

Total No. of Questions : 5]

SEAT No. :

P594

[Total No. of Pages : 3

[4339] - 102

M.Sc. (Semester - I)

COMPUTER SCIENCE

CS - 102 : Advanced Networking

(2011 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right indicate full marks.*
- 3) All questions are compulsory.*

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) Why CSMA/CD is not used in gigabit ethernet ?
- b) List any two advantages & disadvantages of ECB & CBC mode.
- c) Why does RTP needs the service of another protocol, RTCP, but TCP does not ?
- d) How timestamps -based authentication works ?
- e) What is DNS spoofing ?
- f) A routing table has 25 entries. It does not receive information about five routers for 200 sec. How many timers are running at this time ?
- g) In an IP packet, the value of HLEN is 1000 in binary. How many bytes of options are being carried by this packet ?
- h) Why is anonymous offline electronic money dangerous ?

Q2) Attempt any four of the following :

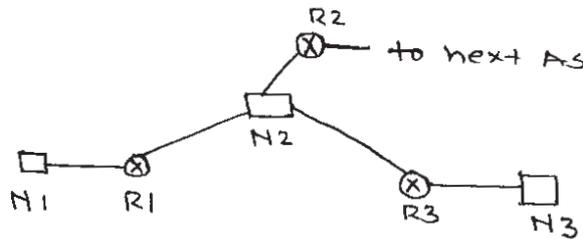
[4 × 4 = 16]

- a) When a user wants to send an email to multiple recipients, how PGP handles the security ?

P.T.O.

- b) Give a potential disadvantage when Nagle's algorithm is used on a badly - congested network ?

c)



In the fig. Show which router (s) sends out router link & network link LSAs ?

- d) Apply play fair cipher on plain text "University of Pune" & use keyword as "Systems".
- e) Explain different strategies of transition from IPv4 to IPv6.

Q3) Attempt any four of the following : [4 × 4 = 16]

- a) List the different technologies used to connect two remote devices in point to point WAN. Explain any one in detail.
- b) Explain AH & ESP Protocols used in IPSec.
- c) Do you think H.323 is actually the same as SIP ? What are the differences? Make a comparison between the two.
- d) What is attack ? Explain active & passive attacks.
- e) Explain key transformation & expansion permutation process in DES.

Q4) Attempt any four of the following : [4 × 4 = 16]

- a) Explain the working of Kerberos ?
- b) What are the typical contents of a digital certificate ?
- c) Explain how transport layer handles buffer allocation dynamically.
- d) Given two prime numbers P=17 & Q= 29, find out N,E & D in an RSA encryption process.
- e) Explain how distance vector routing algorithm is used for creating the routing table for routers in AS.

Q5) Attempt any four of the following :

[4× 4 = 16]

- a) Imagine a generalized n-army problem, in which the agreement of any two of the blue armies is sufficient for victory. Does a protocol exist that allows blue to win ? Justify.
- b) Application gateway firewall are generally more secure than packet filters. - Justify.
- c) Explain how 3 - D secure protocol is used to provide security to the credit card on the Internet.
- d) What is count to infinity problem ? Suggest solutions on that.
- e) Contrast error reporting messages in ICMPv6 with error reporting messages ICMPv4.



Total No. of Questions : 5]

SEAT No. :

P595

[Total No. of Pages : 7

[4339] - 103

M.Sc. COMPUTER SCIENCE

CS - 103: Distributed Database Concepts

(New 2011 Pattern) (Semester - I)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:-

Q1) Attempt (any 8)

[8 × 2 = 16]

- a) State briefly, the two basic alternatives of placing data in a DDBS.
- b) State any 4 different forms of heterogeneity, found in a DDBS?
- c) Define the following:
 - i) The Completeness rule of fragmentation.
 - ii) The Disjointness rule of fragmentation.
- d) Define the process of localization of data involved in a query.
- e) State the following rules of reduction for primary horizontal fragmentation
 - i) reduction for selection
 - ii) reduction for join
- f) Define the following:
 - i) An irreducible query
 - ii) A monorelation query.
- g) State what do you mean by a join selectivity factor between two relations R & S ?
- h) Define a degree 3 level of consistency for a transaction.
- i) Define the concept of serializability of distributed transaction

P.T.O.

Q2) Justify the following (any eight)

[8 × 2 = 16]

- a) We can set only one of the two time values with the utime function.
- b) Getcwd () is preferred than getwd () in applications.
- c) No process can preempt another process executing in the kernel.
- d) The kernel does a longjump to restore a previously saved context if it has no way to complete the system call it is executing.
- e) A process never executes in user mode before handling outstanding signals.
- f) It is very important that any signal handler has to be very careful about the action it performs and the data it touches.
- g) Creating a Windows process consists of several stages.
- h) Create Thread notifies the windows subsystem about the new thread.
- i) Thread priority levels are assigned from different perspectives.
- j) The kernel never schedules Zombie process to execute.

Q3) Attempt any four of the following:

[16]

- a) Explain architecture of Unix Operating system with system Kernel in detail.
- b) The following sequence of code has been observed in program.

```
dup2(fd,0);
```

```
dup2(fd,1);
```

```
dup(fd,2);
```

```
if(fd>2)
```

```
close(fd);
```

To see why the if test is needed, assume that if is 1 and draw a picture of

what happens to the three descriptor entries and the corresponding file table entry with each call to dup2. Then assume that fd is 3 & draw the same picture.

- c) Explain six values for param defined in <malloc.h> supported by Linux.
- d) Explain the following functions sigaction(), sigpending().
- e) Explain the kernel-mode components of Windows.

Q4) Explain the behavior of following C Program (any four) **[2 × 8 = 16]**

a)

```
#include,fcntl.h>

main(argc,argv)

int argc;

char*argv[];

{

    int fd, skval;

    Char c;

    if(argc!=2)

        Exit();

    fd = open(argv[1],O_RDONLY);

    if(fd== -1)

        exit();

    while(skval= read(fd,&c,1)

        {

            print("char%\n",c);
```

```

        skval=lseek(fd,1023l,1);

        Printf("new seek val %d\n",skval);

    }

}

```

b) #include <unistd.h>
#include <stdio.h>
#include <sys/types.h>
#include <sys/wait.h>

```

int main(void)
{
int status;

pid_t pid;
if(!fork())
return 1;

pid = wait (&status);

if(pid == -1)

perror ("wait");

printf ("pid=%d\n",pid);

if(WIFEXITED(status))

    printf("Normal termination with exit status=%d\n", WEXITSTATUS(status));

if(WIFSIGNALED (status))

    Printf ("Killed by signal=%d%s\n",WSTOPSIG (status),
WCOREDUMP (STATUS)}?" (dumped core)" : mm); if(WIFSTOPPED (status))

```

```

printf("stopped by signal=%d\n",WSTOPSIG (status));
if(WIFCONTINUED (status))
    printf("Continued\n");
return 0;
}

```

c) void print_chars (int n, char c)

```

{
    int i;
    for (i = 0; i < n; i++) {
        char *s;
        int j;
        s = calloc (i + 2, 1);
        if (!s) {
            perror ("calloc");
            break;
        }
        for (j = 0; j < i + 1; j++)
            s[j] = c;
        printf ("%s\n",s);
        free (s);
    }
}

```

(Consider n=7 & c is *)

d) char string[] = "hello";

main()

```
{char buf[1024];
```

```

char * cp1,*p2;
int fds[2];
cp1 = string;
cp2 = buf;
while(*cp1)
*cp2++ = *cp1++;
pipe(fds);
for(;;)
{
Write(fds[1],buf,6);
read(fds[0],buf,6);
}
}
f)
#include<signal.h>
main()
{
register int i;
setpgrp( );
for(i =0;i<10;i++)
{
if(i&1)
setpgrp ( );
}
}

```

```

        printf("pid=%d pgrp = %d\n"), getpid( ),
        getpgrp ( );

        pause( );

    }

    kill(0,SIGINT);

}

e) #include<signal.h>
main ( )
{
    into i. *ip;
    extern f( ), sigcatch( );
    ip = (int *)f;

        for(i=0;i<20;i++)
            signal(i,sigcatch);
            *ip = 1;
            printf("after assign to ip\n");

    f( );
}
f() { }
sigcatch(n)
    int n;
    {
        printf("causght sig % d\n", n);
        exit(1);
    }
}

```

Q5) Write a C Program for the following: (Any four) [4 × 4 = 16]

- a) Write a C Program to demonstrate use of Exit Handler.
- b) Write a C Program that creates two files, one with a umask of 0 and one with umask that disables all the group and other permission bits.

[4336]- 202 7
 c) Write a C Program to demonstrate Race condition in catching Signals.

- d) Write a C Program to catch SIGUSR1 & SIGUSR2.

Total No. of Questions : 5]

SEAT No. :

P596

[Total No. of Pages : 4

[4339] - 104

M.Sc. (Semester - I)

COMPUTER SCIENCE

CS - 104 : Design and Analysis of Algorithms

(2011 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:-

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *All questions carry equal marks.*
- 5) *Use of calculator is allowed.*

Q1) Attempt any eight of the following :

[8 × 2 = 16]

- a) Define Big- O_n notation . Is $2^{n+1} = O(2^n)$?
- b) What operations does heap data structure support and what is the growth rate of these operations ?
- c) Merge sort is in - place algorithm. Justify.
- d) Greedy strategy may not always yield optimal solution. Justify.
- e) What is optimal substructure property ? List any two problems which satisfy this property.
- f) What is the difference between tree edge and forward edge ?
- g) Why bounding functions are useful in context of Branch and Bound strategy ?
- h) What is satisfiability problem ? State Cook's theorem.
- i) Define interpolation problem.
- j) Backtracking is Breadth First Search (BFS) for solution. Justify.

