Computing**

Time: 1 Hour Date: Sep 19, 2019 Maximum Marks:15

- Attempt all questions.
- Use of Scientific Calculator is permitted.

1. Consider the following two-dimensional data points:

X1	X2	class
1	1.5	C1
1	-1.5	C1
-2	2.5	C2
-2	-2.5	C2

(2)

Which machine learning model will be suitable for learning patterns from this dataset and why?

2. Define XOR gate problem in the context of artificial neural network. Solve XOR gate problem using a suitable model of artificial neural network. Choose values for random initial weights and biases as 1 only for all connections. Show calculation of weight updates for one iteration. (5)

3. Define the following terms. Regression, Classification, Reinforcement learning (3)

4. What is Hopfield network? Explain its significance. Draw energy transitions from one configuration (V1, V2, V3) = (0, 1, 1) for weights $W_{1,2}=0.5$, $W_{2,3}=1$, $W_{1,3}=1$, $\theta_1=0$, $\theta_2=0$, $\theta_3=-0.5$, calculate energy of each state for all states of transition diagram and find all stable states for this 3-unit network. (5)

MCA (SEM-V) Minor II EXAMINATIONS, 2019

CSCC53: **Machine Learning and Soft Computing**

Time: 1 HourMaximum Marks:15

- Attempt all questions.
- Use of Scientific Calculator is permitted.

Date: November 16, 2019

1. Why is it needed to evaluate Clustering algorithm? Explain a method for measuring clustering quality. (3)
2. Define the following terms: Hedges, Fuzzy Implication Rule, Fuzzy mapping Rule with 2 examples of each. (2)
3. Solve Travelling Salesman Problem using Genetic Algorithm. You will need to specify the following: Solution representation method, genetic operators, fitness function etc. (4)
4. Explain the architecture of Self Organizing Maps with the help of a diagram. Apply SOM model for clustering massive document collection into categories namely Sport News, Medical News, or (3)
5. Briefly explain the following machine learning jargons: Transfer Learning, Ensemble Learning (3)

DEPARTMENT OF COMPUTER SCIENCE

Jamia Millia Islamia

SESSIONAL TEST – I

(Odd Semester, 2019-20)

Programme: MCA (Semester – V) Course: CSEC55.6 (Principles of Prog. Lang

Duration: 1 hour Max. Marks: 15

Attempt ALL the following questions.

All questions carry equal marks. Restrict to the relevant answers only.

1. What is logic programming? Differentiate between imperative and functional programming languages with suitable example(s).
2. Briefly describe the three aspects of general theory of programming languages. What are different language design issues?
3. How is a grammar defined? Write CFGs for any two of the following languages:
   i. Strings ending with a 0
   ii. Strings containing even number of 1's
   iii. palindromes over {0, 1}

DEPARTMENT OF COMPUTER SCIENCE

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SESSIONAL TEST – II

(Odd Semester, 2019-20)

Programme: MCA (Semester – V) Course: CSEC55.6 (Principles of Prog. Lang.

Duration: 1 hour Max. Marks: 15

Attempt ALL the following questions.

All questions carry equal marks. Restrict to the relevant answers only.

1. What are Backus-Naur form (BNF), and extended BNF. Explain with example.
2. Write Grammar and transition rules for a hypothetical programming language (PL_0) that supports two data types: INTEGER and DOUBLE; blocks, expressions and single-arm if condition.
3. Define any TWO of the following terms:
   i. Programming language binding
   ii. Framework for operational semantic
   iii. Program equivalence

Code: CSEC55.06 Roll No.

MCA (SEM-V) EXAMINATIONS, 2019

Elective: Principles of Programming Languages

Time: 2 Hours Max Marks: 75

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions by selecting any TWO parts from each question. Each questions carry equal marks.*

1. (a) Describe the three aspects of general theory of programming languages (PLs). What are various language design issues?

