Total No. of Questions : 8]

SEAT No. : ____

P2831

[Total No. of Pages : 4

[4837] - 1001
M.Sc (Semester - I)
COMPUTER SCIENCE
CS - 101: Principles of Programming Languages
(2013 Pattern)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates :-

1) ***Figures to the right indicate full marks.***
2) ***Neat Diagrams must be drawn whenever necessary.***
3) ***Attempt any five questions.***
4) ***All questions carry equal marks.***
5) ***Assume Suitable data, if necessary.***

Q1) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) Explain the different types of data objects with regards to object lifetime. Give an example of each.

b) Describe three different search strategies that might be employed in the implementation of a case statement.

c) Name two languages in which a program can write new pieces of itself "on the fly".

Q2) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) Define fixed stack-dynamic, stack-dynamic, fixed heap-dynamic and heap-dynamic arrays. What are advantages of each?

b) How do inner classes in Java differ from most other nested classes?

c) What is the difference between a compiler and a preprocessor?

P.T.O.

Q3) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) Describe the lazy and eager approaches to reclaiming garbage.

b) Consider the following statements:

i) Marcus was a man.

ii) Marcus was a Pompeian.

iii) All Pompeian were roman.

iv) Caesar was a ruler.

v) All Romans hated all rulers.

vi) Marcus tried to assassinate Caesar.

Write a Prolog program to prove "Marcus hates Caeser".

c) Why it is useful to specify initial value?

Q4) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) Compare the efficiency of deep-access method to that of the shallow-access method, in terms of both calls and nonlocal accesses.

b) If foo is an abstract class in C++ program, why is it acceptable to declare variable of type foo*, but not of type foo?

c) Define boxing and unboxing in Java.

Q5) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) Explain the difference between initialization and assignment in C++.

b) Explain the competition synchronization with the help of suitable example.

c) Why Prolog variables are type less?

Q6) Attempt ALL of the following. **[4 + 4 + 2 = 10]**

a) What is semaphore? What are the disadvantages of semaphore in Cooperation Synchronization and In Competition Synchronization.

b) Explain tombstone and lock-and-key method of avoiding dangling pointers.

c) What are design issues for unions?

Q7) Attempt ALL of the following. **[5 + 5 = 10]**

a) Write a LISP function LeftRotate to rotate given list in left direction by N elements.

E.g. List = (A B C D E) then

(LeftRotate List, 2) should give output as (C D E A B).

b) Consider the following code:

```
X: integer: = 1
Y: integer: = 2
Procedure add
    X: = X + Y
Procedure second (p: procedure)
    X : Integer: = 2
    P ( )
Procedure first
    Y: integer = 3
    Second (add);
/*Start of main*/
first ( )
write_integer (X)
```

What does this program prints with if the language uses dynamic scoping with:

i) Deep binding

ii) Shallow binding

Q8) Attempt ALL of the following. **[5 + 5 = 10]**

a) Write a Prolog program that accepts single character from user. Accept the character from user till user enters "y". (Use fail and cut predicate).

b) Consider the following program written in C syntax:

```
void swap(int a, int b)

    { int temp;                    temp=a; a=b; b=temp; }

     void main ()

{ int value=2, list [5] = {1, 3, 5, 7, 9};

swap (value, list [0]); swap (list[0], list [1]); swap (value, list[value]);

}
```

For each of the following parameter-passing methods, what are all of the values of the variables "value" and "list" after each of the 3 calls to swap?

i) Passed by reference

ii) Passed by value-result

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Total No. of Questions: 8]

SEAT No. :

P2832

[Total No. of Pages : 3

[4837] - 1002
M.Sc. (Computer Science) (Semester - I)
CS - 102: Advanced Networking
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidate:

1) ***Attempt any five questions from given eight questions.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***All questions carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Assume suitable data if necessary.***

Q1) a) What is the role of rapeater in star topology? Differentiate Bridge and Router. What would be the transformation of the following message using 'Rail Fence Technique' and 'Simple Columnar Transposition Technique'? **[4]**

b) Message: YOU MUST WIN THE GAME **[4]**

While transforming a message using Simple Columnar Transposition, use a rectangle of 5 columns and the random order of columns is 4,1,3,2,5.

c) What is the importance of Database Description Message packet in OSPF routing protocol? **[2]**

Q2) a) Discuss various transition strategies from IPv4 to IPv6. **[4]**

b) "Key Transformation step in DES symmetric key algorithm is also called 'Compression Permutation'." -Comment. **[4]**

c) List out four parties involved in Authentication Protocol used in real life system. Explain each one in brief. **[2]**

P

P.T.O.

Q3) a) Explain how Certificate-based authentication works? "Certificate-based authentication is a stronger mechanism as compared to a password based authentication mechanism." -Comment. **[4]**

b) Write a note on Clark's solution to silly Window Syndrome that degrades the TCP performance. **[4]**

c) What is electronic money? How it is classified based on the tracking of money? **[2]**

Q4) a) Compare and contrast SSL vs. SET. **[4]**

b) Explain the stepwise verification process of a digital certificate. **[4]**

c) Explain how the buffer size problem is tackled in Transport Layer? **[2]**

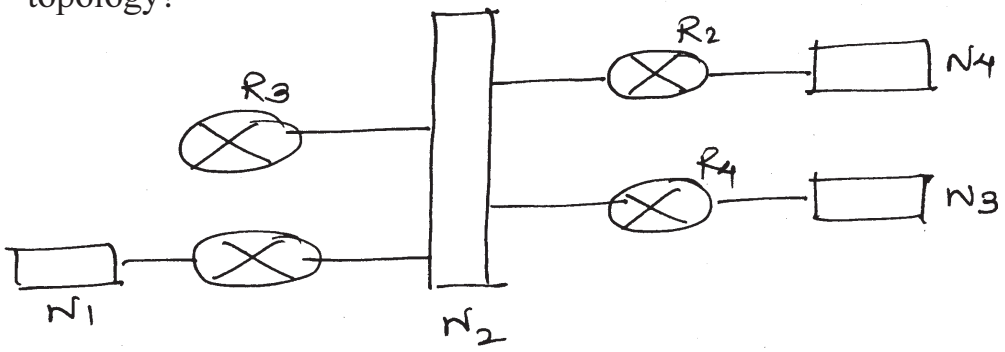
Q5) a) Why TCP is not suitable for interactive multimedia traffic? Which transport layer protocols are used to manage interactive traffic instead? **[4]**

b) Give two prime numbers P = 19 and Q = 7, find out N, E and D in RSA encryption process. **[4]**

c) Why options are made part of IPv4 datagram header? Explain in brief, how a record route option is different from strict source route option? **[2]**

Q6) a) What do you mean by denial of Service and Masquerade attacks? Are these attacks active or passive? Justify your answer. **[4]**

b) In the given network topology, find out which router(s) sends out Router Link LSA and which router sends out Network Link LSAs in a given topology? **[4]**



c) Compare and contrast packet filters and application gateways in brief. **[2]**

Q7) a) Consider the following routing table for router R1. **[5]**

Mask	Network Address	Next-Hop Address	Interface
/27	202.14.17.224	---	m1
/26	145.23.12.192	---	m3
/24	145.23.12.0	---	m0
Default	Default	130.56.12.4	m2

i) Show the forwarding process if a packet arrives at R1 with destination address 145.23.12.204

ii) Show the forwarding process if a packet arrives at R1 with destination address 221.45.14.78.

b) Explain in detail how the email communication is secured using PGP protocol? **[5]**

Q8) a) What is electronic money? State its classification and explain the double spending problem in short. **[5]**

b) Discuss two-army problem and explain how it resembles to connection release issue in transport layer. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2833

[Total No. of Pages : 4

[4837] - 1003

M.Sc (Computer Science) (Semester - I)

DISTRIBUTED DATABASE CONCEPTS

(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates :-

1) ***Attempt any 5 out of 8 questions.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***

Q1) Answer the following. **[10]**

a) Define a Distributed Database. State the promises made by a DDBSs. **[4]**

b) With a neat diagram, write a short note on the Layers of Query processing. **[4]**

c) State the three components of a query optimizer. **[2]**

Q2) Answer the following. **[10]**

a) What are the three dimensions based on which the DDB architecture is defined? Explain in brief the concept of distribution, in defining DDB architecture. **[4]**

b) Consider the following relation Person (Person_no, pname, pcity, age). Perform a horizontal fragmentation of Person with respect to the following predicates:
P1 : age <40; P2 : age> = 40.
Further consider the relation Dependents (dependent_no,Person_no, name). Perform a derived fragmentation of Dependents with respect to the Person relation.
Draw the join graph of Person ∞ Dependents and state its type. **[4]**

c) State the formal definition of a transaction, as a partial ordering of its operations. **[2]**

Q3) Answer the following. **[10]**

a) Define the following terms with an eg: **[4]**
   i) A simple predicate
   ii) A hybrid fragmentation

b) Consider the following query
Select C.Cust_name from Customer C, Account A where C.cust_no = A.cust_no and C.age> 50 and A.account_no>10;

P.T.O.