P.T.O.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Consider the following algorithm :

Algorithm solve (n)

```
{
    if ( n < 1) then return 1;
    else
    {
        for i = 1 to n do
        for j = 1 to n do
        k = k+1;
        for i = 1 to 4 do
        solve (n/2);
    }
}
```

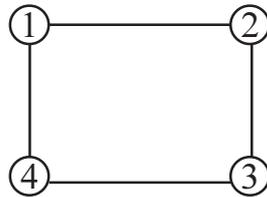
Obtain the recurrence relation for the above algorithm. Determine its time complexity.

- b) Devise a divide and conquer strategy to determine the total number of positive numbers in an array of n numbers.
- c) Obtain a set of optimal Huffman codes for the messages (m1, m2, m3, m4, m5, m6, m7) with relative frequencies (f1, f2, f3, f4, f5, f6, f7) = (1, 1, 2, 3, 5, 8, 13). Draw the decode tree for this set of codes.
- d) What is the best way to multiply a chain of matrices having dimensions 13×5 , 5×89 , 89×3 and 3×34 using dynamic programming.
- e) Show that Breadth First Traversal (BFT) can be used to obtain the reflexive transitive closure matrix of an undirected graph.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) Find out all possible solutions for the following graph coloring problem with $m=3$. Also show that only 12 solutions exist with exactly 3 colors.



- b) Draw the portion of state space tree generated by Least Cost Branch Bound (LCBB) method for the following 0/1 knapsack problem instance

where

$$w = (2, 4, 6, 9)$$

$$p = (10, 10, 12, 18)$$

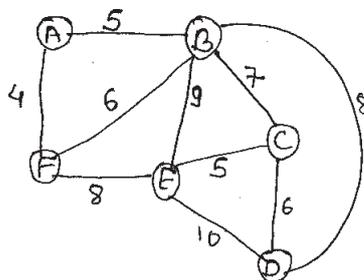
$$m = 15$$

- c) Write non-deterministic algorithm for max - clique decision problem.
 d) Determine the polynomial of smallest degree that interpolates the points (0,1) (1,2) and (2,3).
 e) Order the following functions in ascending order of their growth rate : $e^n, n^n, n!, \log_e(n^n), n^2$.

Q4) Attempt any two from the following :

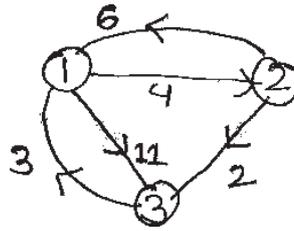
[2 × 8 =16]

- a) Differentiate between Prim's and Kruskal's algorithm for finding minimum spanning tree. Find the minimum spanning tree using Prim's algorithm for the following graph.



- b) Write control abstraction for divide and conquer strategy. Let x, y be two n -bit numbers. The straight way of multiplying x and y takes $O(n^2)$ bit operations. Show that multiplying x and y n - bit numbers required $O(n^{\log_3})$ bit operations using divide and conquer method.

- c) Discuss the features of dynamic programming. Find all pair shortest path for the following graph using dynamic programming.



Q5) Attempt any two of the following :

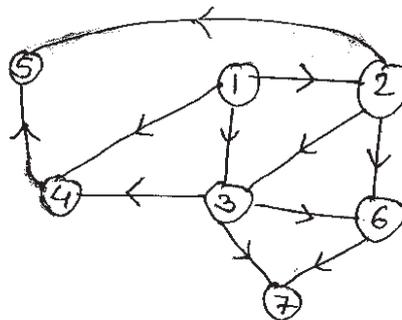
[2 × 8 = 16]

- a) What is backtracking ? Give the bounding function for backtracking solution of sum of subsets problem. For the given set of weights $w = \{5, 7, 10, 12, 15, 17\}$ and $m = 22$. Draw the state space tree using variable tuple size and find all possible subsets that give sum of elements as 22.
- b) Why Least Cost Branch Bound (LCBB) is preferred over FIFO & LIFO branch and bound methods. Consider the following travelling salesman problem instance defined by cost matrix.

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

Obtain the reduced cost matrix. Which node will be selected next in LCBB formulation of problem.

- c) Give an algorithm to test whether given diagraph is Directed Acyclic Graph (DAG) . Test whether the following diagraph is DAG. If yes, apply topological sort to produce ordering of vertices. Start from vertex 1.



Total No. of Questions : 4]

SEAT No. :

P585

[Total No. of Pages : 3

[4339] - 13

M.Sc. (Semester - I)

COMPUTER SCIENCE

CS - 103 : Distributed Database Concepts

(2008 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:-

- 1) *All questions are compulsory.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Make necessary assumptions.*

Q1) Answer the following.

[8 × 2 = 16]

- a) Write any one method in R* algorithm.
- b) Define fuzzy Read.
- c) Define DDBMS.
- d) “B⁺ tree indexing is better than hash indexing” comment.
- e) What is operator tree ?
- f) Write the different failures in DDBMS.
- g) What is Minterm predicate ?
- h) What is Global directory ?

Q2) Attempt any four:

[4 × 5 = 20]

- a) Discuss the different types of transparencies addressed by distributed database.
- b) Explain different phases of query decomposition.
- c) Write short Note on semi - join strategy for query processing in DDBMS.

P.T.O.

- d) What is work flow ? Explain its types.
- e) Write a short Note on distributed deadlock detection.

Q3) Attempt any four:

[4 × 6 = 24]

- a) Consider the following join graph



Let Size (emp) = 100 , Size (ASG) = 200 , Size (Proj) = 300
 Size (emp ⋈ ASG) = 300 , Size (ASG ⋈ PROJ) = 200.

Assume that query needs to access all relation write all possible ways in which query can be executed along with minimum data transfer.

- b) Simplify the following query and transform it into an optimized operator tree using the restructuring algorithm.

Select ename , Pname

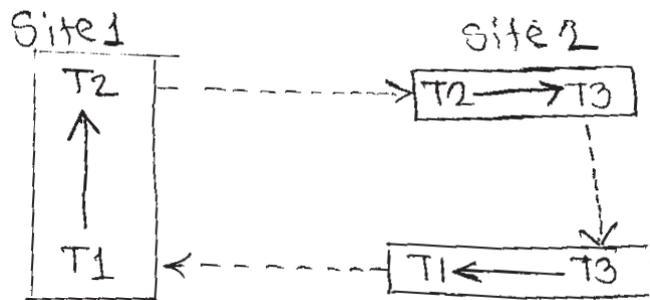
From emp , asg , Proj

Where dur > 12

and emp. eno = asg. eno and

(emp. title = " Mech. Eng" or asg. PNO < "P3") and asg. pno = Proj. Pno;

- c) Consider the following DWFG



Detect deadlock using the distributed deadlock detection algorithm.

- d) Apply the algorithm INGRES to the following query and illustrate the detachments and substitutions by monorelation.

Select ename , pname

from emp , asg , Proj

Where dur > 12

and emp. eno = asg. eno

- e) Let $Q = \{ q_1, q_2, q_3 \}$ be set of queries. $A = \{ A_1, A_2, A_3 \}$ be set of attributes, $S = \{ S_1, S_2 \}$ be a set of sites.

Matrix (X) – describe attribute value and

Matrix (Y) – describe application access frequency.

Assume $i(q_k) = 1$ and S_i & A_i key attribute. Use Bond energy algorithm to vertical fragmentation of attributes in the set A.

$$\begin{array}{ccc}
 & A_1 & A_2 & A_3 & & S_1 & S_2 \\
 q_1 & \left[\begin{array}{ccc} 1 & 1 & 0 \end{array} \right] & & & q_1 & \left[\begin{array}{cc} 2 & 30 \end{array} \right] \\
 q_2 & \left[\begin{array}{ccc} 1 & 0 & 1 \end{array} \right] & & & q_2 & \left[\begin{array}{cc} 28 & 0 \end{array} \right] \\
 q_3 & \left[\begin{array}{ccc} 1 & 0 & 0 \end{array} \right] & & & q_3 & \left[\begin{array}{cc} 33 & 35 \end{array} \right] \\
 & & X & & & & Y
 \end{array}$$

Q4) Attempt any four:

[4 × 5 = 20]

- Explain D2PL algorithm.
- What is benchmarking ? why it is require ?
- Explain Top - down design process of distributed DBMS.
- Discuss the MDBS architecture.
- Write a note on Network Partitioning.



Total No. of Questions : 5]

SEAT No. :

P598

[Total No. of Pages : 7

[4339] - 202
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 202: Advanced Operating Systems
(2011 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates :

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

Q1) Attempt all the following:

[8 × 2 = 16]

- a) How file sharing is done in UNIX Operating System.
- b) Explain the system calls `fsync ()` & `fdatasync()`.
- c) Explain `Symlink ()` and `readlink ()` functions.
- d) Explain Components of register in context with the process.
- e) Why are the logout records written by the `init` process? Is this handled in the same way as network login?
- f) Explain `mincore ()` function.
- g) What happens if a blocked signal is generated more than once before the process unblocks the signal?
- h) Describe the structure of an executive process block.

Q2) Justify the following (any eight):

[8 × 2 = 16]

- a) We can set only one of the two time values with the `utime` function.
- b) `getcwd ()` is preferred than `getwd()` in applications.
- c) No process can preempt another process executing in the kernel.
- d) The kernel does a `longjump` to restore a previously saved context if it has no way to complete the system call it is executing.

P.T.O.

- e) A process never executes in user mode before handling outstanding signals.
- f) It is very important that any signal handler has to be very careful about the actions it performs and the data it touches.
- g) Creating a Windows process consists of several stages.
- h) Create Thread notifies the Windows subsystem about the new thread.
- i) Thread priority levels are assigned from different perspectives.
- j) The kernel never schedules Zombie process to execute.