(b) What is Abstract Syntax Tree (AST)? How would you classify languages by features? 4

(c) What do you understand by the pragmatics of a language? How is it different from syntax and semantics? 4

2. (a) How are grammar and language defined? Write context-free grammars (CFGs) for the following languages:

i. Strings starting with 1 and ending with 0.

ii. Palindromes over {0, 1}

(b) Define regular grammar, context-free grammar and context-sensitive grammar. Also explain the relationship among these grammars. 4

(c) What do you mean by ambiguity in a grammar? Explain with suitable example. What is parse forest? 4

3. (a) What is Backus-Naur Form (BNF)? What are the languages that uses BNF notation? Also explain extended BNF with example. 4

(b) What is program equivalence? Explain program equivalence with example(s). 2

(c) Define grammar for a language P_0, with the following main features. Make necessary assumptions, if required.

(i) Supports a single data type: INTEGER

(ii) Have control structures: Assignment, sequencing, bracketing, looping and one-arm conditions

4. (a) What is operational semantic? Explain the complete framework for operational semantic.

(b) Differentiate between reversible changes and irreversible changes in a PL. What are the advantages of transition systems?

(c) What do you mean by Binding in a PL? Briefly explain the pragmatic notions of binding. 2

5. (a) What do you mean by scope and extent? Discuss the meaning of scope and extent in different languages such as FORTRAN, COBOL, Pascal and Algol-60. 4

(b) What are the pros and cons of static and dynamic allocation of memory? Compare and contrast the static and dynamic allocation in FORTRAN and COBOL. 3

(c) What is λ calculus? Explain briefly. How is it useful in functional programming?

MCA (SEM-V) Minor IEXAMINATIONS, 2019

CBCS51: DIP and GPU Programming

Time: 1 HourMaximum Marks:15

- **Attempt all questions.** B = imresize(A, scale) Date: September 18, 2019

1. Suppose an image has to be enlarged two times. Explain how it can be achieved using intensity interpolation. Compare intensity interpolation using Inverse mapping v/s Forward mapping with respect to this zooming operation. (4)

2. Write a MATLAB program to read a color image and then display 3 channels in different sub frames in a big frame of size 1X3. Which color do you observe for 3 different images corresponding to red, green, and blue channels and why? (2)

3. Consider the two image subsets S_1 and S_2in figure 1, and shown in the following figure. (4)
(i) For V = {1} determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent,or (c) m-adjacent.
(ii) Also find connected components/regions, foreground, background, and boundaryin case of 8- and 4-adjacency.

	S1			S2	
0	0	1	0	1	0
0	0	0	1	1	0
0	1	1	0	1	0
1	0	0	1	0	1
0	1	1	0	1	0
1	0	0	0	0	0

4. Define the following set theoreticoperations with respect to image processing: (a) complement (b) union (c) intersection (2)

5. Define the following: (a) Median filter (b) Sobel filter (3)

Code: CBSE52

MCA (SEM-V) EXAMINATIONS - 2019
Data Mining and Data Warehousing

Time: 2 Hours

- *Write your Roll No. on the top immediately on receipt of the question paper.*
- *Attempt ALL questions selecting any TWO parts. Each question carries equal marks.*

1. (a) Why do we use data mining today? Discuss Evolution of Database Technology.

   (b) Explain Spearman Rank Correlation Coefficient (rs). In a study of the relationship between level education and income the following data was obtained. Find the relationship between them and comment.

Sample No	Education Level (X)	Income (Y)
A	Preparatory	25
B	Primary	10
C	University	8
D	Secondary	10
E	Secondary	15
F	Illiterate	50
G	University	60

   (c) Why is data dirty? How to Handle Noisy Data? Discuss Simple Discretization Method: Binning.

2. (a) What do you mean by Data Warehouse—Subject-Oriented? Differentiate between OLAP and OLTP.

   (b) Why Separate Data Warehouse? Discuss Efficient Data Cube Computation.

   (c) What is multitier architecture? Discuss Data Warehouse -Time Variant and Non-Volatile.

