**Total No. of Questions :5]** **[Total No. of Pages : 4**

**P1057** **[3733]-101**

# M.Sc.
# COMPUTER SCIENCE
## CS - 11 - 101 : Principles of Programming Languages
## ( New & Old Course) (Sem. - I)

***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.***
5) ***All questions carry equal marks.***

***Q1)*** Attempt All : **[ 8 × 2 = 16]**

a) Give one example and one usage of dataflow languages.

b) Write two advantages of multiway assignment. Which language supports this concept?

c) Write two disadvantages of 'Locks & keys' machanism.

d) What is the difference between formal and actual parameters?

e) Justify : True/False : Private members of base class are inherited by derived class.

f) What is the difference between concurrent program and parallel program?

g) Why variables need not be declared in a prolog program before their use?

h) What do you mean by atom in LISP? Give two examples.

***Q2)*** Attempt any FOUR : **[ 4 × 4 = 16]**

a) What determines whether an object is allocated statically, on the stack, or in the heap?

b) Differentiate between boolean condition evaluation techniques in C and Pascal.

c) Why might a compiler reorder the fields of a record? What problems might this cause?

**P.T.O.**

d) Consider the following pseudocode :

——— *x* : integer

——— *y* : integer

——— Procedure one ( P : procedure )

————— *x* : integer

————— *x* : = *y* ; *y* : = 2 ; P ( ) ;

——— Procedure two

————— *x* : = *x* + *y*

——— Procedure three

————— Write - integer (*x*)

——— begin /* main */

————— *x* : = 0 ; *y* : = 1 ;

————— one (two) ; three ( ) ;

——— end.

What does this program print if the language uses dynamic scoping with deep binding and dynamic scoping with shallow binding? Explain the results.

e) Consider the following Pseudocode :

——— Procedure P ( A, B : real )

——— *x* : real

————— Procedure Q ( B, C : real )

————— *y* : real

————— . . .

————— procedure R ( A, C : real )

————— *z* : real

————— . . . – – – ( * )

Assuming static scope, what is the referencing environment at the location marked by ( * ) ?

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

a) List the objects and information commonly found in a stack frame.

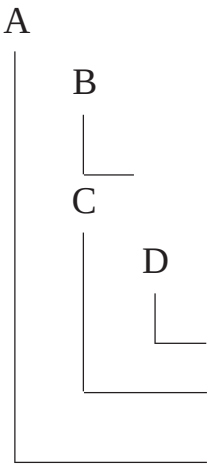
b) What is a dope vector? What purpose does it serve?

c) Why tail recursion optimization is significant? Apply the same on the following function by removing the recursive call and replacing it with a loop to compute the same result.

```
Int log2 (int m, int n)
{ if ( n < 2 ) return m ;
else return log2 ( n | 2 , m + 1 ) ;
}
```

d) Consider the following diagram depicting subroutine nesting levels with the calling sequence as

A, C, D, B, C, D.




Draw the static and dynamic links. Suppose subroutine D now accesses a variable declared in A. How many static links have to be traversed to access this variable?

e) What do you mean by Jensen's device? Explain the parameter passing technique used by Jensen's device.

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

a) Explain shared multiple inheritance with the help of a suitable diagram.

b) How does C + + compiler tell which constructor to use for a given object?

c) Explain the coherence problem in the context of multiprocessor caches.

d) Describe the following terms :

i) Reentrant procedure.

ii) Atomic operation.

e) What makes a programming language successful?

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

a) Explain any four built - in I | O predicates in prolog.

b) Write a prolog program to illustrate the use of red cut.

c) Define a recursive function in LISP to return last element of the list.

d) Define a recursive function in LISP to append two lists taken as argument.

e) Consider the following sentences :

All cats like to eat all types of fish. All calico are cats. All tuna are fish. Charlie is tuna. Herb 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 :4]** **[Total No. of Pages : 2**

**P1058**

# [3733]-102
# M.Sc.
# COMPUTER SCIENCE
## CS - 102 : Object Oriented Software Engineering
## (2005 Pattern (Old) & 2008 Pattern (New)) (Sem. - I)

***Time :3Hours]*** ***[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) What is a model?

b) Explain two ways to apply UML.

c) What do you mean by Generalization?

d) What is object oriented analysis?

e) A modeling technique is normally described by means of syntax, semantics and pragmatics. Comment.

f) The purpose of testing is to find faults. Comment.

g) What is unified Process.

h) What is UML?