Apply the centralized Ingres algorithm and optimize the above query. **[4]**

c) Draw a query tree for the following query

Select C.cust_name, A.balance from Customer C, Account A where C.cust_no = A.cust_no and C.age between 40 and 50 or A.balance > 100000; **[2]**

Q4) Answer the following. **[10]**

a) Consider the following Query

Select Emp_name from Employee E, Project P, Assign a where P.pname = 'ERP' and E.eno = A.eno and P.pno - A.pno;

Assume

→ EMP has an index on ENO,

→ ASG has an index on PNO,

→ PROJ has an index on PNO and an index on PNAME

Apply System R optimization algorithm and determine the best join ordering for Employee ∞ Assign ∞ Project **[4]**

b) Write a short note on Strict Replica control Protocols. **[4]**

c) Define with an eg, A Hybrid fragmentation. **[2]**

Q5) Answer the following. **[10]**

a) Given the following relations:

Account(AccountNumber, ClientNumber, Balance)

Client(ClientNumber, Name, Birthdate, Branch)

i) Formulate a query (in SQL and relational algebra) that asks for account holders affiliated with branches in Saarbrucken and Berlin, who overdraw their accounts (balance <=0). Draw the operator tree corresponding to the relational algebra expression.

ii) Extract the selection predicate from the query and transform it into the conjunctivee normal form and into the disjunctive normal form **[4]**

b) Write a Short note on the Termination protocols for 2PC. **[4]**

c) Define the term Heterogeneity and state its dimensions. **[2]**

Q6) Answer the following. **[10]**

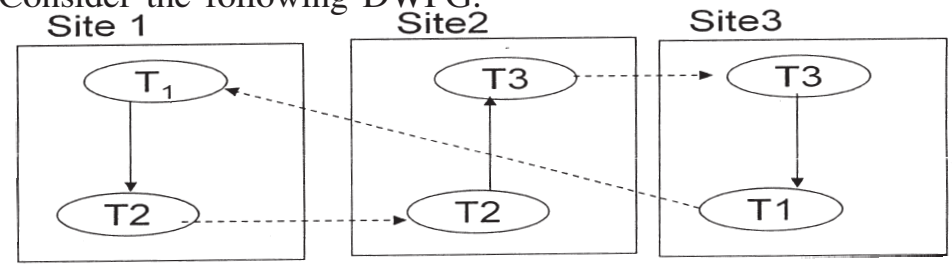
a) Consider the following:

Data items x and y are stored at site 1, z and w are stored at site 2. Determine whether the following executions are serializable or not. Find all possible total orders of transactions for serializable schedules.

i) Execution 1:
S1:Ri(x)Rj(x)Wj(y)Wi(x)
S2:Ri(w)Rj(z)Wj(w)Wi(w)

ii) Execution 2:
S1:Ri(y)Rj(x)Wj(x)
S2:Wi(z)Ri(w)Rj(w)Wi(w) **[4]**

b) Consider the following DWFG: **[4]**



Apply the distributed deadlock detection algorithm and indentify a global deadlock, if it exists,

c) Consider the following Query: **[2]**

Select stud.sname, sub.sbname,ss.marks from student s, subject sub, student_subject ss Where s.sno = ss.sno and ss.sbno = sub.sbno and (ss. marks > 45 or sub.sbno < 5);

Draw the Query graph and join graph for the above query.

Q7) Answer the following. **[10]**

a) Consider the following query to obtain the salaries of engineers who work on the ERP project? **[5]**

$\pi_{SAL}(PAY \infty EMP \infty ENO(ASG \infty PNO(\sigma_{PNAME="ERP"}(PROJ))))$

Schemas:

EMP(ENO,ENAME,TITLE), ASG(ENO,PNO,RESP,DUR), PROJ(PNO,PNAME,BUDGET,LOC),PAY(TITLE,SAL)

Assumptions:

Size of relations is defined as their cardinality

Minimize total cost

Transmission cost between two sites is 1

Ignore local processing cost

size(EMP∞PAY) = 8, size(PROJ∞ASG)=2, size(ASG∞EMP)=10

Statistics

Relation	Size	Site
Emp	8	1
Pay	4	2
Proj	1	3
Asg	10	4

Apply the Hill Climbing optimization algorithm and determine the best join ordering along with the processing site/s for the join of the above relations.

b) Consider a data item x. Let RTM(x)=21 and WTM(x)=20. Let the pair (Pi(x) TS) denote a prewrite request of transaction Ti on the item x with timestamp TS. Indicate the behavior of the timestamp method with 2-phase commitment if the following sequence of requests is received. **[5]**

(P1(x),22), (P2(x), 26), (R3(x),19), (R4(x),23) (W1(x),22), (R5(x),24)(P6(x),18),(R7(x),37),(w2(x),26)

Q8) Answer the following. **[10]**

a) Given the following fragmentation of relation **[5]**

Supplier (SNo, SName, code, city) which splits the relation in internal and external Suppliers:

supplier 1: $\sigma_{code = 'internal'}$(supplier), supplier2:$\sigma_{code= 'external'}$(supplier)

i) Fragment relation items(itemNo, itemName, SNo, price) into two relations by separating attribute itemName. The obtained relation with all the other attributes is to be fragmented into cheap (<=10 EUR) and expensive (>10EUR) items. The expensive items shall once again be partitioned into those bought by internal and those supplied by external suppliers. Provide the relational algebra expressions necessary to partition relation items.

ii) Indicate which kind of fragmentation is used.

iii) Draw the join graph and decide on the goodness of the obtained fragmentation.

b) Define the following terms: **[5]**

i) Fix / Flush

ii) No-Fis / Flush

iii) Fix / No-Flush

iv) No-Fix / No-Flush

v) A checkpoint in a database log

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Total No. of Questions: 8]

SEAT No. :

P2834

[Total No. of Pages : 4

[4837] - 1004
M.Sc. (Computer Science) (Semester - I)
CS-104-Design & Analysis of Algorithm
(2013 Pattern)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn Wherever necessary.***

Q1) a) Write count sort algorithm & obtain its best case & worst case running time. **[4]**

b) Explain string editing problem. Give the recurrence relation for the value of the optimal solution when the problem is to be solved using dynamic programming. **[4]**

c) What are the limitations of Merge-sort? **[2]**

Q2) a) Given a sorted array of n numbers containing all but one of integers in the range 1 through n+1.Devise a divide and conquer based algorithm that determines the missing number. Derive the time complexity required for this algorithm. **[4]**

b) Consider the following instance for job sequencing with deadlines problem where n=7 **[4]**

$(p_1, p_2 ... p_7)=(6,13,20,15,6,8,33)$

$(d_1, d_2 ... d_7)=(2,1,4,3,2,1,2)$

Give solution obtained using greedy method that uses set representation.

c) Explain Ω notations. **[2]**

P.T.O.

