[6073]-111

F.Y. M.Sc.

COMPUTER SCIENCE

CSUT-111 : Paradigm of Programming Languages

(2019 Pattern) (Semester - I)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1)   Question 1 is compulsory.

2)   Solve any five questions from Q.2 to Q.7.

3)   Question 2 to 7 carry equal marks.

Q1) **Attempt any FIVE of the following :**   **[5 × 2 = 10]**

a)   List any two functions of C pre-processor.

b)   Define stack dynamic array and heap dynamic array.

c)   What is memorization?

d)   What is frame pointer? What it is used for?

e)   What is coroutine? What is quasi concurrency?

f)   What is the difference between val and var in Scala? Explain with example.

Q2) **Attempt the following :**

a)   i)   What is enumeration types? Give design issues for enumeration types.   **[5]**

ii)   Name any two languages of category functional and object oriented.   **[2]**

b)   What is semaphore? Explain competition synchronization and cooperation synchronization.   **[5]**

P.T.O.

Q3) **Attempt the following :**

   a) i)   What is dangling reference? Explain the two solutions to dangling pointer problem. **[5]**

       ii)   Justify True/False: "Short- circuit evaluation can save time." **[2]**

   b) Explain the concept of initialization and finalization using a suitable code from C++. **[5]**

Q4) **Attempt the following :**

   a) i)   Explain pass by result and pass by value result parameter passing modes with proper pseudocode. **[5]**

       ii)   Define free union and discriminated union. **[2]**

   b) Write a Scala program to count uppercase letters in a string and convert it to lowercase and display new string. **[5]**

Q5) **Attempt the following :**

   a) i)   Write a Scala program to define a class Employee (id, name, salary). Define method accept () and display (). Display details of employee having maximum salary. **[5]**

       ii)   What is l-value and r-value? **[2]**

   b) Explain fragile base class problem with the help of suitable C++ code. **[5]**

Q6) **Attempt the following :**

   a) i)   List the types of inheritance. Explain shared multiple inheritance. **[5]**

       ii)   What is generic subroutine? Name one language which suppor it. **[2]**

   b) Write a Scala program to create a list using five different methods. **[5]**

Q7) **Write short note on any TWO of the following :**

   a) Three principal Storage allocation mechanism used by object. **[6]**

   b) Applicative and normal order evaluation of an expression. **[6]**

   c) SIMD and MIMD multiprocessor architecture. **[6]**

□□□

P2643

[6073]-112

M.Sc.-I (Computer Science)
CSUT-112 : DESIGN AND ANALYSIS OF ALGORITHM.
(2019 Pattern) (Semester - I)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
  1) Question 1 is compulsory.
  2) Solve any five questions from Q.2 to Q.7.
  3) Q.2 to Q.7 carry equal marks.

Q1) Solve any five of the following: **[10]**

  a)   Define big oh notation and show that $10n^2 + 8n + 4 = O(n^2)$

  b)   Write control abstraction for Divide and coquer strategy.

  c)   Find optimal MRT for storing 4 programs on a tape with lengths 12,18,8,10 respectively.

  d)   Define forward edge and cross edge.

  e)   Show that there is no solution for 3-queen's problem.

  f)   Differentiate between FIFOBB and LIFOBB.

Q2) Attempt all questions: **[12]**

  a)   Write an algorithm for insertion sorting method. and obtain its best and worst case time complerity.   **[7]**

  b)   Consider the following instance for 0-1 Knapsack problem. n=4, w=(2,4,3,5), P=(8,12,6,18) and m=10. Find maximum profit using Dynamic programming strategy's function method.   **[5]**

Q3) Attempt all questions;   **[12]**

a)   Explain merge sort algorithm and apply it on the following elements.

19, 7, 14, 12, 6, 2, 16, 13, 8   **[7]**

b)   A string X can be strnasformed into string Y by applying a sequence of edit operations such as insert, delete and interchange with associated costs of 1, 1 and 2 respectively. For X=ACCTA and Y=CATA find cost of transforming X to y.   **[5]**

Q4) Attempt all questions: **[12]**

a)   What do you mean by optimal merge pattern problem. Find an optimal binary merge pattern for 7 files whose lengths are 15, 2, 12, 28, 11, 5, 13   **[7]**

b)   Solve the TSP problem using dynamic programming method for the graph G given by adjacency matrix.   **[5]**

$$A = \begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 7 & 9 & 0 \end{bmatrix}$$

Q5) Attempt all questions: **[12]**

a)   Give recurrence relation to find minimum number of multiplications required to evaluate product of chain of matrices. and find best way to multiply a chain of matrices. with dimensions 5×4, 4×10, 10×2, 2×7 using Dynamic programming method.   **[7]**