***Q2)*** Attempt any four of the following : **[ 4 × 4 = 16]**

a) Discuss the different components of activity diagram.

b) What are the different types of classifiers supported in UML?

c) Explain breaking and organizing of system into subsystems in system design phase.

d) Write a short note on object oriented testing.

e) What are the UP phases?

**P.T.O.**

***Q3)*** Attempt any four of the following : **[ 4 × 8 = 32]**

a) Prepare a class diagram giving attributes and operations and state transition diagram for both stack and queue implementation using Linked List.

b) Draw state Transition & Activity diagram for different operations supported by 'Washing Machine'.

c) Draw component and Deployment diagram for 'Satellite Communication system'.

d) Prepare object diagram showing at least 8 relationships among the following classes. Include associations, aggregations and generalization. Show multiplicity : You can add additional attributes if necessary. Add atleast one attribute to each class. Expression, constant, variable, function, argument list, relational operator, term factor, arithmetic operator, statement, program.

e) People use elevators to move from one floor to another. Discuss different scenarios and prepare a sequence diagram showing different events and event exchanges between objects.

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

a) Write a note on artifacts in Elaboration.

b) How are requirements organized in UP Artifacts.

c) Discuss the task management component.

d) Draw a collaboration diagram for 'Library Management System'.

e) Draw an activity diagram for the control of a Telephone Answering Machine. An incoming call is detected on the first ring and the machine answers the call with a pre-recorded announcement. When the announcement is complete the caller's message is recorded. When the caller hangs up the machine hangs up and shuts off.

# # # #

**Total No. of Questions :5]** **[Total No. of Pages : 4**

**P1059**

# [3733]-103
# M.Sc.
# COMPUTER SCIENCE
# CS -103 : Advanced Database Concepts (ADC)
# (Sem. - I)

***Time :3Hours]*** ***[Max. Marks : 80***

***Instructions to the candidates:***

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw the neat diagrams if necessary.***
4) ***Make necessary assumptions.***

***Q1)*** Answer the following : **[8 × 2 = 16]**

a) What is workload? How to measure it?

b) How to achieve reliability through the distributed transaction.

c) What is DBMS Benchmark?

d) What is mean term selectivity & access frequency?

e) Explain the role played by distributed query processor.

f) What is search space and search strategy?

g) Explain what is phantom.

h) Differentiate between MTBF & MTTR.

***Q2)*** Answer the following (any four) : **[4 × 4 = 16]**

a) Explain how inplace update and out of place updating takes place.

b) What is basic purpose of conservative time stamp ordering.

c) Explain with diagram the working of distributed execution monitor.

d) What are the problems which arises during query processing?

e) What are categories of information need to be maintained in case of a fragmentation.

***P.T.O.***

***Q3)*** a) Answer the following **:** **[2 × 4 = 8]**

i) Explain MDBMS architecture with GCS and without GCS.

ii) Explain the steps involved in generation of CA.

b) Attempt the following : **[2 × 4 = 8]**

i) Give at least one serializable and one Non serializable schedule for the following transaction.

| $T_1$ | $T_2$ | $T_3$ |
|---|---|---|
| Read ($y$) | Read ($x$) | Read ($x$) |
| $y = y - 10$ | Read ($y$) | $x = x - 50$ |
| Read ($x$) | Read ($z$) | Write ($x$) |
| $x = x - 100$ | $x = x - 10$ | Read ($y$) |
| Write ($y$) | $y = y - 50$ | $y = y - 100$ |
| Write ($x$) | z = z – 10 | Write (y) |
| Read ($z$) | Write ($x$) | Read ($z$) |
| $z = z - x$ | Write ($y$) | $z = x - y$ |
| Write ($z$) | Write ($z$) | Write ($z$) |

ii) Consider the following schedule and explain which schedules are conflict-equivalent and complete.

$S_1 = \{R_2(z), W_2(x), W_2(y), C_2, W_1(x), R_1(x), A_1, R_3(x), R_3(z), R_3(y), C_3\}$

$S_2 = \{R_3(z), W_2(x), W_2(y), R_1(x), R_3(x), R_2(z), R_3(y), C_3, W_1(x), C_2, C_1\}$

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

a) Simplify the following query and check whether it is semantically correct or not.