Q3) a) Find an optimal solution to the knapsack problem instance n=5 ,m=12 p=(10,15,6,8,4) w=(4,6,3,4,2) using greedy strategy. **[4]**

b) Write a non-deterministic algorithm to solve knapsack problem. **[4]**

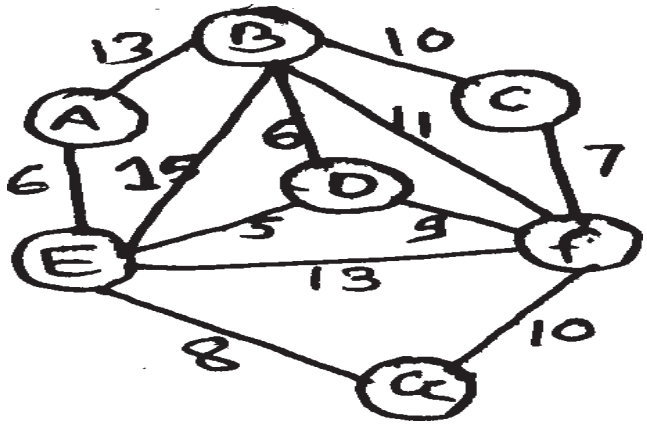
c) Why bounding function are useful in the context of branch and bound. **[2]**

Q4) a) Draw the portion of the state space tree generated by LCBB for 0/1 knapsack problem instance given by n=4 ,m=15 ,p=(10,10,12,18) w=(2,4,6,9). **[4]**

b) Sort the following array of elements by quick sort 5,5,8,3,4,3,2. **[4]**

c) Explain AVL Trees. **[2]**

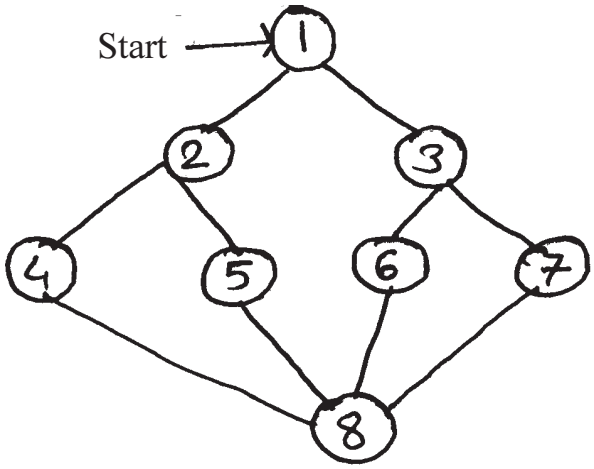
Q5) a) What is minimum spanning tree? Using prims algorithm. Find the minimum spanning tree of following graph G. **[4]**



b) Determine the polynomial of smallest degree that interpolate the point (0,5),(1,10) and (2,20). **[4]**

c) Show that there is no solution for 3 queen problem. **[2]**

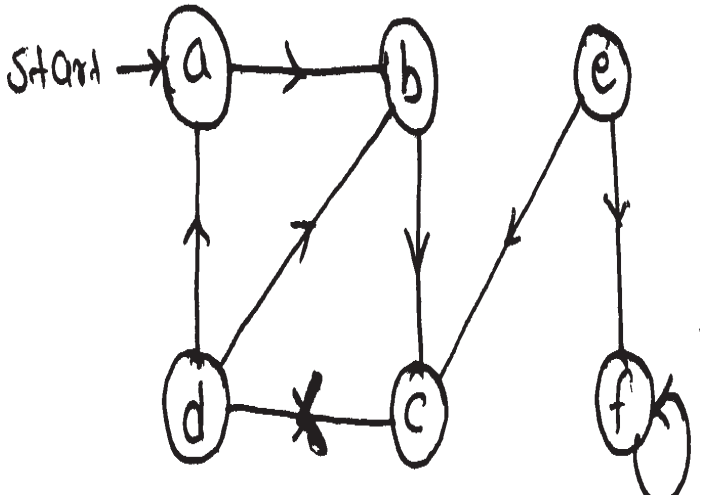
Q6) a) Draw the DFS & BFS spanning tree for the following graph. **[4]**



b) Explain asymptotic notation and Define space complexity? **[4]**

c) Explain Optimal Merge Patterns? **[2]**

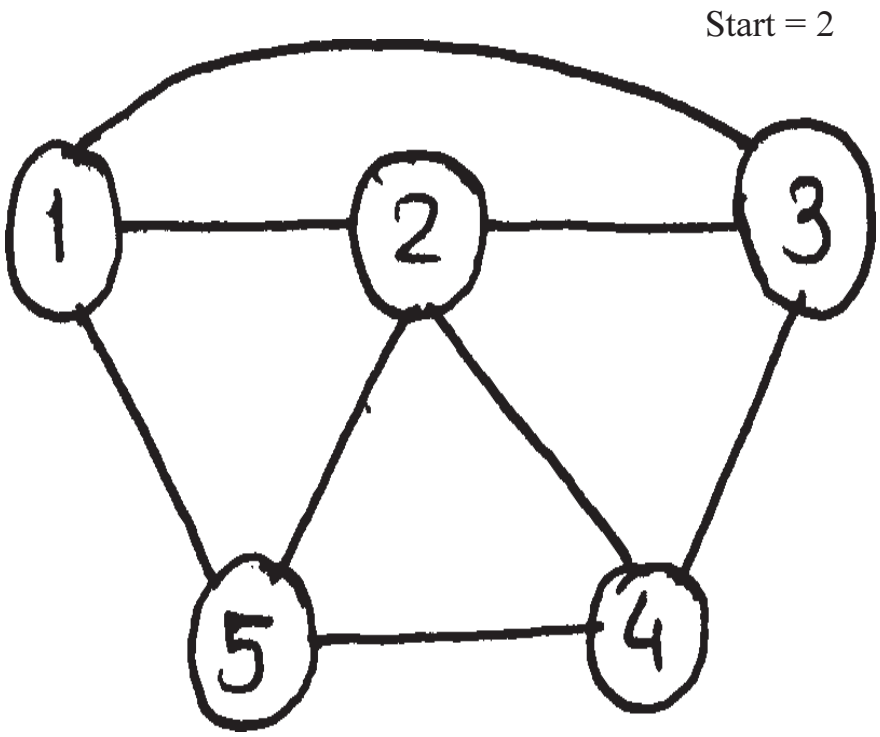
Q7) a) What are strongly connected components? Give the algorithm to compute strongly connected coponents using DFS Find the strongly connected components of the following graph using the above algorithm. **[5]**



b) What is the best way to multiply a chain of matrices with dimensions that are 35 × 50,50 × 70,70 ×50,50 × 5 using dynamic programming method. **[5]**

Q8) a) A string X can be transformed into string Y by applying a sequence of edit operations such as insert,delete and interchange with associated costs of 1,1,2 respectively. For X=(C,C,D,C,D) and Y=(D,C,D,D). Give the matrix of the values computed in bottom-up manner. **[5]**

b) What is m-color ability graph? Draw all Hamiltonian cycle for the following graph. **[5]**



Total No. of Questions: 8]

SEAT No. :

P2835

[Total No. of Pages : 2

[4837] - 1005
M.Sc. (COMPUTER SCIENCE) (Semester - I)
(2013 Pattern)
CS 105:Network Programming

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidate:

1) ***Attempt any five questions from given eight questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Write a note on Wrapper Functions. **[4]**

b) Explain byte ordering functions. **[4]**

c) Write a short note on getsockname. **[2]**

Q2) a) Implement a client function depicting appropriate use of select function. **[4]**

b) Discuss Crashing and Rebooting of Server Host. **[4]**

c) What are different Service Entry functions? **[2]**

P

Q3) a) Explain all IPV4 address conversion functions. **[4]**

b) Write a note on Resolvers and Name Servers. **[4]**

c) What are interrupted system calls? How are they handled? **[2]**

P.T.O.

Q4) a) Explain briefly gethostbyname and gethostbyaddr function. **[4]**

b) Write a function code that increases the size of socket receive buffer using UDP. **[4]**

c) What is the role of readn and writen function? **[2]**

Q5) a) Write a UDP program that uses connect to determine outgoing interface. **[4]**

b) Explain Signal Driven I/O model. **[4]**

c) Define getsocktopt and setsockopt. **[2]**

Q6) a) Write a TCP client function code which handles SIGPIPE Signal appropriately. **[4]**

b) Write a note on connected UDP Sockets. **[4]**

c) What are different macros used in select system call? State its usage. **[2]**

Q7) a) Explain Socket functions for elementary TCP Server. **[5]**

b) What are the methods used to Maintain state at the client side? **[5]**

Q8) a) Discuss different Resource Records used in DNS. **[5]**

b) Explain different purpose of SO_REUSEADDR. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2836

[Total No. of Pages : 2

[4837] - 2001

M.Sc. (Semester - II)

COMPUTER SCIENCE

CS - 201 : Digital Image Processing

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

Q1) a) Explain how digital image processing is useful by considering any two examples. **[4]**

b) State and explain any two properties of discrete fourier transform. **[4]**

c) Write the equation for the procedure used in hole filling. **[2]**

Q2) a) Explain the process of sampling and quantization with reference to a digital image. **[4]**

b) Write a short note on 'Hit-or-Miss' transform. **[4]**

c) List two sources of energy used in acquiring digital image. **[2]**

Q3) a) Draw contrast stretching function and explain its use. **[4]**

b) Define dialation. What will be the result of processing a black-and-white image with broken characters after dialation? **[4]**

c) Calculate the memory required to store a digital image with 1024 pixels and 256 different gray shades. **[2]**

Q4) a) Explain how bit plane slicing is used in digital image processing. **[4]**

b) Write a short note on 'signatures'. **[4]**

c) Write one application each of low pass filter and high pass filter. **[2]**

P.T.O.