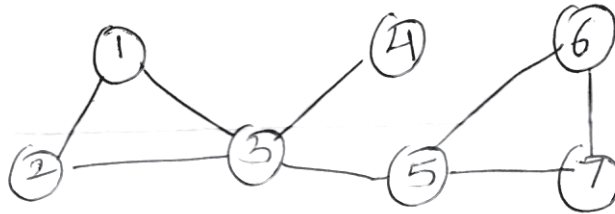b)   Consider the following instance for job sequencing with Deadlines problem where n=5, P= (20, 15, 10, 5, 1)

D=(2,2,1,3,3)

Find optimal solution using greedy method.   **[5]**

Q6) Attempt all questions: **[12]**

a) Define articulation point. Find all articution points from the following graph [Start vertese is 1] **[7]**

b) Sort the following elements using bubble sort: 10, 8, 19, 4, 7, 3 **[5]**

Q7) Attempt any two of the following: **[12]**

a) Define sum of subset problem. Find all the solutions for the following instance n=5, w={5,7,10,13,15} and m=30 [use fixed tuple size state space]

b) Obtain the reduced cost matrix for travelling sales person instance given by the cost matrix.

$$\begin{bmatrix} \infty & 10 & 12 & 9 \\ 7 & \infty & 4 & 3 \\ 9 & 4 & \infty & 3 \\ 11 & 10 & 5 & \infty \end{bmatrix}$$

Which node will be selected next in LCBB formulation of problem.

c) What is satisfiability problem? Check whether following formula is satisfiable or not?

$$X = (q \vee q) \wedge (\sim p \vee r) \wedge (\sim p \vee q)$$

● ● ●

[6073]-113

M.Sc. (Semester - I)

COMPUTER SCIENCE

CSUT - 113 : Database Technologies

(2019 Pattern)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1)   *Question 1 is compulsory.*

2)   *Solve any five questions from Q.2 to Q.7.*

3)   *Questions Q.2 to Q.7 carry equal marks.*

Q1) **Solve any five of the following :**   **[10]**

     a)   What is impedence mismatch?

     b)   Define an Integration Database.

     c)   Give names of any two key-value databases.

     d)   What is polygot programming?

     e)   What is session affinity?

     f)   What is vector stamp?

Q2) **Attempt all :**

     a)   i)   What is sharding?   **[2]**

          ii)   Explain advantages and disadvntages of sharding.   **[5]**

     b)   What is CAP Theorem? How it is applicable to NoSQL Systems?   **[5]**

Q3) **Attempt all :**

     a)   i)   What is quorum?   **[2]**

          ii)   Explain write quorum and read quorum in detail.   **[5]**

     b)   Write suitable use cases for document database.   **[5]**

Q4) **Attempt all :**

a) i) What is a super column family? **[2]**

ii) What are the features of column family databases? **[5]**

b) What is the syntax to create a collection and to drop a collection in mongoDB with suitable example? **[5]**

Q5) **Attempt all :**

a) i) What is Graph Database? **[2]**

ii) Mr. Kartik purchased a new smartphone of Samsung company from flipkart site on dt. 5th Jun. 2022 of cost 24,000/- with 5% cashback on credit card payment. The phone has features of 48 mp camera, 128 GB memory, 24 Hrs battery backup with 6.5 inch screen and 2 years of warrenty.

The same model of smartphone was also rated as best by his two friends Mr. Mayur and Mr. Shripad on 25th May 2022 and 2nd Jun 2022 respectively. It was also rated as best by his three relatives Mrs. Nikita, Mr. Mohan and Mr. Rahul on 28th, 29th and 30th May 2022 resp. Before to purchase this model, Mr. Kartik have searched other models with same features on the site. But, as the same model rated by his friends and relatives, he purchased the same model. In this case,

I) Identify the different tables, nodes, relationships and respective properties.

II) Draw a Graph model using the same.

[5]

b) What are advantages of event sourcing? **[5]**

Q6) **Attempt all :**

a) i)   What is Map Reduce?   **[2]**

    ii) Consider the following five records with keys id, class and marks.