Q3) Attempt any four of the following:

[4 × 4 = 16]

- a) Explain architecture of Unix Operating system with system Kernel in detail.
- b) The following sequence of code has been observed in program.

```
dup2(fd,0);
```

```
dup2(fd,1);
```

```
dup(fd,2);
```

```
if(fd>2)
```

```
close(fd);
```

To see why the if test is needed, assume that fd is 1 and draw a picture of what happens to the three descriptor entries and the corresponding file table entry with each call to dup2. Then assume that fd is 3 & draw the same picture.

- c) Explain six values for param defined in <malloc.h> supported by Linux.
- d) Explain the following functions sigaction(), sigpending().
- e) Explain the kernel-mode components of Windows.

Q4) Explain the behavior of following C Program (any four):

[4 × 4 = 16]

a)

```
#include<fcntl.h>

main(argc,argv)

int argc;

char*argv[];

{

    int fd, skval;

    Char c;

    if(argc!=2)

        Exit();

    fd = open(argv[1],O_RDONLY);

    if(fd== -1)

        exit();

    while(skval=read(fd,&c,1)

        {

            print("char%c\n",c);

            skval = lseek(fd,1023L,1);

            printf("new seek val %d\n",skval);

        }

}
```

```

b) #include <unistd.h>

#include <stdio.h>

#include <sys/types.h>

#include <sys/wait.h>

int main(void)

{

int status;

pid_t pid;

if(!fork())

return 1;

pid = wait (&status);

if(pid == -1)

perror ("wait");

printf ("pid=%d\n",pid);

if(WIFEXITED(status))

    printf("Normal termination with exit status=%d\n", WEXITSTATUS(status));

if(WIFSIGNALED (status))

    printf ("Killed by signal = %d%s \ n",WTERMSIG(status),

WCOREDUMP (status) ?" (dumped core)" : "");

if(WIFSTOPPED (status))

    printf("Stopped by signal=%d\n",WSTOPSIG (status));

if(WIFCONTINUED (status))

    printf("Continued\n");

return 0;

}

```

```

c)    void print_chars (int n, char c)
      {
        int i;
        for (i = 0; i < n; i++) {
          char *s;
          int j;
          s = calloc (i + 2, 1);
          if (!s) {
              perror ("calloc");
              break;
          }
          for (j = 0; j < i + 1; j++)
              s[j] = c;
          printf ("%s\n",s);
          free (s);
        }
      }

```

(Consider n=7 & c is *)

```

d)    char string[] = "hello";
      main()
      {char buf[1024];
        char * cp1,*p2;
        int fds[2];
        cp1 = string;
        cp2 = buf;
        while(*cp1)
            *cp2++ = *cp1++;

```

```

    pipe(fds);
for(;;)
    {
        write(fds[1],buf,6);
        read(fds[0],buf,6);
    }
}

f)
#include<signal.h>
main()
    {
        register int i;
        setpgrp();
        for(i =0;i<10;i++)
            {
                if (fork ( ) == 0)
                    {
                        if(i&1)
                            setpgrp ();
                        printf("pid=%d pgrp = %d\n"), getpid(),
                            getpgrp ());
                        pause();
                    }
            }
        kill(0,SIGINT);
    }

```

```

e) #include<signal.h>
    main()
    {
        int l,*ip;
        extern f(), sigcatch() ;
        ip = (int *)f;

                                for(i=0;i<20;i++)
                                    signal(l,sigcatch);
                                    *ip = 1;
                                    printf("after assign to ip\n");

        f());
    }
    f() { }
    sigcatch(n)
        int n;
        {
            printf("caught sig %d\n ",n);
            exit(1);
        }

```

Q5) Write a C Program for the following: (Any four) **[4 × 4 = 16]**

- a) Write a C Program to demonstrate use of Exit Handler.
- b) Write a C Program that creates two files, one with a umask of 0 and one with umask that disables all the group and other permission bits.
- c) Write a C Program to demonstrate Race condition in catching Signals.
- d) Write a C Program to catch SIGUSR1 & SIGUSR2.
- e) Write a C Program for a signal function that tries to prevent any interrupted system calls from being restarted.
- f) Write a C Program to illustrate use of pipe, dup & fork system call.

++++++

Total No. of Questions : 5]

SEAT No. :

P599

[Total No. of Pages : 3

[4339] - 203

M.Sc. (Semester - II)

COMPUTER SCIENCE

CS - 203 : Data Mining and Data Warehousing

(2011 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:-

- 1) *All questions are compulsory.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt any eight of the following :

[8 × 2 = 16]

- a) What is the need for data warehousing ?
- b) Define an FP- Tree.
- c) Define an association rule.
- d) What are visualization technique ?
- e) What are the types of sequence mining ?
- f) What is clustering ?
- g) What do you mean by active learning ?
- h) When to apply chi- square test.
- i) What are key terms used in confusion matrix ?
- j) What are Bayesian classifier ?

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) What are the data mining applications ?
- b) What are the challenges in web mining?
- c) What is WEKA ? What are the advantages of WEKA ?
- d) What are the two approaches to avoid overfitting ?
- e) What are the different ways of handling noisy data ?

P.T.O.

Q3) Attempt any two of the following :

[2 × 8 = 16]

- a) Suppose that a data warehouse of a match consists of the four dimensions date , spectator, location and game and the two measures count and charge, where charge is the fare that a spectator pays when watching a game on a given date, spectators may be students, adults or seniors, with each category having its own charge rate.

Draw a star schema diagram for the data warehouse.

- b) The following table consists of training tuples from the all electronics customer database . The data have been generalized and in given below:

RID	age	income	Student	Credit rating	Class: buys-Computer
1	youth	high	no	fair	no
2	"	"	"	excellent	"
3	middle-age	"	"	fair	yes
4	senior	medium	"	"	"
5	"	low	yes	"	"
6	"	"	"	excellent	no
7	middle -aged	"	"	"	yes
8	youth	medium	no	fair	no
9	"	low	yes	fair	yes
10	senior	medium	"	fair	"
11	youth	"	"	excellent	"
12	middle-eaged	"	no	"	"
13	"	high	yes	fair	"
14	senior	medium	no	excellent	no

- i) Draw a decision tree for the concept buys - computer.

- ii) Compute information gain of the attribute age, to find the splitting criterion for the tuples. (The class label attribute buys. Computer has two distinct values. Let class C1 corresponds to no. of yes and C2 corresponds to no. of no).
- c) Explain basic data mining tasks of predictive model.

Q4) Attempt any four of the following: **[4× 4 =16]**

- a) What are data preprocessing techniques ? Explain any one.
- b) Differentiate between Text mining and Web mining.
- c) Explain sampling algorithm with an example.
- d) How is a data warehouse different from a database ? How are they similar?
- e) Differentiate between OLTP and OLAP.

Q5) Attempt any four of the following : **[4 ×4 = 16]**

- a) Explain the major steps of decision tree classification.
- b) How does the k- means clustering algorithm works ?
- c) Write a note on non linear regression.
- d) Explain following accuracy measures (any two) :
 - i) Bootstrap
 - ii) F - measure
 - iii) Precision
 - iv) Cross- validation
- e) Differentiate between agglomerative and divisive clustering method.



Total No. of Questions : 5]

SEAT No. :

P588

[Total No. of Pages : 4

[4339] - 22
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 202 : Unix Internals
(2008 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:

- 1) Neat diagram must be drawn wherever necessary.*
- 2) Figures to the right indicate full marks.*
- 3) All questions carry equal marks.*
- 4) Assume suitable data, if necessary.*
- 5) All questions are compulsory.*

Q1) Attempt all of the following:

[8 × 2 = 16]

- a) List any four fields of uarea.
- b) When the kernel releases an inode, what happens if reference count drops to zero?
- c) Give the syntax of mount system call. When does unmount call fail?
- d) List the steps for a context switch.
- e) Write any four functions of clock interrupt handler?
- f) What is a protection fault? When does a process incur a protection fault?
- g) What do you mean by Clists?
- h) What is the significance of following, kill (pid,signum);
where i) pid is -1 ii) pid is 0

P.T.O.

Q2) State whether the following statements are true or false. Justify your answer (any four): **[4 × 4 = 16]**

- a) The kernel can lock and unlock an allocated inode independent of the value of the reference count.
- b) No process can preempt another process executing in the kernel.
- c) The contents of inode will change only when file contents are modified.
- d) In the link system call, the kernel must release the source file's inode after incrementing its link count.
- e) The kernel invokes growreg algorithm to increase the size of shared region that is already attached to several processes.

Q3) Attempt any four of the following : **[4 × 4 = 16]**

- a) Why does kernel lock the file during the system call read? What would happen if it does not lock it?
- b) Which are the actions taken by kernel for releasing a buffer?
- c) What happens if a process executing wait () has :
 - i) no zombie child
 - ii) one zombie child
 - iii) child processes but none are zombie.
- d) In sleep algorithm, why does kernel raises processor execution level to block all interrupts? How it handles cases of interruptible and not interruptible sleep?
- e) Discuss swap in function of swapper process.

Q4) Attempt any four of the folloiwng: **[4 × 4 = 16]**

- a) Write a program to accept a file name from user using command line argument and create a file write the string UNIX at every 800th byte 10 times. Close the file Reopen the file in readmode and print the string stored at every 800th byte. Use lseek system call.

- b) Write and explain program in C, that checks the access time of a file every minute and prints a message if the file had been accessed.
- c) Explain the behaviour of following program.

```
# include <stdio.h>

main ()
{
    int p[2], j, pid;
    char msg [20];
    pipe (p);
    pid = getpid ();
    fork ();
    fork ();
    if (pid == getpid ())
    {
        for (j = 0, j < 3 ; j ++ )
            wait ((int*)0);
        for (j = 0; j < 3 ; j ++ )
        {
            read (p[0], msg, 12);
            printf ("%s\n", msg);
        }
    }
    else
        write (p[1], "hello world", 12);
}
```

- d) Write a program which is ready to catch a signal generated by pressing `cntrl + c`. The program should display message "you have pressed `cntrl+c`". The process should catch the `cntrl+c` signal five times, display same message and should not terminate. The process will terminate when it catches the `cntrl+c` signal 6th time.