Q5) a) Give the definition of 2-D discrete fourier transform along with significance of each variable. **[4]**

b) Write a short note on 'shape numbers'. **[4]**

c) Find convolution of following two 1-D images - **[2]**

$x = \{1, 4, 4, 5, 0\}$ $y = \{-2, 3, 4, 5\}$

Q6) a) What are maximum and minimum filters? Give one application of each. **[4]**

b) Write the iterative algorithm for global thresholding. **[4]**

c) Define 'm-adjacency'. **[2]**

Q7) a) Give three edge models. When and how do we use zero detection? **[5]**

b) Find the transformation function using histogram equalization technique for following data of an image- **[5]**

r_k	n_k
0	790
1	1023
2	850
3	656
4	329
5	245
6	122
7	81

Q8) a) Illustrate the process of frequency domain operations for a digitial image. Draw suitable block diagram and explain function of each block. **[5]**

b) Give a detailed account of image degradation and restoration model. **[5]**

Total No. of Questions : 8]

SEAT No. : ____

P2837

[Total No. of Pages : 3

[4837] - 2002

M.Sc. (Semester - II)

COMPUTER SCIENCE

CS-202 : Advanced Operating System

(2013 Pattern)

Time :3 Hours] ***[Max. Marks :50***

Instructions to the candidates:

1) ***Attempt any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain the behaviour of 'c' program? **[4]**

```
char str 1[ ] = "Linux";
main ( )
{
  int fd[2];
  char str 2 [10];
  pipe (fd);
  if (fork ( ) = =0)
      write (fd[1], str1, 5);
  else
      read (fd[0], str2, 5);
  }
```

b) Explain 4 major data structures to support demand paging? **[4]**

c) List any 4 characteristics of unix O.S. **[2]**

P.T.O.

Q2) a) Discuss the concept of blocking signals. **[4]**

b) Explain the steps in process creation. **[4]**

c) What is demand fill and demand zero? **[2]**

Q3) a) Write a short note on buffer headers and buffer pool. **[4]**

b) Explain the signals SIGUSR1 and SIGCLD. **[4]**

c) What is the use of sync, fsync and fdata sync ( ) functions. **[2]**

Q4) a) Demonstrate stat, lstat and fstat using 'C' program. **[4]**

b) Discuss thread states w.r.t. Windows O.S. **[4]**

c) What are the different system calls used to terminate the process? List all of them. **[2]**

Q5) a) Explain the use of fork( ) & Vfork ( ) using 'C' program. **[4]**

b) Explain expansion swap with the help of diagram. **[4]**

c) Explain the use of nice system call. **[2]**

Q6) a) Find the physical byte offset & respective block no. for the logical byte offset 3,33,000. [Use bmap ( ) algorithm]. **[4]**

b) Explain the steps to handle the interrept. **[4]**

c) Explain 3 levels of UNIX O.S. **[2]**

Q7) a) List any 10 contents of process table. **[5]**

b) Explain the behaviour of following 'C' program. **[5]**

```
void exit_handler1( ); exit_handler 2 ( );
int main ( )
{
      int pid;
      at exit (exit-handler 1);
      at exit (exit_handler 2);
      pid = fork ( );
      if (pid = = 0)
            – exit (0);
      else
            {
                  sleep (2);
                  exit (0);
            }
      return 0;
   }
Void exit_handler 1 ( )
{
  print f(" One Exit ");
}
Void exit_handler 2 ( )
{
  print f(" Two Exit ");
}
```

Q8) a) Discuss the return values of Fork ( ). Demonstrate using C program. **[5]**

b) Write a short note on Windows priority levels. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2838

[Total No. of Pages : 3

[4837] - 2003

M.Sc. (Semester - II)

COMPUTER SCIENCE

CS-203 : Data Mining and Data Warehousing

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data if necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Explain linear regression. **[4]**

b) Explain need for data preprocessing. **[4]**

c) What is bootstrap? **[2]**

Q2) a) Describe the steps involved in data mining when viewed as a process of knowledge discovery. **[4]**

b) Explain in detail architecture of data warehouse. **[4]**

c) What is pattern discovery in web mining. **[2]**

Q3) a) Explain Naïve Bayesian Classification with example. **[4]**

b) What are data mining premitives? **[4]**

c) Explain Recall. **[2]**

P.T.O.

Q4) a) Consider following transactional table and generate the candidate itemsets and frequent itemsets using Apriori algorithm, where support count is 2. **[4]**

TID	List of Items
1	Bread,Butter,Sugar
2	Bread, Butter, Milk, Sugar
3	Bread Butter Milk
4	Bread, Butter, Sugar
5	Butter, Milk
6	Butter, Sugar
7	Bread, Milk
8	Butter, Milk
9	Bread, Milk

b) What is personalization? How web content mining is used in personalization? **[4]**

c) Mention methods to handle the missing values. **[2]**

Q5) a) Compare classification and prediction. **[4]**

b) Suppose that a data warehouse consists of the three dimensions time, doctor and patient and the two measures count and charge where charge is the fee that a doctor charges a patient for a visit. Enumerate and draw snowflake schema. **[4]**

c) What is confusion Matrix? **[2]**

Q6) a) Explain Tree pruning Methods. **[4]**

b) Write a short note on crawlers. **[4]**

c) What is curse of dimensionality? **[2]**

Q7) a) Compare OLTP with OLAP systems. **[5]**

b) What is Page rank? Explain how web structure mining is used to increase the effectiveness of search engines. **[5]**

Q8) a) Write short note on Text Mining. **[5]**

b) Suppose that the data mining task is to cluster the following eight points (with (x; y) representing location) into three clusters. **[5]**

$A1(2; 10)$; $A2(2; 5)$; $A3(8; 4)$; $B1(5; 8)$; $B2(7; 5)$; $B3(6; 4)$; $C1(1; 2)$; $C2(4; 9)$:

The distance function is Euclidean distance. Suppose initially we assign $A1$, $B1$ and $C1$ as the centre of each cluster, respectively. Use the *k-means* algorithm to show only

i) The three cluster centres after the first round of execution and

ii) The final three clusters

Total No. of Questions : 8]

SEAT No. :

P2839

[Total No. of Pages : 2

[4837] - 2004

M.Sc.-I (Semester - II)

COMPUTER SCIENCE

CS - 205 : Programming With DotNet

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any Five out of Eight questions.***
2) ***All questions carry equal marks.***

Q1) Attempt the following :

a) What is a session? Explain the purpose of a session in server side programming. **[4]**

b) What are delegates? How can we declare and instantiate a delegate? What is multicasting of delegate? **[4]**

c) Differentiate between value type and reference type. **[2]**

Q2) Attempt the following :

a) Write a note on Data Binding by listing ADO.NET data objects. What is the role of currency manager. **[4]**

b) Write a C# program to read a file line by line. **[4]**

c) How pen ( ) is used to draw Green color line in GDI +. **[2]**

Q3) Attempt the following :

a) What are webpages? Explain MVC model in ASP.NET. **[4]**

b) Write a static method to accept param arrays of integers. The method should find the sum of all integers passed and display the results. Write a program to call a method. **[4]**

c) What are indexers? **[2]**

P.T.O.