         {"id" : 1, "class" : A, "marks" : 80}

         {"id" : 2, "class" : A, "marks" : 90}

         {"id" : 1, "class" : B, "marks" : 90}

         {"id" : 1, "class" : B, "marks" : 95}

         {"id" : 1, "class" : C, "marks" : 90}

         Write a map-reduce function to find the maximum marks in each
         class, using key 'class' and value will be 'marks'.   **[5]**

b) What is the difference between NoSQL and RDBMS?   **[5]**

Q7) **Attempt any two :**

a) Explain Master-slave Replication Technique in detail.   **[6]**

b) What is the use of SET clause in Neo4j database? Explain with suitable
    example.   **[6]**

c) What are the different points to be considered while choosing a database?
                                                                   [6]

▽ ▽ ▽ ▽

Total No. of Questions : 5]

SEAT No. : ☐

P-2645

[Total No. of Pages : 6

[6073]-114

M.Sc. (Computer Science)
CSDT-114A : CLOUD COMPUTING
(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

1) Question 1 is compulsory.

2) Solve any three questions from Q.2 to Q.5.

3) Question 2 to 5 carry equal marks.

Q1) **Solve Any Five of the following :**   **[5]**

    a)   Define the term cloud computing.

    b)   What is Cloud Infrastructure?

    c)   List out any two examples of SAAS providers.

    d)   Define cold migration.

    e)   Define private cloud.

    f)   List the different ways of IO virtualization.

Q2) **Attempt the following :**   **[10]**

    a)   i)   Discuss the characteristics of multitenant Application of cloud.

                                                 [2]

        ii)   Write a short note on public cloud and Hybrid Cloud.   **[4]**

    b)   Explain security issues in cloud computing.   **[4]**

Q3) **Attempt the following :**   **[10]**

    a)   i)   Explain in brief google cloud platform.   **[2]**

        ii)   Explain VM Provisioning Process.   **[4]**

    b)   Explain the steps for migrating application to cloud.   **[4]**

P.T.O.

Q4) **Attempt the following :** **[10]**

    a) i)   Write any 4 advantages of cloud computing. **[2]**

        ii) Define virtualization. Explain full & para virtualization. **[4]**

    b) Compare Google cloud, AWS and Azure. **[4]**

Q5) **Attempt any two of the following :** **[10]**

    a) Write a short note on : **[5]**

        i)   IAAS

        ii) PAAS

    b) Compare cloud computing and Grid Computing. **[5]**

    c) What are the seven security issues which one should discuss with cloud computing vendor, given by Gartner. **[5]**

□□□

P-2645

[6073]-114
M.Sc. (Computer Science)
CSDT-114 B : ARTIFICIAL INTELLIGENCE
(2019 Pattern) (Semester - I)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Question 1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5.*
3) *Question 2 to 5 carry equal marks.*

Q1) **Solve any Five of the following :**   **[5]**

    a)   Define Artificial Intelligence.

    b)   Write an advantages of DFS.

    c)   What are the various techniques of knowledge Representation in AI?

    d)   Define constraint satisfaction problem.

    e)   What is Machine Learning?

    f)   Define Production System.

Q2) **Attempt the following :**   **[10]**

    a)   i)   Write short note on Python Touples.   **[2]**

        ii)   Explain KNN algorithm with example.   **[4]**

    b)   Write an applications of machine learning.   **[4]**

Q3) **Attempt the following :**   **[10]**

    a)   i)   Write Applications of Python.   **[2]**

        ii)   State & Explain the algorithm to convert WFF to CNF.   **[4]**

    b)   Give the following equation :   **[4]**

       +   CROSS
            ROADS
            ————————
            DANGER

The aim is to assign each letter a unique integer in the range 0-9 so that the sum is correct. This problem can be defined as a Constraint Satisfaction Problem (CSP) in terms of Variables (V), Domains (D) & Constraint (C).

State the initial solution, initial constraints. Describe any one step of reducing the domain & creating additional constraints.

Q4) Attempt the following : [10]

a) i) Differentiate Heuristic function and Heuristic search. **[2]**

ii) Define forward and backward chaining. Differentiate between two. **[4]**

b) Convert following English sentence into PL (Propositional Logic). **[4]**

i) Ram Teaches math if and only if Ram does not teach CS.

ii) Ram loves Sita.

iii) Ram is tall.

iv) Tom is a math Teacher but not computer teacher.

v) If it is humid then it will run.

vi) It is hot and sunny.

Q5) Attempt any two of the following : [10]

a) What is Hill climbing? Explain its all types. **[5]**

b) What is clustering & association rule in unsupervised learning. Explain in brief. **[5]**

c) Differentiate propositional logic and predicate logic. **[5]**

□□□

P-2645

[6073]-114

M.Sc. (Computer Science)
CSDT-114 C : WEB SERVICES
(2019 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*
Instructions to the candidates:

　1) *Question 1 is compulsory.*

　2) *Solve any three questions from Q.2 to Q.5.*

　3) *Question 2 to 5 carry equal marks.*

Q1) **Solve any five of the following :** **[5]**

　a) What is Web Service?

　b) What is the purpose of <type> element of WSDL File?

　c) List any two Enquiry API's of UDDI Registry.

　d) List any two advantages of RESTful Web Service.

　e) What is Quality of Service (QoS)?

　f) List any two limitations of WSDL.