- e) Explain the behaviour of following program.

```
#include <fcntl.h>

main ()
{
    int i,j;
    char but 1 [512], but 2[512];
    i = open("/etc/ passwd",O_RDONLY);
    j = dup (i);
    read (i,but 1, sizeof (but 1 ));
    read (j, but2, sizeof (but 2));
    close (i);
    read(j, but2, sizeof (but 2));
}
```

Q5) Attempt any four of the following:

[4 × 4 = 16]

- a) Give and explain logical format of an executable file.
- b) Write a short note on page stealer process.
- c) List the sequence of operations taken by kernel for handling the interrupt.
What do you mean by interrupt vector?
- d) Explain the race condition arised in unlink system call.
- e) What are the components of register level context?

++++++

Total No. of Questions : 5]

SEAT No. :

P602

[Total No. of Pages : 4

[4339] - 303

M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 303 : Soft Computing
(2011 Pattern)

Time :3 Hours]

[Max. Marks :80

Instructions to the candidates:-

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *All questions carry equal marks.*
- 5) *Use of electronic pocket Calculator is allowed.*

Q1) Attempt All

[8× 2 = 16]

- a) State any two basic operators in genetic algorithms.
- b) Find $A^c \cap B$ for the following two fuzzy sets A & B

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

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

- c) Explain the linguistic hedge - Concentration.
- d) State the equation for a piecewise linear threshold signal function.
- e) Define a Fuzzy set.
- f) State any two applications of G.A.
- g) What is unsupervised learning ?
- h) State the components of a neural network.

P.T.O.

Q2) Attempt any four

[4 × 4 = 16]

- What is defuzzification ? Explain the centroid and weighted average methods for defuzzifying fuzzy output.
- Explain the concept of Convex fuzzy sets. What is a fuzzy number.
- Explain any four properties of GA.
- Briefly outline the procedure of gradient descent based learning.
- State the important properties of TLN's.

Q3) Attempt any four :

[4 × 4 = 16]

- Given the following two fuzzy sets

$$D_1 = \left\{ \frac{1}{1.0} + \frac{.75}{1.5} + \frac{.3}{2.0} + \frac{.15}{2.5} + \frac{0}{3.0} \right\}$$

$$D_2 = \left\{ \frac{1}{1.0} + \frac{.6}{1.5} + \frac{.2}{2.0} + \frac{.1}{2.5} + \frac{0}{3.0} \right\}$$

Find i) $D_2 | D_1$ ii) $\overline{D_1 \cup D_2}$

- For the following fuzzy relation R find the λ - cut relation for $\lambda .7$ and $\lambda .3$.

$$R = \begin{matrix} & \begin{matrix} x_1 & x_2 & x_3 & x_4 \end{matrix} \\ \begin{matrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{matrix} & \begin{bmatrix} 1 & .8 & .4 & .2 \\ .8 & 1 & .3 & .1 \\ .4 & .3 & 1 & .2 \\ .2 & .1 & .2 & 1 \end{bmatrix} \end{matrix}$$

- Given the following fuzzy numbers I & J, using Zadeh's extension principle calculate fuzzy number " Approximately 24". Is the resulting set convex?

$$I = \text{approximately } 4 = \left\{ \frac{.6}{3} + \frac{1}{4} + \frac{.5}{5} \right\}$$

$$J = \text{approximately } 6 = \left\{ \frac{.2}{4} + \frac{.4}{5} + \frac{1}{6} + \frac{.6}{7} + \frac{.3}{8} \right\}$$

- Determine the preposition " IF K THEN V "for the fuzzy sets given below.

$$K = \left\{ \frac{0}{q} + \frac{.2}{t} + \frac{1}{r} + \frac{1}{c} \right\}$$

$$V = \left\{ \frac{0}{n} + \frac{.3}{s} + \frac{.8}{g} + \frac{1}{e} \right\}$$

e) Given the following two fuzzy sets :

$$\text{Bright} = B = \left\{ \frac{0}{4.5} + \frac{0.6}{4.7} + \frac{0.8}{5.0} + \frac{1}{6.0} \right\}$$

$$\text{Dark} = D = \left\{ \frac{.5}{2.2} + \frac{.8}{2.8} + \frac{1}{3.6} + \frac{.85}{4.0} + \frac{.5}{4.5} \right\}$$

Find membership functions for

- i) not very bright & very dark.
- ii) not very dark but not bright

Q4) Attempt any two

[2 × 8 = 16]

- a) Explain any two properties of neural networks. Differentiate between supervised and unsupervised learning.
- b) Define linear separability and show that the 2D boolean function XOR is linearly non - separable.
- c) Let $X = \{x_1, x_2, x_3\}$, $Y = \{y_1, y_2, y_3\}$ and $Z = \{z_1, z_2, z_3\}$ be the universe of discourse on which the following fuzzy sets be defined respectively.

$$A = \left\{ \frac{0.1}{x_1} + \frac{0.9}{x_2} + \frac{0.3}{x_3} \right\}$$

$$B = \left\{ \frac{0.4}{y_1} + \frac{1}{y_2} + \frac{0}{y_3} \right\}$$

$$C = \left\{ \frac{0.3}{z_1} + \frac{1.0}{z_2} + \frac{.2}{z_3} \right\}$$

- Find
- i) $A \times B = R$
 - ii) $S = B \times C$
 - iii) $T = \text{RoS}$ using min - max composition
 - iv) $U = R \bullet S$

Q5) Attempt any two

[2 × 8 =16]

- a) Simulate the execution of perceptron learning algorithm for each epoch on the following inputs : (1,1,1) (1,1,-1) (1,0,-1) (-1,1,1), (-1,1,-1) (-1,0,-1) with weight vector (0,1,0) and $\eta = 1$. What is the final weight vector.
- b) Let $X = \{a,b,c,d\}$ and $Y = \{1,2,3,4\}$ &

$$\text{Let } A = \left\{ \frac{.1}{a} + \frac{.7}{b} + \frac{.5}{c} + \frac{1}{d} \right\}$$

$$B = \left\{ \frac{.3}{1} + \frac{1}{2} + \frac{.8}{3} + \frac{0}{4} \right\}$$

$$C = \left\{ \frac{0}{1} + \frac{.5}{2} + \frac{1}{3} + \frac{.7}{4} \right\}$$

Determine the implication relations

- i) if x is in A then y is in B
- ii) if x is in A then y is in B
else y is in C

- c) Explain the basic genetic algorithm, Maximize $f(x) = 2x$ over $\{0,1,2,3,\dots,31\}$ with initial x values of (12, 23, 8, 16)



Total No. of Questions : 5]

SEAT No. :

P593

[4339]-101

[Total No. of Pages : 3

**M.Sc. (Semester - I)
COMPUTER SCIENCE**

**CS - 101 : Principles of Programming Languages
(2011 Pattern)**

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *All questions carry equal marks.*
- 4) *Assume suitable data, if necessary.*
- 5) *All questions are compulsory.*

Q1) Attempt any eight.

[8 × 2 = 16]

- a) What distinguishes declarative languages from imperative languages.
- b) Find o/p of
 - i) (first (rest (first ((a b) (c d))))).
 - ii) (list ' (a b c) ' ()).
- c) What are bound and free variables in prolog.
- d) What is elaboration and referencing environment?
- e) What is l - value and r - value?
- f) "C language does not support array operations" Justify whether true or false.
- g) Define -
 - i) Static link.
 - ii) Dynamic link.
- h) What is generic subroutine? Name one language which support it.
- i) What is task? What is purpose of a task ready queue?
- j) Define -
 - i) Physical concurrency.
 - ii) Logical concurrency.

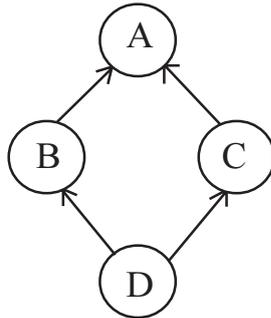
Q2) Attempt any four.

[4 × 4 = 16]

- a) Explain how IDE differs from a collection of command - line tools.
- b) What is an object closure? Explain with suitable example in C++.
- c) Explain the difference between applicative and normal order evaluation of an expression. Under what circumstances is each desirable?
- d) Explain the reference counters approach to garbage collection. What problems are faced with this approach?

P.T.O.

- e) Give the implementation for the following shared multiple inheritance.



Q3) Attempt any four. **[4 × 4 = 16]**

- a) Write a pseudo code to illustrate the use of semaphores to provide both competition and cooperation synchronization for a concurrently accessed shared buffer.
- b) Explain why ordering within an expression is important.
- c) Explain different approaches to dangling reference problem.
- d) What is coroutine? What is quasi - concurrency?
- e) What is abstraction? What are the benefits of abstraction provided by modules and module types.

Q4) Attempt any four. **[4 × 4 = 16]**

- a) Write a code in C/C++ to demonstrate creation of lost heap - dynamic variables.
- b) What is difference between enumeration - controlled loop and logically controlled loops?

Consider a midtest loop given below that looks for blank lines in its input.

```
for (; ;)  
{  
    line = read_line ();  
    if(all_blanks(line)) break;  
    consume_line(line);  
}
```

show how you might accomplish the same task using post - test loop.

- c) Explain following parameter passing modes with proper pseudocode for each one.
 - i) Pass by result.
 - ii) Pass by value result.
- d) Explain how cooperation synchronization is accomplished in Java.
- e) Explain the layout of the run - time stack.

Q5) Attempt any four.