Q4) Attempt the following :

a) How disconnected data architecture is implemented in ADO.NET? Explain with sample C# code. **[4]**

b) What is assembly? Write down its features. **[4]**

c) Explain : WebRequest, WebResponse. **[2]**

Q5) Attempt the following :

a) List the common dialog classes provided by Winforms. Explain any two in detail. **[4]**

b) How parameters can be passed to a method. Explain with examples. **[4]**

c) What are properties in C#? **[2]**

Q6) Attempt the following :

a) List any four collection classes and their usage. **[4]**

b) How exceptions are handled in C#? Explain with an example. Can we use 'throws' keyword in C#. **[4]**

c) Differentiate between structures in C# and C++. **[2]**

Q7) Attempt the following :

a) Explain ASP.NET architecture. **[5]**

b) Write a note on DotNet framework. **[5]**

Q8) Attempt the following :

a) How does the navigation method is used in web browser control. Write the steps for displaying www.yahoo.com page. **[5]**

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

Total No. of Questions : 8]

SEAT No. :

P2840

[Total No. of Pages : 3

[4837] - 2005
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 206 : Artificial Intelligence
(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any Five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

Q1) a) Write a short note on Explanation-based learning. **[4]**

b) Describe the four critereas in designing a search algorithm. **[4]**

c) "Intelligence requires knowledge". State any 2 undesirable properties of knowledge. **[2]**

Q2) a) Write a short note on the components of a script. **[4]**

b) The goal of 8-queens problem is to place eight queens on a chess board such that no queen attacks any other. A queen attacks any piece in the same row, column or diagonal. Formalize the problem of 8-queens in terms of state-space search suggest a suitable representation for the problem. State the initial & final/goal states list the actions as operators/rules for getting from one state to the other. **[4]**

c) In AO* algorithm, why it is not necessary to store the value of 'g' (the cost of getting from the start node to the current node) as in A* algorithm? **[2]**

Q3) a) Consider the following statements **[4]**

i) Everyone who sees Krish loves Krish.

ii) Someone walks & someone talks.

iii) Everyone who loves krish loves someone who is happy.

Represent the above statements as WFFs,

P.T.O.

b) Represent the following sentence using an appropriate conceptual dependency diagram

"since smoking can kill you, I stopped". **[4]**

c) State the things required to be considered when we want to build an AI system that is used to solve a particular problem. **[2]**

Q4) a) Write a script for robbing a bank. **[4]**

b) Describe the drawbacks of conceptual dependency representation. **[4]**

c) Define "local maximum" that is reached when you apply hill climbing search. **[2]**

Q5) a) Write a short note on Decision Trees. **[4]**

b) Suppose that the goal is to conclude the color of a pet named Tony, given that he croaks and eats flies. Using forward chaining/reasoning, derive that Tony is Green. Use the following rule base & facts. **[4]**

Rules ;

i) If x croaks & eats flies - then x is a frog.

ii) If x chirps and sings - then x is a canary.

iii) If x is a frog then x is green.

iv) If x is a canary - then x is yellow.

Facts : -

i) Tony Croaks

ii) Tony eats flies

iii) Tweety chirps

iv) Tweety is yellow.

c) Represent the following using semantic nets : **[2]**

Ramesh fixed the chair with fevicol.

Q6) a) What are the steps to convert WFFs to clausal form? **[4]**

b) In game playing, state the use of static evaluation fn. How is it similar to the h′ function in A* algorithm? Describe the two knowledge - based components of a good game playing program. **[4]**

c) What are computable predicates? **[2]**

Q7) a) State any 2 advantages and disadvantages of an Expert System. **[5]**

b) Translate the following English statements into FOPL. **[5]**

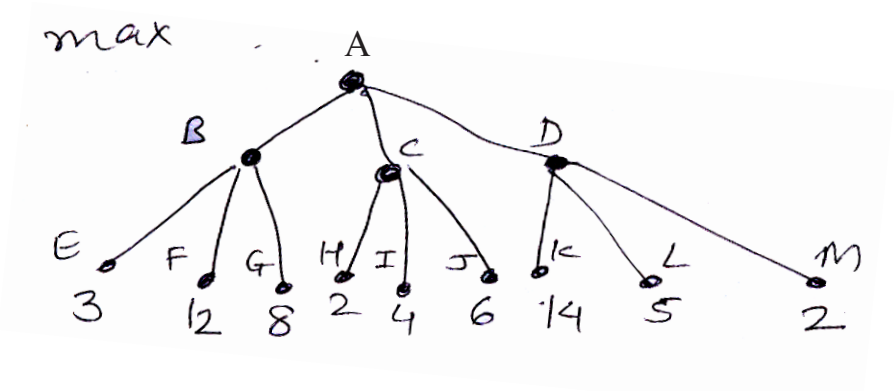
i) Any natural number is either odd or even.

ii) A natural number is divisible by 1.

iii) If a natural number is odd then its square is odd.

iv) Every body who runs also walks.

Q8) a) Consider the following game tree. **[5]**



Find the best move for MAX player using minmax procedure & perform left-to-right alpha-beta pruning on the tree. Indicate where cut offs occur.

b) Describe the AO* Algorithm. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2841

[Total No. of Pages : 2

[4837] - 2006
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 207 : Advance Algorithm
(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) *All questions carry equal marks.*
2) *Attempt any 5 out of 8.*
3) *All subquestions in each question are compulsory.*

Q1) a) Write properties of Flow networks. **[4]**

b) Write a note on group steiner tree problem. **[4]**

c) What are splay trees? Where are they used? **[2]**

Q2) a) Write a note on convex optimization. **[4]**

b) Explain memory management using B trees. **[4]**

c) Write a note on k-median problem. **[2]**

Q3) a) What is the role & significance of cutting plane method. **[4]**

b) Explain how two Fibonacci heaps are united. **[4]**

c) What are the applications of suffix trees? **[2]**

Q4) a) What are universal steiner trees? Which problems are solved using them? **[4]**

b) Explain linear programming approach towards steiner Forest. **[4]**

c) What are decision problems & optimization problems? **[2]**

Q5) a) Explain Implicit & Explicit enumeration with example. **[4]**

b) What is descrete optimization? Where is it used? **[4]**

c) Explain the concept of heuristic optimization. **[2]**

P.T.O.

Q6) a) What does Boyer-Moore algorithm do? Explain its working. **[4]**

b) Write a note on Simplex Method. **[4]**

c) Explain the concept of Dynamic Trees. **[2]**

Q7) a) Explain Primal-Dual method to solve TSP. **[5]**

b) Write a note on Simple KMP algorithm for strings. **[5]**

Q8) a) Formulate 0/1 knapsack problem as integer linear programming problem. **[5]**

b) Discuss any problem to which complete enumeration is applied. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2842

[Total No. of Pages : 2

[4837] - 3001

M.Sc. (Semester - III)

COMPUTER SCIENCE

CS - 301 : Software Metrics and Project Management

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***All questions carry equal marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) Attempt the following :

a) Explain in brief Project Attributes in Project Management. **[4]**

b) Write a note on cost of Quality in Project Quality Management. **[4]**

c) Define EVM. **[2]**

Q2) Attempt the following :

a) Explain in detail Resource leveling and Resource Loading. **[4]**

b) Define Risk Identification? Explain various risk categories. **[4]**

c) List the tools used in Quality control. **[2]**

Q3) Attempt the following :

a) Explain the Role of Data collection in software measurement. **[4]**

b) Define cost estimates? Explain types of cost estimates. **[4]**

c) Define statistical sampling in Quality management. **[2]**

Q4) Attempt the following :

a) Explain tools and techniques used for planning purchases and Acquisition. **[4]**

b) Explain any four basic modes for handling conflict in communication management. **[4]**

c) Define Project. **[2]**

P.T.O.

Q5) Attempt the following :

a) What are the different aspects of size in software measurement. **[4]**

b) Explain four basic response strategies for Negative Risk in Risk Management. **[4]**

c) Define cash flow Analysis. **[2]**

Q6) Attempt the following :

a) Explain any two project selection method. **[4]**

b) Write a note on GQM. **[4]**

c) Define productivity. **[2]**

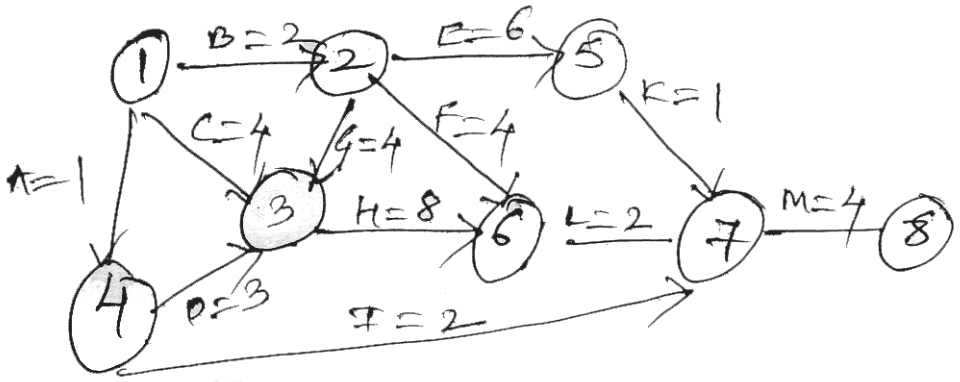
Q7) Attempt the following :

a) Create WBS for online shopping system. **[5]**

b) Write a Note on Bohem software quality model. **[5]**

Q8) Attempt the following :

a) Define critical Path Analysis and determine it for following. **[5]**



b) Explain characteristics of good data? and explain in brief how to collect data. **[5]**