Q2) **Attempt the following :** **[10]**

　a) i) Explain Web Service Development life cycle. **[4]**

　　 ii) What is WSDL? Explain. **[2]**

　b) Explain the structure of SOAP message. **[4]**

Q3) **Attempt the following :** **[10]**

　a) i) What is UDDI? Explain UDDI Registries. **[4]**

　　 ii) What is the advantages and disadvantages of Soap? Explain. **[2]**

　b) Explain any Five key elements of RESTful Web Services. **[4]**

Q4) **Attempt the following :** **[10]**

    a)   i)   Explain the difference between Web Services and Web Applications. **[4]**

          ii)   What SOA? Explain. **[2]**

    b)   Explain publishing API of UDDI. **[4]**

Q5) **Attempt any two of the following :** **[10]**

    a)   Explain the basic steps of implementing web services. **[5]**

    b)   Explain searching and deleting information in a UDDI Registry. **[5]**

    c)   Explain description and discovery of RESTful Web Services. **[5]**

□□□

[6073]-211

F.Y. M.Sc. (Computer Science)
CSUT-121 : ADVANCED OPERATING SYSTEM
(2019 Pattern) (Semester-II)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:
1) *Q.1 is compulsory.*
2) *Solve any five questions from Q.2 to Q.7.*
3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following.   **[5×2=10]**
     a)   Explain any two operating system services.
     b)   What are the content of buffer header?
     c)   Explain vfork () sys call.
     d)   What are the different memory regions?
     e)   Explain alloca (), memcmp with syntax?
     f)   Define signal. Explain a system call used by a process waiting for signal, with syntax.

Q2) Attempt the following: **[12]**

     a)   i)   Describe algorithm for reading a file with sample program.   **[5]**
           ii)   What is program? Write a program to create new process to copy files.   **[2]**
     b)   Define interrupt. Write down sequence of operations in handling interrupt.   **[5]**

Q3) Attempt the following: **[12]**
     a)   i)   What happens if the Kernal issues a wakeup system call for all processes asleep on address 'A'?   **[4]**
           ii)   Write a program that will read data from one file and will copy into another file.   **[3]**
     b)   Explain steps involved in file creation.   **[5]**

Q4) Attempt the following: **[12]**

a) Explain the system call using which process sends signal to another process. Explain all its parameters with the possible vallues of parameters.Write a program to demonstrate use of system call. **[7]**

b) Explain getcwd () system call with its syntax and write a code segment to demonstrate its use. **[5]**

Q5) Attempt the following: **[12]**

a) i) Assume that the following two processes execute given code segment

Process P1

fd1 = open ("Sample. dat", O-RDONLY);

fd2 = dup (fd1);

fd3 = open ("data. dat", O-WRONLY);

Process P2

f1 = open ("trail.dat", O-RDONLY);

f2 = open ("trail.dat", O-WRONLY);

f3 = open ("data.dat", O-RDONY);

show how different data structures managed by file subsystem will be updated ofter execution of these statements. **[4]**

ii) Explain different ways in which process reacts to a signal **[3]**

b) What is race condition? Explain any one scenario in which race condition occurs. **[5]**

Q6) Attempt the following: **[12]**

a) i) Explain the system calls for acessing and setting file permissions with the syntax. **[4]**

ii) What is an orphan process? Write down the sequence of events that should occur for a process to become orphan. **[3]**

b) Which is the system call to create a child process? Explain with syntax. Explain how Kernal handles this system call. **[5]**

Q7) Attempt any two of the following: **[12]**

    a)   Explain any six system calls related to signals sets by specifying proper syntax. **[6]**

    b)   Explain demand paging memory management mechanism with the data structures used by it. **[6]**

    c)   Explain what happens when a process executes the following program. How does Kernal avoid deadlock on locked nodes? **[6]**

```
Main (argc, argv)

int argc;

char * argv [];

{
        execl (argv[0], argv[0], 0);

}
```

● ● ●

[6073]-212

M.Sc. (Computer Science)

CSUT 122 : MOBILE TECHNOLOGIES

(2019 Pattern) (Semester - II) (4 Credit) (CBCS)

Time : 3 Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1)   *Question 1 is compulsory.*

2)   *Solve any five questions from Q2 to Q7.*

3)   *Questions Q2 to Q7 carry equal marks.*

Q1) **Solve any five of the following :**   **[10]**

   a)   What is the purpose of Activity?

   b)   What is Intent?

   c)   Define Mobility?

   d)   List the languages used to build Android.

   e)   What is Android Virtual Device?

   f)   What is the purpose of phone Gap?