[4 × 4 = 16]

- a) Write a prolog program to find factorial of a given number.
- b) Define a lisp function pal to check whether a given list is palindrome or not.
- c) Write a lisp function for finding intersection of 2 lists.
- d) Consider the employee database.

Works _ in (employee _ name, department)

earns (employee _ name, salary)

Write a prolog program to list

- i) All employees not working in sales department.
 - ii) List employees earning salary more than ₹ 10,000. (Use cut and fail)
- e) “All cats like to eat all types of fish. All calico are cats. All tuna are fish. Charlie is tuna. Herby is tuna puss is calico”. Write a prolog program to answer the question, “what does puss like to eat? Show how it will be answered by your program.



Total No. of Questions : 5]

SEAT No. :

P583

[Total No. of Pages : 3

[4339] - 11
M.Sc. (Semester - I)
COMPUTER SCIENCE
CS - 101 : Principles of Programming Language
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*
- 3) *All questions carry equal marks.*

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) State any four datatypes predicates in LISP.
- b) Give the structure of PROLOG program.
- c) Define precedence and associativity.
- d) Differentiate type casting and coercion.
- e) What are first and second class subroutines?
- f) What is the use of cactus stack.
- g) Define :
 - i) Dynamic binding.
 - ii) Binding's Lifetime.
- h) State any two real life applications of multithreading.

Q2) Attempt any four :

[4 × 4 = 16]

- a) What determine whether an object is allocated statically, on the stack or on the heap.
- b) Why there are so many programming languages? Explain.
- c) What is a referencing environment? Describe the difference between deep and shallow binding of referrencing environments.
- d) Differentiate between boolean condition evaluation techniques in C and PASCAL.
- e) Discuss the significance of holes in records. Why do they arise? What problems do they cause.

P.T.O.

Q3) Attempt any four : **[4 × 4 = 16]**

- a) What is a dope vector? What purpose does it serve?
- b) What is subroutine calling sequence? What does it do? What is meant by the subroutine prologue and epilogue.
- c) Explain how assignment operations are implemented in imperative languages.
- d) What are dangling references? How are they created? Why are they a problem? Discuss the advantages of tombstones to solve the problem.
- e) Consider the following program segment in C++.

```
try { - - -  
    // Protected block of code  
} catch (end _ of _ file)  
{ - - - }  
catch (io _ error e)  
{ // handler for io-error other than end-of-file  
} catch (- - -)  
{ // handler for any exception not previously named  
}
```

show how this exceptions can be handled using exception handler in C++.

Q4) Attempt any four : **[4 × 4 = 16]**

- a) State six different syntactic constructs commonly used to create new thread of control in a concurrent program? Explain any one.
- b) What do you mean by collateral execution? Illustrate with the help of suitable example.
- c) Explain how shared multiple inheritance is implemented with suitable diagram.
- d) What is critical section? What is semaphore? Why semaphore is used?
- e) The main program calls P1, P1 calls P2 and P2 calls P3. What is the stack layout after these calls? Show the stack with subroutine frames and static links.

Q5) Attempt any four : **[4 × 4 = 16]**

- a) Define a LISP function to find the smallest element from the list.
- b) Define a LISP function to find a power. Power (m, n) = m raised to the power of n.

- c) Write a PROLOG program to store and retrieve the compound object part which contains (no, description, unit-price, quantity). The program should output the list of parts.
- d) Write a PROLOG program to count the number of words in a given sentence.
- e) Consider the following sentences.
John likes all animals. Cat, bird, dog and snake are animals.
Write a PROLOG program such that goal :
likes (John, Snake)
return false; whereas for other animal it will return ture.



Total No. of Questions : 4]

SEAT No. :

P584

[Total No. of Pages : 2

[4339] - 12
M.Sc. (Semester - I)
COMPUTER SCIENCE
CS - 102 : Object Oriented Software Engineering
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Neat diagrams must be drawn where necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

Q1) Attempt the following :

[8 × 2 = 16]

- a) What is object orientation?
- b) What is UML?
- c) What is unified process?
- d) Define the terms :
 - i) Fork
 - ii) Polymorphism
- e) What is meta model?
- f) What is object oriented analysis?
- g) What is testing?
- h) What are components?

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) What are different kinds of relationships supported in UML?
- b) Differentiate between link and association.
- c) Discuss the component of sequence diagram with example.
- d) What are the steps in object oriented analysis.
- e) What is a qualifier? Explain with example.

Q3) Attempt any four of the following :

[4 × 8 = 32]

- a) Draw a use case diagram and class diagram for an interactive diagram editor. A sheet is a collection of links and boxes. A link is a sequence of line segments that connects two boxes. Each line segment is specified by two points. A point may be shared by a vertical and horizontal line segment in the same link. A selection is a collection of links and boxes.

P.T.O.

A buffer is a collection of links and boxes that have been cut or copied from the sheet.

- b) Prepare an object diagram showing at least six relationships among the following object classes. Include association, aggregation and generalization. Show multiplicity and add atleast one attribute to each, class, card, deck, hand, collection of cards, discard file, draw file.
- c) Draw state diagram and sequence diagram for considering different scenarios for ATM machines.
- d) Draw activity diagram for considering different scenarios for icecream preparation machine where you can get different flavours.
- e) A system for distributing electronic mail over network is needed. Each user of the system should be able to send mail from any computer. All the received mails are stored at a central server. The user can receive mail at any computer. One or two machines with larger data spaces also allows saving messages in files. There should be provisions for forwarding mails and sending mail to several users at once using address list. Draw component and deployment diagram.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) Write short note on object oriented testing.
- b) How a use case model helps in analysis phase from inception to elaboration?
- c) Discuss the task management component.
- d) Consider an automatic water level control system. Which is used for controlling the water flow. Identify the different states and draw a state transition diagram.
- e) Draw a collaboration diagram for Railway Reservation system. The passenger is required to fill a reservation form giving details of his journey. The counter clerk ensures whether the place is available and prepares a booking statement.



Total No. of Questions : 4]

SEAT No. :

P586

[Total No. of Pages : 4

[4339] - 14
M.Sc. (Semester - I)
COMPUTER SCIENCE
CS 11 - 104 : Design And Analysis Of Algorithms
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) All questions are compulsory.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Assume suitable data, if necessary.*

Q1) Attempt all of the following :

[8 × 2 = 16]

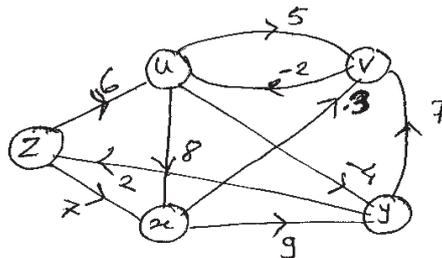
- a) Name sorting algorithm which use divide & conquer strategy.
- b) Define NP-hard class & give an example of decision problem that is NP-hard
- c) Give the implicit and explicit constraints of 8 Queen's problem.
- d) Define Ω notation. Is $3n + 2 = \Omega(n)$. Justify.
- e) What do you mean by minimum spanning tree.
- f) Define principle of Optimality? State one essential difference between greedy method and dynamic programming.
- g) Show that there is no solution to the 2-queens.
- h) Define live node and dead node.

P.T.O.

Q2) Attempt any four of the following :

[4 × 5 = 20]

- Write insertion sort algorithm and derive its best case and worst case running time.
- Let $A[1 \dots n]$ be an array of integer write an efficient algorithm to count occurrences of given integer using divide and conquer strategy what is its time complexity.
- Consider the following instance for job scheduling with deadlines problems where $n = 6$. $P = (20, 15, 10, 7, 5, 3)$, $d = (3, 1, 1, 3, 1, 3)$. Give solution obtained using fast greedy method that uses set representation.
- Explain string editing problem for $X = (b, b, a, b, a)$ and $Y = (a, b, a, a)$ give the matrix of values computed in bottom-up manner.
- Using Bellman ford algorithm find length of shortest path from source z to all other vertices.



Q3) Attempt any four of the following :

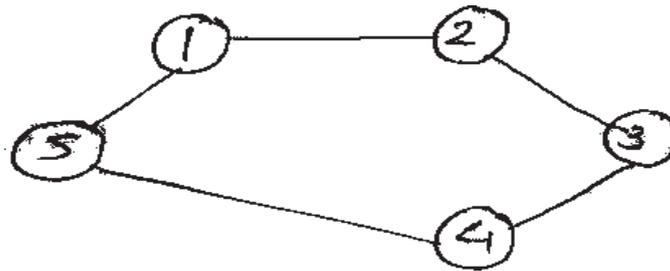
[4 × 5 = 20]

- What are the minimum and maximum number of element in a heap of height h ? Is an sorted array, a min heap? Justify.
- Use strassen's algorithm to compute the matrix product of following matrix giving each computational step

$$A = \begin{bmatrix} 4 & 3 \\ 5 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -2 \\ -4 & 2 \end{bmatrix}$$

- What is best way to multiply a chain of matrices with dimensions that are 13×5 , 5×89 , 89×3 , 3×34 . respectively.

- d) Find all possible solution when the following graph is coloured using exactly 3 colours

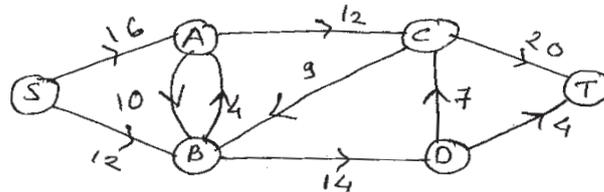


- e) Explain the function that characterize a non-deterministic algorithm.

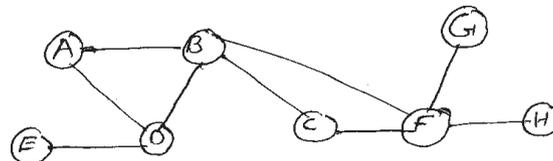
Q4) Attempt any four of the following:

[4 × 6 = 24]

- a) Find out the maximum flow from the network where S is source and T is sink.