✪✡✪✡

Total No. of Questions : 8]

SEAT No. :

P2843

[Total No. of Pages : 2

[4837] - 3002

M.Sc. (Semester - III)

COMPUTER SCIENCE

CS - 302 : Mobile Computing

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five of the following.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Attempt all of the following :

a) Explain Architecture of Android. **[4]**

b) What are limitations of mobile computing. **[4]**

c) Give any two requirements of mobile IP. **[2]**

Q2) Attempt all of the following :

a) Differentiate between FDMA & CDMA. **[4]**

b) Explain various mobile services of GSM. **[4]**

c) What is encapsulation? **[2]**

Q3) Attempt all of the following :

a) What is Direct sequence spread spectrum Technology? Explain how it works in the CDMA technology. **[4]**

b) Explain wireless session protocol. **[4]**

c) What is OVSF? **[2]**

Q4) Attempt all of the following :

a) 'CDMA - CA' used in wireless LAN instead of 'CDMA - CD' comment & Justify. **[4]**

b) Explain UMTS handover. **[4]**

c) Define cell breathing. **[2]**

P.T.O.

Q5) Attempt all of the following :

a) Explain functions of RNC. **[4]**

b) Write short note on WAP devices. **[4]**

c) What is GPRS? **[2]**

Q6) Attempt all of the following :

a) Compare different types of transmission errors that occar in wireless & wired network. What additional role does mobility play? **[5]**

b) Explain value added services through SMS. **[3]**

c) What is soft & hard handoff? **[2]**

Q7) Attempt all of the following :

a) What are problems associated with reverse path in mobile IP? **[5]**

b) Explain GPRS Architecture. **[5]**

Q8) Attempt all of the following :

a) What are the advantages & disadvantages of snooping TCP? **[5]**

b) Name the main elements of mobile IP & describe their functions. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2844

[Total No. of Pages : 3

[4837] - 3003
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 303 : Soft Computing
(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions from given eight questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of simple calculator is allowed.***

Q1) Attempt the following :

a) Explain artificial neuron model with the help of a neat diagram. **[4]**

b) For the following two fuzzy sets find its union and intersection. **[4]**

$$\underset{\sim}{A}=\left\{\frac{1}{2}+\frac{0.7}{3}+\frac{0.3}{4}+\frac{0.4}{5}\right\}$$

$$\underset{\sim}{B}=\left\{\frac{0.5}{2}+\frac{0.6}{3}+\frac{0.2}{4}+\frac{0.8}{5}\right\}$$

c) What is search space in genetic algorithms. **[2]**

Q2) Attempt the following :

a) Explain neural network architectures. **[4]**

b) Using Genetic Algorithm maximize $f(x)=x^2-x+1$ over (0,1,2....31) with initial x values of (12, 23, 8, 16). **[4]**

c) Define core of a membership function. **[2]**

P.T.O.

Q3) Attempt the following :

a) For the following fuzzy relation matrix

$$\underset{\sim}{R} = \begin{bmatrix} 0.2 & 0.7 & 0.4 & 1 \\ 1 & 0.9 & 0.5 & 0.1 \\ 0 & 0.8 & 1 & 0.6 \\ 0.2 & 0.5 & 1 & 0.3 \end{bmatrix}$$

Determine λ - cut relations for the following λ-values on R. λ_1, $\lambda_{0.7}$, $\lambda_{0.5}$, $\lambda_{0.2}$. **[4]**

b) Define defuzzification. Explain any two methods of defuzzification. **[4]**

c) State the equation for Gaussian signal function. **[2]**

Q4) Attempt the following :

a) Consider the following fuzzy sets

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

$$\underset{\sim}{B} = \left\{ \frac{0.4}{2} + \frac{1}{3} + \frac{0.8}{4} + \frac{0.3}{5} \right\}$$

$$\underset{\sim}{C} = \left\{ \frac{0.3}{1} + \frac{0.5}{2} + \frac{0.6}{3} + \frac{0.6}{4} + \frac{0.5}{5} + \frac{0.3}{6} \right\}$$

Determine the implication relation

IF $\underset{\sim}{A}$ THEN $\underset{\sim}{B}$ ELSE $\underset{\sim}{C}$ **[4]**

b) Explain any four properties of Genetic Algorithms. **[4]**

c) What is intensification in linguistic hedges. **[2]**

Q5) Attempt the following :

a) Given the following fuzzy numbers A and B, using zadeh's extension principle calculate fuzzy number "approximately 12".

$$\underset{\sim}{A} = \text{"approximately 2"} = \left\{ \frac{0.6}{1} + \frac{1}{2} + \frac{0.8}{3} \right\}$$

$$\underset{\sim}{B} = \text{"approximately 6"} = \left\{ \frac{0.8}{5} + \frac{1}{6} + \frac{0.7}{7} \right\}$$ **[4]**

b) How are Genetic Algorithms different from traditional methods. **[4]**

c) What is fuzzy equivalence relation. **[2]**

Q6) Attempt the following :

a) Explain differentiating characteristics of supervised and unsupervised learning. **[5]**

b) Consider the following two fuzzy sets

$$\underset{\sim}{A} = \frac{0.2}{P_1} + \frac{0.6}{P_2} + \frac{0.5}{P_3} + \frac{0.9}{P_4}$$

$$\underset{\sim}{B} = \frac{0.4}{g_1} + \frac{0.7}{g_2} + \frac{0.8}{g_3}$$

Find cartesion product $\underset{\sim}{C} = \underset{\sim}{A} \times \underset{\sim}{B}$

Further, consider the fuzzy relation $\underset{\sim}{D}$

$$\underset{\sim}{D} = \begin{matrix} g_1 \\ g_2 \\ g_3 \end{matrix} \begin{bmatrix} 0.3 & 0.6 & 0.5 & 0.2 & 0.1 \\ 0.4 & 0.7 & 0.5 & 0.3 & 0.3 \\ 0.2 & 0.6 & 0.8 & 0.9 & 0.8 \end{bmatrix}$$

Find the max-min composition of $\underset{\sim}{C}$ and $\underset{\sim}{D}$ i.e $\underset{\sim}{E} = \underset{\sim}{C}$ o $\underset{\sim}{D}$ **[5]**

Q7) Attempt the following :

a) Write a note on Linguistic Hedges. **[5]**

b) Simulate the execution of perceptron learning algorithm for each epoch on the following inputs (1, 0, 0) (1, 0, 1) (1, 1, 0) (1, 1, 1) with weight vector (0, 0, 0) and η=1. what is the final weight vector? Tanget vector (1, 1, 1, –1). **[5]**

Q8) Attempt the following :

a) Explain the practical considerations in implementing the back propogation algorithm. **[5]**

b) Explain important properties of TLNs. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2845

[Total No. of Pages : 2

[4837] - 3004

M.Sc. (Semester - III)

COMPUTER SCIENCE

CS - 305 : Web Services

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain the Header block of SOAP message in detail. **[4]**

b) What are the core building blocks of web services. **[4]**

c) Give the role of service discovery in SOA. **[2]**

Q2) a) Explain the service oriented architecture of web services. **[4]**

b) Write a note on WSDL binding. **[4]**

c) List out different form of services provided by cloud. **[2]**

Q3) a) Explain the use of <SOAP : FAULT> with proper example. **[4]**

b) Explain publisher interface and inquiry interface for the information handled by UDDI. **[4]**

c) What are the Impact of cloud computing. **[2]**

Q4) a) What do you mean by VMWare hypervisors. Explain there features in detail. **[4]**

b) What do you mean by Quality of service? How it is maintained in case of web services. **[4]**

c) List out the uses of UDDI registry. **[2]**

P.T.O.