Select eno from

ASG where

Resp = “Analyst”

AND NOT ( pno = "$p_2$" OR DUR = 12 )

AND pno $\neq$ "$p_2$"

AND DUR = 12

b) Given the relation EMP (ENO, ENAME, TITLE)

Let $P_1$ & $P_2$ be the two simple predicates where

$P_1$ : TITLE < "programmer"

$P_2$ : TITLE > "programmer"

Assume that char strings has order amongs then based on alphabetical order.

i) Perform the horizontal fragmentation of EMP with respect to $P_1$ & $P_2$

ii) Explain whether the resulting fragmentation emp1& emp2 fulfills the correctness rules of fragmentation or not?

iii) Modify the predicates $P_1$ & $P_2$. if needed to satisfy correctness rules.

c) Apply the algorithm INGRES to the following query and illustrate the successive detachment and substitutions by giving mono-relation sub queries generated.

Select ename, sal

from EMP, ASG , PROJ, Pay

Where EMP. eno = ASG · eno

AND EMP. title = Pay, title

AND Budget > 200000

OR DUR = 24

AND ASG . pno = PROJ. Pno

d) Let Q = {$q_1$,$q_2$,$q_3$,$q_4$,$q_5$} be the set of queries

A = {$A_1$,$A_2$,$A_3$,$A_4$,$A_5$} be the set of attributes and

S = { $S_1$,$S_2$,$S_3$} be the set of sites. Use the attribute usage values and access frequencies and Do the vertical fragmentation of set of attributes using BE algorithm.

$A_1$ $A_2$ $A_3$ $A_4$ $A_5$

Attribute usage matrix

$$\begin{array}{c} \\ q_1 \\ q_2 \\ q_3 \\ q_4 \\ q_5 \end{array} \begin{array}{c} \begin{array}{ccc} S_3 & S_1 & S_2 \end{array} \\ \begin{bmatrix} 10 & 20 & 0 \\ 5 & 0 & 10 \\ 0 & 35 & 5 \\ 0 & 10 & 0 \\ 0 & 15 & 0 \end{bmatrix} \end{array}$$

Access frequencies.

e) Select ENAME from EMP, PROJ, ASG
Where EMP. ENO = ASG · ENO AND ASG · PNO = PROJ.PNO
AND PNAME = "CAD/CAM"
AND DUR = 12 or DUR = 24
AND ENAME < > '*xyz*'
Convert the above query into the operator tree.

$$\begin{array}{c} \\ q_1 \\ q_2 \\ q_3 \\ q_4 \\ q_5 \end{array} \begin{array}{c} \begin{array}{ccccc} & & & & \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 \end{bmatrix} \end{array}$$

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

a) What is deadlock? How deadlock can be managed?

b) Explain the problems why DBMS bypass OS buffer manager and manage the disk & main memory.

c) Explain the issues of global directory.

d) Explain the process of localization.

e) Which drawbacks of PC2PL are removed by D2PL?

# # # #

**Total No. of Questions : 4]** **[Total No. of Pages : 4**

**P1060**

# [3733]-104
# M.Sc.
# COMPUTER SCIENCE
## CS11-104 : Design & Analysis of Algorithms
## (Old & New Course) (Semester - I)

***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) ***Assume suitable data, if necessary.***

***Q1)*** Attempt all of the following : **[8 × 2 = 16]**

a) Define O notation. Is $2^{n+1} = O(2^n)$?

b) What are prefix codes? What is the use of prefix code.

c) Explain relaxing of edge with an example.

d) What is the difference between Dynamic programming and Divide and conquer strategy.

e) Define articulation point and bridge.

f) What is optimal substructure property. List any two problems which satisfy this property.

g) Define P and NP class.

h) Define explicit and implicit constraints.

***Q2)*** Attempt any Four of the following : **[4 × 5 = 20]**

a) Find an optimal solution to the Knapsack problem instance, $n=7, m=35$, $w = (15, 13, 12, 7, 9, 5, 8)$ and $p = (30, 28, 36, 7, 15, 10, 20)$

b) Define sum of subset problem. What are the rules for generating state space tree?

c) Explain Dijkstra's Algorithm. What is its time complexity?

d) What is Tower of Hanol problem? Give a recursive algorithm for the problem and find its running time in terms of number of disks *n*.

e) What do you mean by Stable Sorting Algorithm. Prove that counting sort is stable.

***Q3)*** Attempt any Four of the following : **[4 × 5 = 20]**

a) Write a nondeterministic algorithm for max Clique decision problem.