3. (a) What are support and confidence? Consider the following Transaction data.

t1:	Beef, Chicken, Milk
t2:	Beef, Cheese
t3:	Cheese, Boots
t4:	Beef, Chicken, Cheese
t5:	Beef, Chicken, Clothes, Cheese, Milk
t6:	Chicken, Clothes, Milk
t7:	Chicken, Milk, Clothes

   Find support and confidence of the following association rule

   (i) Clothes → Milk, Chicken

   (ii) Milk→Clothes, Chicken

   (iii) Cheese, Chicken →Beef

   (iv) Beef, Chicken →Clothes, Cheese, Milk

   (b) What do you mean by 1itemset, 2itemset and 3 itemset? Discuss Generating rules from frequent itemsets with suitable example.

   (c) What is Rare Item Problem? Discuss Multiple minsups model.

4. (a) What is Bayesian classification? Explain Estimating a-posteriori probabilities.

Code: CBCS51 Roll No.....

M.C.A. (SEM V) EXAMINATIONS- 2019

Digital Image Processing and GPU Programming

Time: 2 Hours **Max Marks: 75**

- Write your Roll No. on the top immediately on receipt of the question paper.
- Attempt ALL questions by selecting any TWO parts. All questions carry equal marks.
- Use of Scientific calculator is permitted.

1. (a) Briefly explain different types of image processing applications: Multispectral imaging, Hyperspectral imaging

   (b) Explain Lab color model with its usefulness. Also explain how color transformation takes place in the following models: RGB, HSV, CMYK

   (c) Explain the following and give MATLAB/Python commands for the same:
   (i) Thresholding (ii) Histogram Equalization

2. (a) Define periodic noise. Explain how Band-pass or Band-reject frequency domain filtering can help in denoising periodic noise. Write MATLAB/Python program for Band-reject Gaussian filtering of an input image.

   (b) Briefly explain the steps of image sharpening with Laplacian filter. Write MATLAB commands for the same.

   (c) Briefly explain the characteristics of the following noise probability density functions: Gauss, Salt and Pepper, also suggest at least two denoising filters for both of these models.

3. (a) For a 3-bit image shown below, find the following: 4-, 8- and m-connected regions, foreground, background, where intensity values of interest are V= {1, 2, 3}:

3	0	2	1	7
4	5	2	3	1
3	2	1	6	1
1	3	5	1	3
2	6	3	2	4

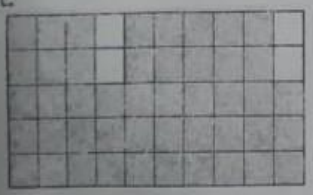
   (b) Define Sobel filter. Give one filter of size 3X3 for detecting the following: Horizontal lines, Vertical lines, 45 degree lines, 135 degree lines

   (c) Briefly explain one of the most common applications of 2-D interpolation in image processing.

4. (a) What is the usefulness of Information theory in image processing? Briefly explain different types of redundancy present in a digital image. Compare and contrast subjective v/s objective fidelity criteria.

   (b) What is Huffman coding? How is it helpful in image compression? Suppose an 8-bit image has only 7 intensity values [Z_1:Z_7] each with probability [0.31, 0.25, 0.125, 0.125, 0.064, 0.063, 0.063]. Calculate Huffman coding for this image also show how decoding can be done unambiguously. Calculate compression ratio (CR) and relative data redundancy (RDR) for your code against original 8-bit image.

   (c) Define the following: morphological erosion and dilation operation. Perform morphological opening and closing operations on the image (5X10) given below by 3X3 structuring element shown along with it:



5. (a) Suppose you have an image dataset corresponding to 3 variety of flowers. Each image in the dataset is of dimension 50X50. Design a feed-forward neural network to classify images of this dataset. Write learning rule which you will use to train your model.

   (b) What do you mean by pre-trained convolutional neural networks? Briefly explain with one example.

   (c) What is the need for color slicing? Explain a method to do color slicing.