- b) Give BFS and DFS for the following graph. Show all steps (Start at vertex A)



- c) What is Travelling salesman problem. Solve the following TSP instance using Dynamic programming method.

$$\begin{bmatrix}
 \infty & 7 & 3 & 12 & 8 \\
 3 & \infty & 6 & 14 & 9 \\
 5 & 8 & \infty & 6 & 18 \\
 9 & 3 & 5 & \infty & 11 \\
 18 & 14 & 9 & 8 & \infty
 \end{bmatrix}$$

- d) Describe LCBB method. Apply it to solve following instance of 0/1 Knapsack problem. $w = (3, 4, 6, 2, 5)$, $p = (15, 12, 10, 8, 6)$ $m = 14$.
- e) Give the recurrence relation for the value of the optimal solution when longest common subsequence problem is to be solved using dynamic programming method Give the matrix of the values computed while determining LCS of the following string.
- $X = B D C A B A$
- $Y = A B C B D A B$
- f) Define sum of subset problem? Let the weight given the $w = (5, 7, 10, 12, 15, 17)$ and $m = 22$ Draw the state space tree for the above problem to find all subsets that sum to 22.



Total No. of Questions : 5]

SEAT No. :

P587

[Total No. of Pages : 2

[4339] - 21
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 201 : Advanced Networking Concepts
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

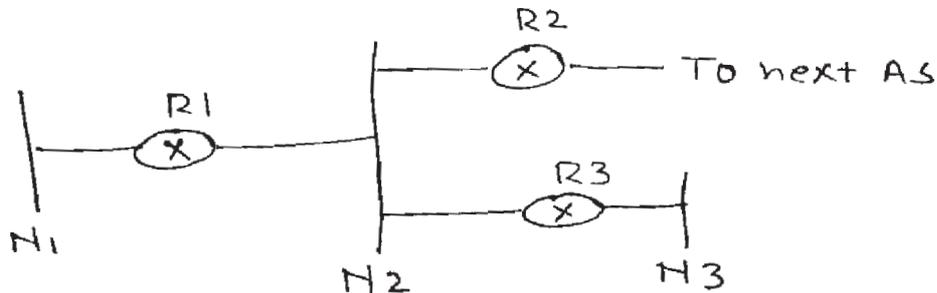
Instructions to the candidates :

- 1) All questions are compulsory.
- 2) Figures to the right indicates full marks.
- 3) Neat diagrams must be drawn wherever necessary.

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) Give format and maximum length of jumbo payload of IPV 6.
- b) Define partially qualified domain name.
- c) What is hidden terminal problem?
- d) Define interactive audio/video.
- e) In figure which router(s) sends out router link LSAS?

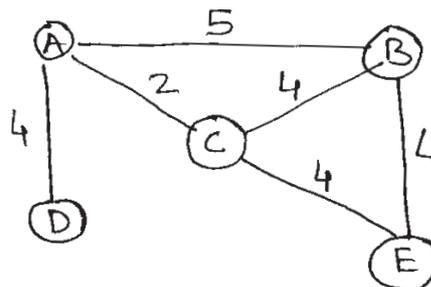


- f) What is role of relay agent in BOOTP?
- g) What is significance of persistence timer used in TCP?
- h) How does the hop count limit alleviate RIP's problems?

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Create shortest path tree by using Dijkstra algorithm for Node C. Explain the steps.



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- b) Discuss the different options supported by DHCP.
- c) Explain the login procedure used in TELNET.
- d) Explain any two options supported by IPV4/IPV6.
- e) Compare and contrast CSMA/CA with CSMA/CD.

Q3) Attempt any four of the following : **[4 × 4 = 16]**

- a) List the different types of commands used in FTP. Explain any one in detail.
- b) Explain socket structure used in client server model.
- c) What are the problems for full implementation of voice over IP? Do you think we will stop using the telephone network very soon.
- d) Releasing a connection without data loss in transport layer is not simple. Comment.
- e) Explain the functions of RTCP.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) Discuss ethernet gigabit implementation.
- b) State the advantages of IPV6 over IPV4.
- c) How TCP handles congestion control?
- d) Explain the general header and entity header used in HTTP.
- e) Explain Tomlinson's clock based method and state its problems.

Q5) Attempt any four of the following : **[4 × 4 = 16]**

- a) How non ASCII data is sent through email?
- b) What is the significance of transport layer in TCP/IP model?
- c) How errors are handled in TFTP? Explain sorcerer's apprentice bug.
- d) State the differences between data link layer protocol and transport layer protocol.
- e) Discuss response message of DNS.



Total No. of Questions : 5]

SEAT No. :

P589

[Total No. of Pages : 2

[4339] - 23
M.Sc. - I (Semester - II)
COMPUTER SCIENCE
CS - 203 : Software Architecture
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable data, if necessary.*

Q1) Attempt the following :

[8 × 2 = 16]

- a) Define the term “Architectural Styles”.
- b) What do you mean by “Architectural Patterns”?
- c) What is a pattern?
- d) Briefly explain. “Pure Fabrication” GRASP.
- e) What are the types of responsibility?
- f) In short, explain sitemesh framework.
- g) Give the features of webwork framework.
- h) What are the advantages of components?

Q2) Attempt the following (any four) :

[4 × 4 = 16]

- a) What are the VP phases?
- b) Write a short note on “Allocation” structure.
- c) Explain Interpreter Architectural Style.
- d) How pattern meets the objectives of software Architecture?
- e) What is a design pattern? What are the essential elements of a design pattern?

Q3) Attempt the following (any four) :

[4 × 4 = 16]

- a) Many graphical user interface toolkits separate the presentational aspects of the user interface from the underlying application data. Classes defining application data and presentations can be used independently. They can work together, too. Both a spreadsheet object and bar chart objects can depict information in the same application data object using different presentations. The spreadsheet and the bar chart don't know about each

P.T.O.

other, but they behave as though they do. When the user changes the information in the spreadsheet, the bar chart reflects the changes immediately, and vice versa.

Select the most appropriate design pattern to address the above problem. Give structure and participants to illustrate the use of design pattern.

- b) With the help of example, illustrate indirection GRASP.
- c) Explain Intent and applicability of Abstract Factory Design Pattern.
- d) What are the participants of decorator design pattern?
- e) Give structure and collaboration of strategy design pattern.

Q4) Attempt the following (any four) : **[4 × 4 = 16]**

- a) What are the consequences and implementation issues of singleton design pattern?
- b) What do you mean by cohesion? What are the types of cohesion?
- c) What are the scopes of resources in struts framework?
- d) Define the term “Framework”. What are the characteristics of frameworks.
- e) Write a short note on MVC model.

Q5) Attempt the following (any four) : **[4 × 4 = 16]**

- a) Explain the concept of container in struts framework.
- b) With the help of diagram, explain middle tier of struts framework.
- c) What are the different approaches for component based development?
- d) Consider a PAN card registration form with the fields Name, Address, Date of Birth, Mobile No., Email-ID.
Apply validator framework of struts for the above fields.
- e) The website contains a home page displaying information about real estate. On clicking the “Real Estate” URL, a home page asks for type, location, and price range. When a page is submitted, an index page displays a list of Real Estate, and prices along with the link to the details.
Design a struts application along with the struts components needed to design the above application.



Total No. of Questions : 5]

SEAT No. :

P590

[Total No. of Pages : 2

[4339] - 31
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 301 : Software Metrics and Project Management
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All the questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt the following :

[8 × 2 = 16]

- a) Define activity sequencing.
- b) What is project charter?
- c) What is metric plan?
- d) What is the need of CCB's?
- e) Define fault and failure in software.
- f) Define MTTF.
- g) State tools and techniques used in quality assurance.
- h) What do you mean by project.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Discuss project life cycle.
- b) Explain WBS with example.
- c) What is the project scope management.
- d) Define :
 - i) EVA.
 - ii) SV.
 - iii) CV.
 - iv) CPI.
- e) Discuss various types of contracts.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) Project manager tries to reduce high staff turnover. Justify.
- b) Write a note on quality control.
- c) Write a note on GQM.
- d) Write a note on solicitation planning.
- e) Discuss role of communication management in particular project.

P.T.O.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) “The basic problem of reliability theory is to predict when a system will eventually fail”. Justify.
- b) What are the different areas for identification of risk.
- c) Explain different process involved in project Human Resource Management? Explain team development planning in detail.
- d) In software metrics data collection, what are the consideration for “when to collect data”.
- e) Explain importance of good time management.

Q5) Attempt any four of the following : **[4 × 4 = 16]**

- a) Write a note on organizational work breakdown structure.
- b) Differentiate between software reliability and hardware reliability.
- c) Describe project execution tools and techniques.
- d) Write a note on attributes of software measure.
- e) What are the types of power in HR management.



Total No. of Questions : 5]

SEAT No. :

P591

[Total No. of Pages : 2

[4339] - 32
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 302 : Mobile Computing
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

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

Q1) Attempt all of the following :

[16]

- a) What is the difference between CLDC and CDC?
- b) What is good code for CDMA?
- c) What is RTT problem in GSM? How it can be resolved?
- d) What are the advantages of spread spectrum technology?
- e) What is the difference between FACOA and Co-COA?
- f) What are the functions of MSC in GSM?
- g) What is profile? Name different profiles of J2ME?
- h) What are the functions of Gateway GSN in GPRS?

Q2) Attempt any four of the following :

[16]

- a) Name all entities of GSM with their functionality.
- b) What is snooping TCP? What are its advantages and disadvantages?
- c) Why is routing in multi-hop ad-hoc network is complicated?
- d) What are the advantages and disadvantages of cellular system?
- e) Explain MACA with its advantages and disadvantages.