Q2) **Attempt all :**

   a)   i)   Explain Android Architecture.   **[5]**

        ii) What is Implicit intent?   **[2]**

   b)   Write a short note on broadcast receivers.   **[5]**

Q3) **Attempt all :**

   a)   Explain Activity life cycle with diagram and example.   **[7]**

   b)   Explain different features of swift programming.   **[5]**

Q4) **Attempt all :**

    a)   i)   Explain IOS Architecture in detail.   **[5]**

          ii)   What is mobile computing.   **[2]**

    b)   What is services? Explain service life cycle with diagram.   **[5]**

Q5) **Attempt all :**

    a)   i)   Explain Application life cycle of IOS with diagram.   **[5]**

          ii)   List different types of layouts used in Android.   **[2]**

    b)   Write a java android program to demonstrate switch button by implementing on click listener.   **[5]**

Q6) **Attempt all :**

    a)   i)   Explain phoneGap Applications.   **[5]**

          ii)   Which built in method is used to display zoom controls on Google maps?   **[2]**

    b)   Explain steps to create cordova project.   **[5]**

Q7) **Write short notes on any two of the following :**   **[12]**

    a)   Adapter concept in Android.

    b)   Asyn Task.

    c)   Mobile operating systems.

✗   ✗   ✗

P2648

[6073]-213

F.Y.M.Sc. (Computer Science)
CSUT-123 : Software Project Management
(2019 Pattern) (Semester - II)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
   1)   *Q.1 is compulsory.*
   2)   *Solve any Five questions from Q.2 to Q.7.*
   3)   *Questions 2 to 7 carry equal marks.*

Q1) Solve any five of the following :   **[10]**

    a)   List the tools and techniques used in Quality Control.

    b)   Define statistical sampling in Quality management.

    c)   List the phases of project life cycle.

    d)   List the contents of risk register.

    e)   State the purpose of statement of work.

    f)   Define productivity in software metric.

Q2) a)   Explain organizational structure in project management.   **[7]**

    b)   How project plan can be developed? Explain.   **[5]**

Q3) a)   Explain types of complexity used in software measurement.   **[7]**

    b)   A project size of 200 K LOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project.   **[5]**

Q4) a)   Explain scope verification and control in Scope management.   **[7]**

    b)   What do you mean by WBS and solve WBS case study for college Admission System?   **[5]**

Q5) a) What is CCB? Explain overall change control process with a neat diagram.

[7]

b) Define project churter. Design project charter for hotel management system.

[5]

Q6) a) List different software quality models. Explain ISO standard quality modes in detail. **[7]**

b) Explain Solicitation planning in detail. **[5]**

Q7) Write short notes on any two of the following : **[12]**

a) Risk Management.

b) Resource measurement.

c) Staff acquisition.

✦ ✦ ✦ ✦

[6073]-214
M.Sc. -I
COMPUTER SCIENCE
CSDT-124B : Human Computer Interaction
(2019 Pattern) (Semester - II)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:
1) *Q. 1 is compulsory.*
2) *Solve any three questions from Q.No.2 to Q.No.5.*
3) *Question 2 to Q.5 carry equal marks.*

Q1) Solve any Five of the following.   **[5]**

a)   What is HCI?

b)   Define Moore's law.

c)   What are the elements of design model?

d)   Who are stackholders?

e)   Differentiate Dragged object versus drop target.

f)   What is meant by multi-level tools?

Q2) Attempt following   **[10]**

a)   i)   Who are the actors in drag & drop?   **[2]**

      ii)   What is the purpose of drag & drop?   **[4]**

b)   What are the advantages of prototyping model?   **[4]**

Q3) Attempt following: **[10]**

a)   i)   What are the activities in the waterfall model of the software life cycle?   **[2]**

      ii)   Explain in detail about waterfall model of software development life cycle.   **[4]**

b)   Write note on WIMP interface. List it's elements.   **[4]**

Q4) Attempt following: **[10]**

    a)   i)   Write short notes on **[2]**

              1)   Application context

              2)   Utility context

        ii)   list out types of design rules **[4]**

    b)   Write a note on toggle selection. **[4]**

Q5) Attempt any two of the following: **[10]**

    a)   Explain in detail about the standards, guidelines & golden rules for interactive system design? **[5]**

    b)   What are overlays? Types of overlays? **[5]**

    c)   What is Hill-Climbing? Explain with example. **[5]**

● ● ●

P2649

[6073]-214
M.Sc.-I
COMPUTER SCIENCE
CSDT-124C : Soft Computing
(2019 Pattern) (Semester - II)