Q5) a) Write a SOAP response page to response the age if birthday date is inputed. **[4]**

b) Explain advantages and disadvantages of SOAP. **[4]**

c) What are impact of Web services. **[2]**

Q6) a) Explain the detail structure of cloud deployment model. **[4]**

b) SOAP and REST protocol. **[4]**

c) What do you mean by wire protocol. **[2]**

Q7) a) Enlist the name of various API's with there uses, used by UDDI. **[5]**

b) Explain the concept of PaaS and IaaS in detail. **[5]**

Q8) a) Write down the steps to create Web services. Write RPC client and server to convert the units of distance. (eg. Meter to centimeter, meter to k.m.). **[5]**

b) Discuss the case of Amazon EC2 with various aspects of cloud. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2846

[Total No. of Pages : 2

[4837] - 3005

M.Sc. (Semester - III)

COMPUTER SCIENCE

CS - 306 : Database and System Administrator

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions from given eight questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

Q1) a) Explain MERGE storage engine, create one MERGE table. **[4]**

b) What are disk checking commands in Linux OS. **[4]**

c) Write down commands for dump & reload data using mysqldump. **[2]**

Q2) a) Give reasons of using MYSQL cluster. **[4]**

b) Write short note on extended file system 4 (extu). **[4]**

c) What is key buffer & buffer pool. **[2]**

Q3) a) Explain usage of locking tables in MYSQL. **[4]**

b) What is client command and SQL statement? **[4]**

c) How to set transaction isolation level for all cases? [In innoDB storage engine]. **[2]**

Q4) a) Write down all file manipulation commands in Linux OS. **[4]**

b) Explain MEMORY and FEDERATED storage engine. **[4]**

c) What are repeatable read & non repeatable read concepts? **[2]**

P.T.O.

Q5) a) How MYSQL uses Disk Space? **[4]**

b) Explain MYSQL Architecture with diagram. **[4]**

c) What is SQL parser? **[2]**

Q6) a) What are all directory listing options in Linux OS. **[4]**

b) Explain samba server? Its configuration & usage. **[4]**

c) Write down command for dump & reload data using mysqldump. **[2]**

Q7) a) Explain extended file systems in Linux OS. **[5]**

b) Explain MYSQL duster as Disaster prevention. **[5]**

Q8) a) Explain storage engine MYISAM. **[5]**

b) What is advisory lock & explain its all functions. **[5]**

Total No. of Questions : 8]

SEAT No. :

P2847

[Total No. of Pages : 2

[4837] - 3006
M.Sc. (Part - II) (Semester - III)
COMPUTER SCIENCE
CS - 307 : Functional Programming
(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***

Q1) a) Why Python is popular in computational science? **[4]**

b) Describes the various types/varieties of functional languages. **[4]**

c) Define Tail recursion. **[2]**

Q2) a) Find all free (unbound) and bound variables in the following λ-expression.

i) (λx·x z) λy · w λw · wy z*x*

ii) λ*x* · *xy* λ*x* · *yx* **[4]**

b) What is substitution? Explain it's role in expression evaluation with examples. **[4]**

c) What is the difference between input and raw-input? **[2]**

Q3) a) What will be the output of following program.

i)
```
for n in range (6, 10) :
    for x in range (2, n) :
        if (n % x = = 0) :
            print n, 'equals', x, '*', n/x
            break
    else
        print n, 'is a prime number'
```

ii)
```
def squares (x) :
    for i in range (x) :
        yield i  * * 2
for i in squares (3) : print i,
```
[4]

P.T.O.

b) What are Higher order functions? Explain composition and construction with the help of examples. **[4]**

c) What is currying. **[2]**

Q4) a) Write a program in Python to read 1024 bytes from a file and write this to another file. **[4]**

b) Define combination and abstruction. What is 'rator' and 'rand'. **[4]**

c) What is difference between list, tuple and sets? **[2]**

Q5) a) What are anonymous functions? How can they be defined and used in Python. **[4]**

b) Consider the string str = 'Global Warming' write statements in Python to implement following

i) to display last four characters

ii) replace all occurance of letter 'a' with '*'

iii) change case of given string

iv) trim first four character from string **[4]**

c) What is the purpose of re-compile. **[2]**

Q6) a) Write a function to print fibonacci series upto input limit. **[4]**

b) Explain importance of filter ( ) & map ( ) functions in Python. **[4]**

c) What are exceptions in Python. **[2]**

Q7) a) Create a class person, add constructor to the class to accept name & age as parameter. Add getter methods for name & age. **[5]**

b) Reduce following λ-expressions

i) $((\lambda(x)\ (+\ 1\ x))\ ((\lambda(z)\ (+1\ z))3))$

ii) $(\lambda x \cdot (\lambda y \cdot x + y)5)\ ((\lambda y \cdot y * y)6)$ **[5]**

Q8) a) Explain lazy evaluation in Python with example. **[5]**

b) Define substitution formaly by recursion. Evaluate following λ-expression using substitution

$(\lambda y.x\ (\lambda x.x))\ [(\lambda y.xy)/x]$ **[5]**

Total No. of Questions : 8]

SEAT No. :

P2848

[Total No. of Pages : 2

[4837] - 3007

M.Sc. (Semester - III)

COMPUTER SCIENCE - II

CS - 308 : Business Intelligence

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Figures to the right indicate full marks.***

Q1) a) List the components and Explain the Business pressures Responses-Support Model. **[4]**

b) Explain how collaborative Decision Making works with respective to BI implementation. **[4]**

c) Define : BPM. **[2]**

Q2) a) What is a KPI and Explain its characteristics that are distinguished with respect to BI? **[4]**

b) Briefly describe the algorithm used in devision tree and how it helps in BI analytical approach. **[4]**

c) Define : Meta data. **[2]**

Q3) a) Explain the challenges associated with the implementation of Natural language processing (NLP). **[4]**

b) What is on-demand BI? Give its major benefits. **[4]**

c) Give any 2 major differences between a traditional data warehouse and a real-time data werehouse. **[2]**

Q4) a) 'A data mart can replace a data warehouse. Compare and Comment the above statement. **[4]**

b) How does CRISP-DM differ from SEMMA? **[4]**

c) What are the main steps in the text mining process? List the steps of the process. **[2]**

P.T.O.

Q5) a) What is web content mining? How does it differ from text mining? **[4]**

b) Explain the steps in closed loop model of Act and Adjust process of BPM. **[4]**

c) Define : Gini index. **[2]**

Q6) a) How does a Balanced Score Card (BSC) align strategies and actions? **[4]**

b) What are hubs and authorities? What is the HITS algorithm? **[4]**

c) Give any 2 benefits of collaborative Decision making. **[2]**

Q7) a) Explain the architecture structure of web-based data warehousing and list the alternative data warehousing architecture. **[5]**

b) Consider the case study of a major company like starbacks that embarks on considerable effort to make the system more analytical with data that are collocted on board. When things go astray a variety of biases often come into play directly and indirectly putting pressure on employees to stick to the plan at all costs. The concera of the plan are to keep track of its progress toward its franchise goal, fast sales and strategic initiatives.

Apply Discovery-driven planning and comment on the factors that distinguish Discovery driven planning from conventional planning methods. **[5]**

Q8) a) Discuss the relationship between web mining and web analytics. **[5]**

b) What is data visualization? How does the selection of a particular display widgets used with particular metrics affect the visualization of data? **[5]**

Total No. of Questions : 8]

SEAT No. :

P2849

[Total No. of Pages : 3

[4837] - 4001

M.Sc. (Semester - IV)

COMPUTER SCIENCE

CS - 402 : Parallel Computing

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions out of eight.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Explain Amdahl's law in parallel processing. **[2]**

b) Explain in brief data parallel model (partitioned global address space model). **[4]**

c) Compare and contrast shared memory and distributed memory architectures. **[4]**

Q2) a) Compare and contrast SIMD and MIMD computers. **[2]**

b) Explain SPMD and MPMD style of parallel programming. **[4]**

c) Distinguish between UMA, NUMA and CC-NUMA parallel computer architectures. Draw block diagram of each architecture. **[4]**

Q3) a) What is the difference between a direct and indirect interconnection network. **[2]**

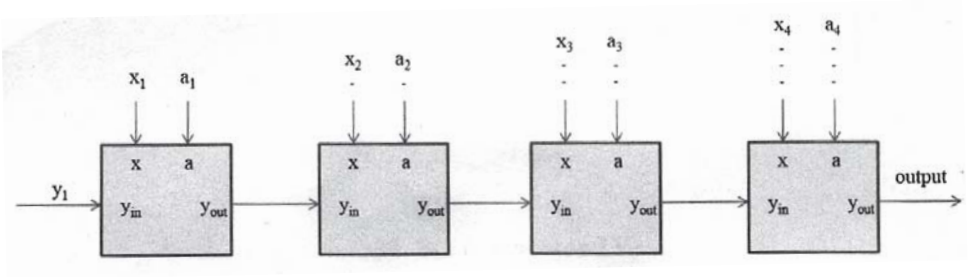
b) Define total network bandwidth and bisection bandwidth of an interconnection network. What are the values of these parameters for a ring of n computing elements (processors with own memory)? Assume B to be the bandwidth of an individual link. **[4]**

c) Explain the following with examples : MPI_Scatter and MPI_Gather.**[4]**

P.T.O.