Q3) Attempt any four of the following :

[16]

- a) What is micro-mobility support? Why it is required in mobile IP? Which are the schemes available for micro-mobility support?
- b) Explain coda file system.
- c) What is the purpose of following optimizations in TCP?
 - i) Fast retransmission/Recovery.
 - ii) Timeout freezing.
 - iii) Transaction oriented TCP.
 - iv) Selective Retransmissions.

P.T.O.

- d) What are the advantages of IPV6 in mobile IP?
- e) Explain logical reference model of location based services (LCS).

Q4) Attempt any four of the following : **[16]**

- a) How localization is achieved in GSM?
- b) Explain architecture of WAP.
- c) What are the features of WML?
- d) What are the constraints possible on Text Box in J2ME?
- e) What are the Quality Of Services (QOS) GPRS supports?

Q5) Attempt any four of the following : **[16]**

- a) What is reverse tunneling? Why it is needed?
- b) What improvements are needed in TCP for 2.5/3G networks?
- c) Compare proactive protocols and reactive protocols.
- d) Explain Agent Discovery mechanism of mobile IP.
- e) Compare direct sequence spread spectrum with frequency hopping spread spectrum.



Total No. of Questions : 5]

SEAT No. :

P592

[Total No. of Pages : 2

[4339] - 33
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 23 - 303 : Information Systems Security
(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) Define masquerade attack.
- b) Discuss Homophonic substitution cipher.
- c) What is use of IV in CBC mode?
- d) Explain how birthday attack is used to detect collisions in message digest algorithms.
- e) What are the problems with public key cryptography.
- f) What are the applications of IPsec?
- g) Define the term steganography.
- h) What is phishing?

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain how 3-D secure protocol is used to provide security to the credit card on the Internet?
- b) Why internetwork security is called fascinating and complex?
- c) Apply the vernal cipher algorithm to a plain text message "Hello John" using a one time pad NCBTZQARX.
- d) Discuss the advantages and disadvantages of ECB and OFB mode.
- e) Given two prime numbers $P = 7$ and $Q = 17$. Find out N , E and D in an RSA encryption process.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain the working of secure hash algorithm.
- b) What are the broad level differences between CRL, OSCP and SCVP?
- c) How key agreement and key distribution is handled in IPsec?

P.T.O.

- d) When is a Demilitarized zone required? How is it implemented?
- e) Explain how subkeys are generated in Blowfish algorithm.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) Discuss the different types of intruders. Explain any one intrusion detection mechanism.
- b) Explain any one mutual authentication mechanism with its advantages and drawbacks.
- c) Discuss the working of handshake protocol used in SSL.
- d) How does the one time initialization step works in AES?
- e) What is key wrapping? How is it useful?

Q5) Attempt any four of the following : **[4 × 4 = 16]**

- a) Explain the working of PEM.
- b) Discuss the VPN architecture in detail.
- c) A and B want to establish a secret key using Deffie Hellman key exchange protocol. Assuming the values are $N = 5$, $g = 13$, $x = 13$, $y = 9$. Find out the values of A, B, K_1 and K_2 .
- d) Discuss the various steps used in verification of digital certificate.
- e) What are authentication tokens? Explain time based tokens.



Total No. of Questions : 5]

SEAT No. :

P595

[Total No. of Pages : 7

[4339] - 103
M.Sc. (Semester - I)
COMPUTER SCIENCE
CS - 103 : Distributed Database Concepts
(2011 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to candidates :

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

Q1) Attempt any 8

[8 × 2 = 16]

- a) State briefly, the two basic alternatives of placing data, in a DDBS.
- b) State any 4 different forms of heterogeneity, found in a DDBS?
- c) Define the following : -
 - i) The Completeness rule of fragmentation.
 - ii) The Disjointness rule of fragmentation.
- d) Define the process of localization of data involved in a query.
- e) State the following rules of reduction for primary horizontal fragmentation
 - i) reduction for selection
 - ii) reduction for join
- f) Define the following :
 - i) An irreducible query.
 - ii) A monorelation query.

P.T.O.

- g) State what do you mean by a join selectivity factor between two relations R & S?
- h) Define a degree 3 level of consistency, for a transaction.
- i) Define the concept of serializability of distributed transactions.
- j) Define the following terms :
 - i) Reliability of data.
 - ii) Availability of data.

Q2) Attempt any 4 **[4 × 4 = 16]**

- a) “Concurrency control is one of the major problem areas in a DDBS”. Comment.
- b) “A unilingual MDBS doesn’t provide data model transparency and language transparency to users”. Comment.
- c) “A simple join graph ensures an intraquery parallelism, during query execution”. Comment.
- d) “The Semantic correctness of a query can be determined using a query graph”. Comment.
- e) “Semijoins are beneficial with fast networks, if they have a good selectivity and are implemented with bit arrays”. Comment.

Q3) Solve any 4 **[4 × 4 = 16]**

- a) Consider the following set of queries, on a relation dept (dno, dname, Budget, location)
 - i) Select * from dept where
dno < 10;
 - ii) Select * from dept where
budget = 500000;
 - iii) Select * from dept where
budget < 700000 and
location = “Geneva” ;

Derive the set of valid predicates, that are candidates for deriving a primary horizontal fragmentation of the relation, dept, using COM-MIN algorithm.

b) Consider the following relations :-

prog (pno , pname)

Emp (eno, ename, title)

Asg (eno, pno, resp, dur)

Consider the following fragmentations, of the above relations :

$$p_1 = \sigma_{pno \leq 'p_2'} \text{proj}$$
$$p_2 = \sigma_{pno > 'p_2'} \text{proj}$$
$$A_1 = \text{Asg} \bowtie_{pno} p_1$$
$$A_2 = \text{Asg} \bowtie_{pno} p_2$$
$$E_1 = \Pi_{eno, ename} \text{Emp}$$
$$E_2 = \Pi_{eno, title} \text{Emp}$$

Transform the following query into a reduced query on fragments.

Select ename, title

From Emp e, Asg a, proj p

Where p.pno = a. pno and

P.pname = “ Order processing”

and e.eno = A.eno and

A.dur < 24 ;

c) Consider the following relations

Emp (eno, ename, title)

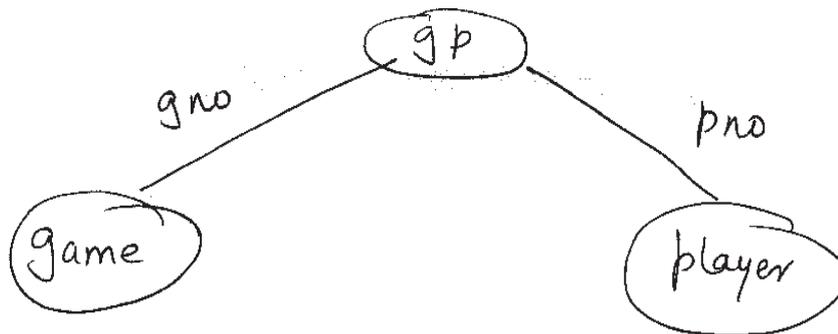
Proj (pno, pname)

Asg (eno, pno, resp, dur)

Apply Ingres algorithm and illustrate successive detachments and substitutions by giving mono relation queries :-

Select ename from
 emp e, Asg a, proj p
 where e.eno = a.eno and
 a.pno = p.pno and
 p.pno = "p4" and
 dur > 12 ;

d) Consider the following join graph



and the fragmentation information given as :

Relation	Site 1	Site 2	Site 3
game	1000	1000	1000
gp		2000	
player	1000		

Assume,

$$\text{Size (game} \infty \text{ gp)} = 2000$$

$$\text{and Size (gp} \infty \text{ player)} = 1000$$

Apply the algorithm of distributed Ingres in the following 2 cases

- i) Point - to - Point n/w
- ii) broadcast n/w

so that communication time is minimized.

- e) Consider a data item, x , stored at site 1, in a DDB with 2 sites.

Let the triple $\langle R_i, j, T_s \rangle$, $\langle W_i, j, T_s \rangle$ denote a read / write request of a transaction T_i , on x , generated at site j with time stamp T_s . Assume that initially following operations are buffered.

$\langle R_1, 2, 12 \rangle$, $\langle W_2, 1, 8 \rangle$, $\langle W_3, 2, 9 \rangle$

Indicate the behaviour of conservative Time stamp algorithm, with the following sequence of requests :-

$\langle R_4, 1, 10 \rangle$, $\langle R_5, 1, 11 \rangle$, $\langle W_6, 1, 13 \rangle$

$\langle W_7, 2, 14 \rangle$, $\langle R_8, 1, 14 \rangle$, $\langle R_9, 2, 17 \rangle$

$\langle R_{10}, 1, 16 \rangle$, $\langle W_{11}, 1, 20 \rangle$, $\langle W_{12}, 2, 22 \rangle$

Q4) Attempt any 4

[4 × 4 = 16]

- a) Consider the following view definition create view gameview (gno, gname, pno, prole)

as select g.gno, g.gname, gp.pno,

gp.prole from game g,

gameplayer gp

where g.gno = gp.gno and g.no of players <10;

The above view is accessed by an application q_1 located at sites 1 & 2 with frequencies 10 and 20 respectively. Let us further assume that another query q_2 , defined as

select gno, prole

from gameplayer where

$pno \leq 10$;

runs at sites 2 & 3, with frequencies 20 & 10 respectively.

Based on the above information,

- i) Construct the usage matrix, use (q_i, A_i) , for the attributes of game & gameplayer.
- ii) Construct Affinity matrix containing all attributes of game and game player.