Time : 2 Hours] [*Max. Marks : 35*
Instructions to the candidates:
1) *Questions1 is compulsory.*
2) *Solve any three questions from Q.2 to Q.5*
3) *Q.No. 2 to Q.5 carry equal marks.*

Q1) Solve any five of the following: **[5]**

  a)   State two advantages of Genetic Algorithm.

  b)   Define core of a membership function.

  c)   What is fuzzy equivalence relation?

  d)   Define convex set and convex full.

  e)   List down different types of neural network architecture.

  f)   Find $A^C \cap B$ for the following two fuzzy set A&B

$$\underset{\sim}{A}\left\{\frac{0.1}{0}+\frac{0.5}{1}+\frac{1}{2}+\frac{0.6}{3}+\frac{0.2}{4}\right\}$$

$$\underset{\sim}{B}\left\{\frac{0.2}{0}+\frac{0.5}{1}+\frac{0.8}{2}+\frac{0.3}{3}+\frac{0.1}{4}\right\}$$

Q2) Attempt the following: **[10]**

  a)   What do you meant by error correction & gradient rule. **[2]**

  b)   Explain the following terminologies of GA **[4]**

   i)   Individual

   ii)   Genes

   iii)   Alleles.

   iv)   Population

  c)   What is defuzzification? Explain methods of defuzzification. **[4]**

Q3) Attempt the following: **[10]**

   a)   Explain Inference & Intuition membership value assignment methods.**[2]**

   b)   Using genetic algorithm maximize $f(x)=x^2+1$ with the initial values of (12,25,5,19)   **[4]**

   c)   Define artificial neural network? Explain its different components?   **[4]**

Q4) Attempt the following: **[10]**

   a)   Obatain the output of neuron y for the network shown in the following figure using activation function as :   **[2]**
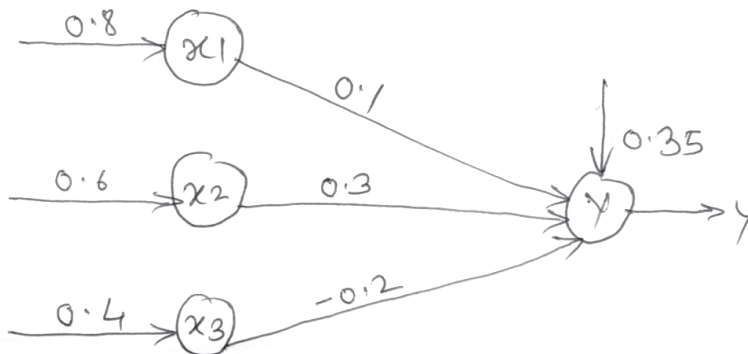
   b)   Consider fuzzy sets.   **[4]**

$$A=\left\{\frac{0.1}{a}+\frac{0.5}{b}+\frac{0.2}{c}\right\} B=\left\{\frac{0}{d}+\frac{0.5}{e}+\frac{0.3}{f}\right\} C=\left\{\frac{0.1}{g}+\frac{0.6}{h}+\frac{1}{i}\right\}$$

Find the following:

i)   R=A×B

ii)   S=B×C

iii)   T=RoS using max-min composition.

   c)   Explain any two neuron signal functions.   **[4]**

Q5) Attempt any two of the following: [10]

    a)   Explain mutation and crossover operators of genetic algorithm with example. [5]

    b)   Consider the fuzzy matrix relation R. [5]

$$R = \begin{bmatrix} 1 & 0.8 & 0 & 0.2 & 0.5 \\ 0.8 & 1 & 0.5 & 0 & 0.2 \\ 0 & 0.5 & 1 & 0.6 & 0 \\ 0.2 & 0 & 0.6 & 1 & 0.5 \\ 0.5 & 0.2 & 0 & 0.5 & 1 \end{bmatrix}$$

Determine the λ-cut relations of the following λ values on R. $\lambda_1, \lambda_{0.5}, \lambda_{0.8}, \lambda_{0.3}, \lambda_{0.6}$

    c)   Explain importance properties of TLNs. [5]

●   ●   ●

[6073]-311

S.Y. M.Sc.

COMPUTER SCIENCE

CSUT-231 : Software Architecture and Design Patterns
(Revised 2019 Pattern) (Semester - III) (CBCS) (Credit - 4)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

1) Question 1 is compulsory.