Q4) a) Explain in brief MPI_COMM_WORLD and MPI_Comm_rank. **[2]**

b) The pipeline given below consists of four stages and it is synchronous, i.e., each cell finishes its operation in one clock cycle and the (input/ output) data advances one step forward.



If each stage performs the operation

$$y_{out} = y_{in} + a \cdot x$$

What will be the final output after four clock cycles? **[3]**

c) Explain what is meant by deadlock, blocking and non-blocking communications. **[5]**

Q5) a) Explain single and master directives in OpenMP. **[2]**

b) Does the following code snippet lead to a deadlock? Is so, give at least two methods that you can use to avoid this deadlock. **[3]**

```
if (myrank = =0)    {
   MPI_Send (in, 10, MPI_INT, 1, 1, MPI_COMM_WORLD);
   MPI_Send (out, 10, MPI_INT, 1, 2, MPI_COMM_WORLD);
}
else if (myrank == 1)    {
   MPI_Recv (out, 10, MPI_INT, 0, 2, MPI_COMM_WORLD);
   MPI_Recv (in,   10, MPI_INT, 0, 1, MPI_COMM_WORLD);
}
```

Note: The parameters in the above functions represent: buffer, count of data type to be sent/received, data-type, destination/source process-id, message-tag, and communicator, respectively

c) What is shared memory parallel programming paradigm? Describe with schematic the OpenMP shared parallel programming model. **[5]**

Q6) a) Distinguish between MPI_Bcast and MPI_Send. **[2]**

b) Explain the purpose of *parallel for* and *parallel sections* directives in OpenMP. **[3]**

c) What is a critical section in parallel program? Which OpenMP directive can be used to implement a critical section? **[5]**

Q7) a) Write a note on avoiding false sharing and race conditions in OpenMP. **[5]**

b) Explain task parallelism using spawn and sync keywords in Cilk++ with an example. **[5]**

Q8) a) Explain the concepts of grids, thread blocks, threads and warps in CUDA programming. **[5]**

b) What is the purpose of GPU and how does it differ from CP.? **[5]**

Total No. of Questions : 8]

SEAT No. :

P2850

[Total No. of Pages : 2

[4837] - 4002
M.Sc. (Semester - IV)
COMPUTER SCIENCE
CS - 403 : Embedded System
(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***

Q1) a) Draw block diagram of 8051 microcontroller and explain function of timer/counter section and interrupt controller. **[4]**

b) Define critical section of task. What are the ways by which the critical section run by blocking other process? **[4]**

c) Define embedded system. Give any two examples of embedded system. **[2]**

Q2) a) What are the situations which leads to priority inversion problem? How does an OS solve this problem by a priority inheritence mechanism? **[4]**

b) Define following terms : **[4]**

i) Assembler
ii) Compiler
iii) Loader
iv) Linker

c) List the functions of a kernel. **[2]**

Q3) a) Explain linked lists technique for combining buffers. **[4]**

b) Define simulation. Explain high level language simulation technique. **[4]**

c) How does a DSP differ from a general purpose processor (GPP)? **[2]**

P.T.O.

Q4) a) Write short note on in circuit emulator (ICE). **[4]**

b) Compare two scheduling strategies for the real time scheduling Preemptive mode and round robin scheduling. **[4]**

c) Give the function of config All. h header file. **[2]**

Q5) a) Explain encapulation using semphores and queues. **[4]**

b) Explain role of scheduling and the data sampling in data logger system. **[4]**

c) List main features of ARM. **[2]**

Q6) a) Distinguish between RISC and CISC architecture. **[4]**

b) How a real time performance can be derive from a non real time system? **[4]**

c) Give an example of deadlock situation during multitasking execution. **[2]**

Q7) a) With neat block diagram explain ISR process. **[5]**

b) Write note on onboard debugger. **[5]**

Q8) a) Define interrupt latency. What are the precautions to keep interrupt latency low. **[5]**

b) How buffer exchange technique is useful to simplify the control code and allow multiple task? **[5]**

Total No. of Questions : 8]

SEAT No. :

P2851

[Total No. of Pages : 2

[4837] - 4003

M.Sc. (Semester - IV)

COMPUTER SCIENCE

CS - 404 : Software Quality Assurance

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Neat diagram must be drawn whenever necessary.***
3) ***Figures to the right side indicates full marks.***

Q1) Answer the following :

a) Explain the key process areas (KPA) in SEI - CMM. **[4]**

b) What are the stages of contract Review? Explain in details. **[4]**

c) Explain the term validation. **[2]**

Q2) Answer the following :

a) Differentiate between software quality assurance and software quality control. **[4]**

b) What is the contribution of templates in software quality? List out the sources of updating templates. **[4]**

c) Explain the term change control. **[2]**

Q3) Answer the following :

a) Draw cause-effect diagram for House paint peeling. **[4]**

b) How quality costs is used for decision making? **[4]**

c) List out the issues resolved by procedures. **[2]**

P.T.O.

Q4) Answer the following :

a) Explain stress testing and performance testing. **[4]**

b) Explain McCall's quality model with neat diagram. **[4]**

c) Explain the term quality assurance. **[2]**

Q5) Answer the following :

a) What is the impact of CASE tools on software quality? Explain in details. **[4]**

b) Explain the term corrective actions and preventive actions. **[4]**

c) What is meant by ISO 9001 certification? **[2]**

Q6) Answer the following :

a) Explain with neat diagram software configuration Management tasks. **[5]**

b) Write a note on formal technical reviews. **[5]**

Q7) Answer the following :

a) List out the contents of a procedure. **[4]**

b) Write a note on process metrics. **[4]**

c) Explain the term white box testing. **[2]**

Q8) Answer the following :

a) i) List out the elements of Quality Assurance plan. **[2]**

ii) Write down the steps for drawing run charts. **[3]**

b) i) What are the benefits of identifying cost of Quality. **[2]**

ii) List out the software risk items (SRI). **[3]**

Total No. of Questions : 8]

SEAT No. :

P2852

[Total No. of Pages : 2

[4837] - 4004

M.Sc. (Semester - IV)

COMPUTER SCIENCE

CS - 405 : Modeling & Simulation

(2013 Pattern)

Time :3 Hours] *[Max. Marks :50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) Attempt the following :

a) Explain the components of an Experimental frame. **[4]**

b) Give the application areas of Simulation. **[4]**

c) What are random variates. **[2]**

Q2) Attempt the following :

a) Give the advantages and disadvantages of Simulation. **[4]**

b) Which are the characteristics of a good random number generator. **[3]**

c) Explain the process of verification and validation of a model. **[3]**

Q3) Attempt the following :

a) What is random variable and a distribution function. **[4]**

b) Write a note on Report Generation after Simulation. **[4]**

c) What is the importance of a simulation clock. **[2]**

P.T.O.

Q4) Attempt the following :

a) Write a note on 'Need for Modeling and Simulation'. **[4]**

b) Explain sensitivity analysis. **[4]**

c) Which are the different Types of validity. **[2]**

Q5) Attempt the following :

a) Explain Switching Automata. **[4]**

b) Discuss qualitative and Quantitative comparison of Model and Source System behavior. **[4]**

c) Give two point of comparison between Static and Dynamic simulation models. **[2]**

Q6) Attempt the following :

a) Discuss the concept of cellular automata, explain fitness of a cell. **[5]**

b) How is testing of hypothesis done. **[3]**

c) What is logical time. **[2]**

Q7) Write a note on the following :

a) Discuss Transient and steady state behavior of stochastic systems. **[5]**

b) Discuss Experimenting with actual system and a model of the system. **[5]**

Q8) Attempt the Case Study and answer the following questions.

Two – Server Queuing system

OR

A moving Air-craft

Questions→

a) Define Discrete and Continuous system. Identify whether the System is Discrete or Continuous System and justify your answer. **[5]**

b) Draw flowcharts for depicting various phases in Modeling and Simulation of the problem with correct symbols and flow of execution. **[5]**