(Note :- The relation game is defined by attributes (gno, gname, no of Players) and the relation game player is defined by attributes (gno, pno, prole)

- b) Explain in brief, with the help of a neat diagram, the different layers of query processing, in a DDBS.
- c) Consider the following relations

emp (eno , ename , title)

pay (title , salary)

proj (pno , pname)

Asg (eno , pno , resp)

Consider the following query

“Find the salaries of engineers who work on the cad/cam project” and the following assumptions :

$T_{msg} = 0$, $T_{Tr} = 1$ and the fragmentation / storage information given as

Relation	Size	Site
emp	8	1
pay	4	2
proj	1	3
Asg	10	4

Length of a tuple in every relation = 1.

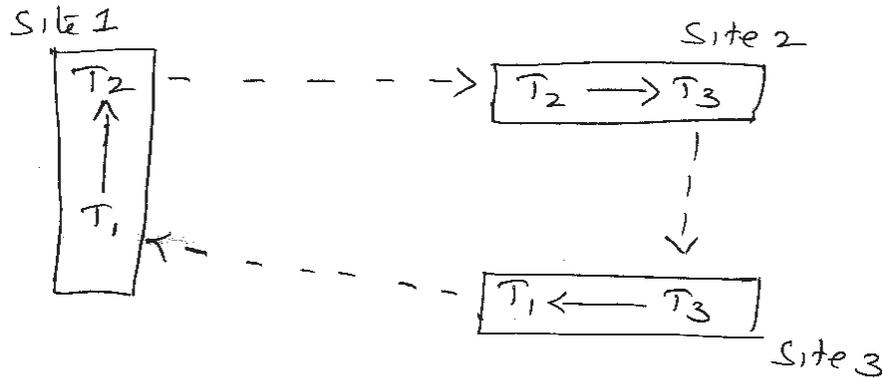
Size (emp ∞ pay) = Size (emp)

Size (proj ∞ Asg) = 2 * size (proj)

Size (Asg ∞ emp) = Size (Asg)

- i) Draw the join graph (query graph) for the above query.
- ii) Apply hill climbing algorithm and illustrate the different possible solutions for Asg ∞ emp ∞ proj ∞ pay.

d) Consider the following DWFG,



Detect deadlock, if any, using the distributed deadlock detection algorithm.

e) Write a short note on

“Different types of failures in a DDBS”.

Q5) Answer any 4

[4 × 4 = 16]

- Explain, with an example, the concept of Data localization, in query processing.
- Write a short note on “Different methods of lock management in a DDBS”.
- Write a short note on “Isolation levels”, for a transaction, in a DDBS.
- Explain briefly, the steps followed, in the execution of a termination protocol, in case of voting based protocols.
- Write a short note on the correctness rules of fragmentation for Derived Horizontal fragmentation.



Total No. of Questions : 8]

SEAT No. :

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P597

[Total No. of Pages : 2

[4339] - 201
M.Sc. (Semester - II)
COMPUTER SCIENCE
CS - 201 : Digital Image Processing
(2011 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *Question 1 is compulsory.*
- 2) *Attempt any four from the remaining.*
- 3) *Draw neat diagrams wherever necessary.*
- 4) *Figures to the right indicate full marks.*

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) What is Spatial Filtering?
- b) What is Smoothing?
- c) What do you mean by Smearing?
- d) Which are the logical operations involved in binary images?
- e) Define Image Sampling.
- f) What is a blind spot?
- g) How do we estimate the degradation function for use in image restoration?
- h) Write the coordinates of the four diagonal neighbors of pixel p (x, y).

Q2) a) Explain the different noise probability density functions encountered in image restoration. **[8]**

b) Explain and state the use of Wiener Filtering. **[4]**

c) Given below is 'X' a section of horizontal intensity profile from an image. Illustrate the 1st and 2nd derivative of the 1-D digital functions represented by 'x'. Depict zero crossing if any. **[4]**

Scan Line x :

6	6	6	6	6	5	4	3	2	1	1	1	1	1	1	6	6	6	6	6
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Q3) a) State the equations for 2-D discrete Fourier transform and its inverse. Describe any two properties of 2-D discrete Fourier transform. **[8]**

b) Explain Image Subtraction and Image Averaging. Why is it used in Image Enhancement? **[4]**

c) List the types of Adaptive Filters and explain how they help in noise reduction. **[4]**

P.T.O.

- Q4)** a) Explain the basics of filtering in the frequency domain. [8]
 b) What is 'Bridging Gap'? How is it achieved with the help of Dilation?[4]
 c) Explain the following with respect to a pixel : [4]
 i) Adjacency.
 ii) Boundaries.
 iii) Connectivity.
 iv) Regions.

- Q5)** a) Describe the fundamental steps in Image Processing with the help of block diagram? [8]
 b) Explain Image Acquisition using sensor arrays. [4]
 c) Explain Bandreject, Bandpass and Notch Filters. [4]

- Q6)** a) Given a 3-bit image of size 64×64 pixels having intensity distribution as shown in the table given below, where intensity levels are in the range 0-7. Apply histogram equalization technique and find the transfer function $T(r)$ which relates input image intensity level R_k to output image intensity S_k . [8]

Intensity Level	Number of Pixels
$R_0 = 0$	790
$R_1 = 1$	1023
$R_2 = 2$	850
$R_3 = 3$	656
$R_4 = 4$	329
$R_5 = 5$	245
$R_6 = 6$	122
$R_7 = 7$	81

- b) Draw the shapes for the orders $n = 4, 6$ and 8 . Also give their Chain code representations, first difference and shape number. [4]
 c) What is Gamma Correction? Explain. [4]
- Q7)** a) Explain hit or miss transformation in Morphological Image Processing. [8]
 b) Explain local processing for edge linking. [4]
 c) Write a short note on Ideal High Pass Filter. [4]
- Q8)** a) Describe the role of illumination in thresholding, basic adaptive thresholding and basic global thresholding. [8]
 b) Explain Zooming and Shrinking in digital images. How does it take place? [4]
 c) Define mixed adjacency. Explain how it eliminates ambiguity that often arises with 8-adjacency. [4]



Total No. of Questions : 5]

SEAT No. :

P600

[Total No. of Pages : 2

[4339] - 301
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 301 : Software Metrics and Project Management
(2011 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt the following questions :

[8 × 2 = 16]

- a) Why project manager called as “captain of ship” of the project.
- b) What do you mean by project plan?
- c) Define the first phase of project scope.
- d) Define :
 - i) Fault.
 - ii) Failure.
- e) Define staff acquisition.
- f) List the process of project procurement management.
- g) Define :
 - i) MTTF.
 - ii) MTBF.
- h) What is the defination of quality according to JSO.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain characteristics of measurement team member.
- b) Write a short note on CMM.
- c) Differentiate between software reliability and hardware reliability.
- d) Discuss the reasons of failure of JT projects.
- e) Explain cost estimation tools and techniques.

P.T.O.

Q3) Attempt any four of the following : **[4 × 4 = 16]**

- a) Explain five basic modes in handling conflict in communication.
- b) Differentiate internal product attribute and external product attribute based on various entities.
- c) Explain why and what, Where and when. How of metric plan?
- d) Consider the example of designing a website for aircraft system. Design work break down structure for the above system.
- e) Describe project execution tools and techniques.

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) Summarize the process involved in human resource management.
- b) Write a short note on performance reporting.
- c) What is the need of resource measurement.
- d) Write a short note on PSP.
- e) Write a short note on :
 - i) Stake holder analysis.
 - ii) Overall change control.

Q5) Attempt any four of the following : **[4 × 4 = 16]**

- a) Explain in detail project scope statement.
- b) Describe Gantt chart.
- c) Which factors affects the quality of JT project.
- d) Write a short note on simulation.
- e) What are the different types of contracts.



Total No. of Questions : 5]

SEAT No. :

P601

[Total No. of Pages : 2

[4339] - 302
M.Sc. (Semester - III)
COMPUTER SCIENCE
CS - 302 : Mobile Computing
(2011 Pattern)

Time : 3 Hours]

[Max. Marks : 80

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *All questions carry equal marks.*
- 3) *Figures to the right indicate full marks.*

Q1) Attempt all of the following :

[8 × 2 = 16]

- a) Define short term fading.
- b) List the different messages used in wireless control message protocol.
- c) What disadvantages does OVSF have with respect to flexible data rates?
- d) List any two disadvantages of snooping TCP.
- e) Why guard spaces are required in multiplexing?
- f) How mobile communication is useful in vehicles?
- g) Explain hidden and exposed terminals.
- h) Give any two requirements of mobile IP.

Q2) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain the packet delivery to and from the mobile node.
- b) What is path loss of radio signal? Also explain additional signal propagation effects.
- c) List and explain the task of RNC in UMTS.
- d) Why is a new infrastructure needed for GPRS, but not for HSCSD? Which components are new and what is their purpose?
- e) Explain J2ME architecture.

Q3) Attempt any four of the following :

[4 × 4 = 16]

- a) Explain the mobile originated SMS procedures.
- b) Explain the three classes of transaction service used in WTP.
- c) Compare in between SDMA and TDMA.

P.T.O.

- d) How does registration of mobile node occurs?
- e) What are the functions of authentication and encryption in GSM? How is system security maintained?

Q4) Attempt any four of the following : **[4 × 4 = 16]**

- a) Which general features WSP offers for content exchange?
- b) Discuss the features of Android.
- c) Name the inefficiencies of mobile IP regarding data forwarding from a correspondent node to a mobile node. What are optimizations and what additional problems do they cause?
- d) Give reasons for a handover in GSM. What are the typical steps of intra MSC handover.
- e) How and why does I - TCP isolate problems on the wireless link? What are the main drawbacks of this solution?

Q5) Attempt any four of the following : **[4 × 4 = 16]**

- a) How does dynamic source routing handle routing?
- b) Explain UMTS system architecture.
- c) Explain the working of mobile TCP.
- d) Discuss the demand assigned multiple access method.
- e) Explain how wireless transport layer established a secure session.