2) Solve any five questions from Q.2 to Q.7.

3) Questions 2 to 7 carry equal marks.

Q1) **Attempt any FIVE of the following :** **[10]**

a) Give the factors for describing design pattern.

b) What is mean by Intent in design pattern?

c) Enlist Behavioural Patterns.

d) Draw structure of facade design pattern.

e) Define UML.

f) What is implicit invocation?

Q2) **Attempt All :**

a) Explain Low Coupling GRASP. **[7]**

b) Write a short note on component and Connector Structure (C&C). **[5]**

Q3) **Attempt All :**

a) What do you mean Adapter design Pattern? When it is used? **[7]**

b) Write a short note on pipes and filters architecture style. **[5]**

P.T.O.

Q4) **Attempt all :**

a) Describe intent and applicability of Command design pattern.   **[7]**

b) Explain participants and structure of State design pattern.   **[5]**

Q5) **Attempt all :**

a) i) Explain iterator design Pattern (Intent, Structure, Participants).

   [4]

   ii) Explain the following :   **[3]**

      A) Dependency

      B) Association

      C) Generalization

b) Differentiate in between service oriented architecture (SOA) and micro services architecture.   **[5]**

Q6) **Attempt all :**

a) i) Explain Process Unified Process / Rational Unified Process. **[4]**

   ii) Enlist Advantages of Spring.   **[3]**

b) Enlist some useful Allocation structure. Explain any two.   **[5]**

Q7) **Write short notes on any two of the following :**   **[12]**

a) Blackboard Model.

b) Spring framework Architecture.

c) High Cohesion.

□□□

[6073]-312

S.Y.M.Sc.(Computer Science)
CSUT 232 : MACHINE LEARNING
(2019 Pattern) (Semester - III)

Time : 3 Hours]   *[Max. Marks : 70*
Instructions to the candidates:
    1)   *Question 1 is compulsory.*
    2)   *Solve any 5 questions from Q.no.2 to Q.no.7.*
    3)   *Q.2 to Q.7 carry equal marks.*
    4)   *Figures to right indicate full marks.*

Q1) Attempt any five of the following.   **[10]**

    a)   Explain the types of learners in classification.

    b)   What is reinforcement learning?

    c)   Explain the term support vectors.

    d)   Write an applications of Association Rule.

    e)   What is dendrogram?

    f)   Define bias and variance.

    g)   What is Fl-score

Q2) Attempt the following:

    a)   What is machine learning? Explain various types of machine learning models.   **[7]**

    b)   Explain important elements of reinforcement learning.   **[5]**

Q3) Attempt the following:

    a)   Explain K-means clustering.   **[7]**

    b)   Explain Naïve Bayes classifier in detail.   **[5]**

Q4) Attempt the following:

    a)   Explain Decision Tree algorithm in Detail.   **[7]**

    b)   Explain various activation functions.   **[5]**

Q5) Attempt the following:

    a)   Differentiate Supervised/Unsupervised Learning and Reinforcement Learning.   **[7]**

    b)   Explain components of ANN.   **[5]**

Q6) Attempt the following:

    a)   Find frequent itemset using Apriori Algorithm with min_sup=3.   **[7]**

Transaction ID	Itemset
T1	A,B,C,D
T2	A,B,C
T3	A,B,D
T4	C,D,E,
T5	A,D,E

    b)   Describe machine learning system cycle and design cycle in detail.   **[5]**

Q7) Write short notes on any two of the following: **[2×6=12]**

    a)   Random forest algorithm?

    b)   What is dummy variable trap? What are the solutions to dummy variable trap?

    c)   How to handle missing values?

[6073]-313

M.Sc. (Computer Science)

CSUT233 : WEB FRAMEWORKS

(2019 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates :

    1)   *Q1 is compulsory*

    2)   *Solve any FIVE from Q2 to Q7 of the following*

    3)   *Q2 to Q7 carry equal marks*

    4)   *Neat diagram must be drawn wherever necessary*

    5)   *Figure on the right indicate full marks*

Q1) Solve any 5 of the following. **[5×2=10]**

    a)   Explain event loop in Nodejs.

    b)   Explain callbacks in Nodejs

    c)   Create a simple webserver using nodejs

    d)   Explain the use of 'migrate' command in Django?

    e)   What is the usage of Django-admin.py and manage.py?

    f)   What is NPM?

Q2) a)   What architecture does Django use? explain it in detail. **[7]**

    b)   What is callback hell in Nodejs, explain with example and how can you avoid it? **[5]**

Q3) a)   Create a node.js file that Select all records from the 'customers' table, and display the result object on console. **[7]**

    b)   What are the different data types present in JavaScript? **[5]**

Q4) a)   Which core files of Django Framework are used to develop any web application? Explain in detail. **[7]**

    b)   Create a Node.js file that will convert the output "Hello!" into upper-case letters **[5]**

Q5) a) What is REST? Explain functions used in REST. [7]

b) Write a node on nodejs modules. [5]

Q6) a) What are streams in Nodejs. [7]

b) Explain Async Await with promises in Nodejs. [5]

Q7) Answer any two of the following. [12]

a) Explain any three methods of the EventEmitter class.

b) Write a note on Mongoose 0DM

c) Which files are created by default when a Django project is started? Explain each one in brief

○○○○

[6073]-314

M.Sc.

COMPUTER SCIENCE

CSDT-234A : Big Data Analytics

(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]   *[Max. Marks : 35*

Instructions to the candidates:

   1)   *All questions are compulsory.*

   2)   *Figures to the right indicate full marks.*

   3)   *Assume suitable data if necessary.*

Q1) **Attempt any Eight of the following :**   **[8 × 1 = 8]**

   a)   What are the challenges of big data?

   b)   Why do we need Hadoop for Big Data Analytics?

   c)   Define term- replication.

   d)   What is Sharding?

   e)   Define Big Data Analytics.

   f)   Why do we need Apache Pig?

   g)   What is the purpose of the JPS command in Hadoop?

   h)   State time window slicing.

   l)   Differentiate between CRISP-DM and SEMMA methodology.

   j)   Explain the concepts of Data Acquisition.

Q2) **Attempt any Four of the following :** [4 × 2 = 8]

a) Justify True/False: The concept of a multi-node database architecture, requires manual partitioning of data in identical schemas across nodes.

b) Write any four features of HDFS.

c) Discuss the concept of Big data warehousing?

d) Give the diagrammatic representation of the CRISP-DM Life cycle model.

e) Enlist four features of IMDG architecture.

Q3) **Attempt any Two of the following :** [2 × 4 = 8]

a) Discuss various sources of big data.

b) Explain implications of Big Data scale on data processing.

c) Describe various data integration patterns.

Q4) **Attempt any Two of the following :** [2 × 4 = 8]

a) Describe the structure of HDFS in a Hadoop ecosystem using a diagram.

b) Explain different steps to extract value from big data.

c) Illustrate the different stages of SEMMA methodology.

Q5) **Attempt any One of the following :** [1 × 3 = 3]

a) Explain 3V's or characteristics of Big Data.

b) Compare Apache Pig and Map Reduce.

c) Show Map Reduce implementation for multiplication of two matrices using pseudocode.

⌘⌘⌘

P-2654

[6073]-315

S.Y. M.Sc.

COMPUTER SCIENCE

CSDT-234 B : Web Analytics

(2019 Pattern) (CBCS) (Semester - III)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

1)   All questions are compulsory.

2)   Figures to the right indicate full marks.

3)   Assume suitable data if necessary.

Q1) Attempt any **Eight** of the following :   **[8 × 1 = 8]**

a)   What is A/B testing

b)   What is session?

c)   Define Bounce rate.

d)   What is difference between Clicks and Visits?

e)   Describe in short Roll up reporting?

f)   Define the term Competitive Intelligence

g)   What is cohort in Google analytics?

h)   Define the term Funnel.

i)   List the types of custom reports in Google analytics.

j)   What is Google Website Optimizer?

Q2) Attempt any **Four** of the following :   **[4 × 2 = 8]**

a)   What are surveys? Explain Post Visit Surveys.

b)   Write a note on Parsing of Text Analytics

P.T.O.

c) What is ISP (Network) Data?

d) Explain the Data Privacy issues

e) What is the Exit Rate?

f) What is Actional Reporting? How to prepare it?

Q3) Attempt any **Two** of the following : [2 × 4 = 8]

a) What is Acquisition Analysis?

b) What do you understand by KPI in google analytics?

c) Write a short note on Mobile analytics.

Q4) Attempt any **Two** of the following : [2 × 4 = 8]

a) Explain the Web Analytics Frameworks in detail

b) What are Site visits? Write benefits of Site Visits.

c) What is Text Analysis? Explain the 4 phases of Text Analysis

Q5) Attempt any **One** of the following : [1 × 3 = 3]

a) What do you understand by heuristic evaluation? How do you measure heuristic evaluation?

b) Explain in brief Website traffic analysis.

c) What is sentiment analysis? Explain with an example.

▢▢▢