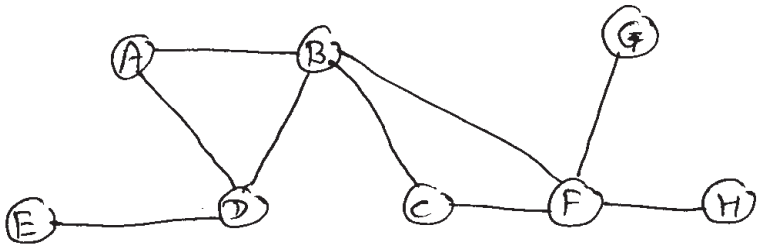
b) What is matrix chain multiplication problem. What is the best way to multiply a chain of matrices with dimensions, A = 10 × 20, B = 20 × 50. C = 50 × 1, D = 1 × 100, using dynamic programming.

c) What is the longest common subsequence problem? Find the LCS of following string.

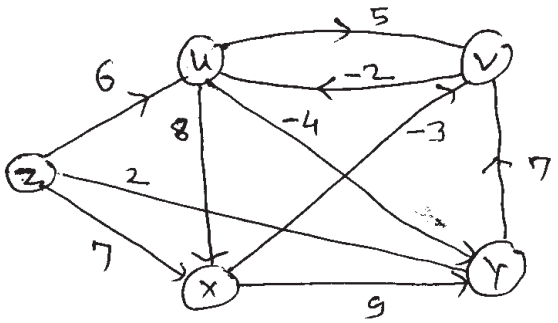
X = AGCGA

Y = CAGATAGAG

d) Explain Breadth First traversal of a graph. Give a breadth first traversal for following graph starting at A, if neighboring nodes are picked in reverse alphabetical order.

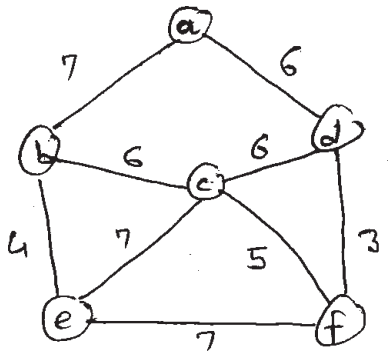



e) Using Bellman Ford algorithm find lengths of shortest paths from source Z to all other vertices.



***Q4)*** Attempt any Four of the following : **[4 × 6 = 24]**

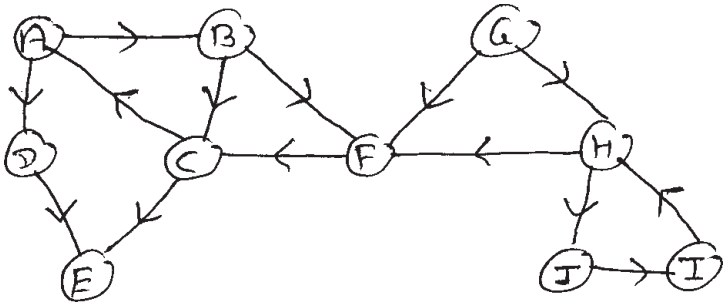
a) What is minimum spanning tree? Use Prim's and Kruskal's algorithm to find minimum spanning tree of following graph.



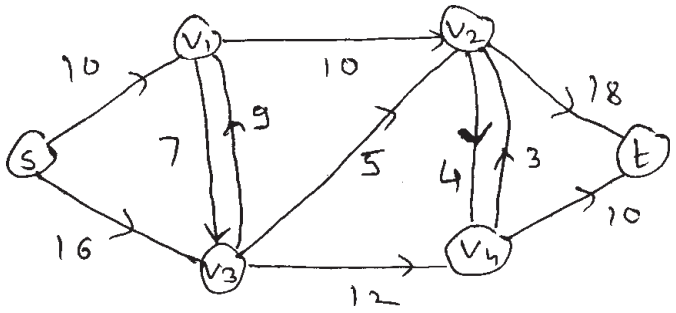

b) Draw the portion of state space tree generated by LCBB for the Knapsack problem instance given by w = (4, 6, 3, 4, 2), p = (10, 15, 6, 8, 4) and $m$ = 12.

c) Derive the time complexity required by Strassen's matrix multiplication. How Strassen's approach different from the ordinary matrix multiplication algorithm.

d) What are strongly connected component? Give the algorithm to compute strongly connected component using DFS. Find the strongly connected component of the following graph using above algorithm.




e) What is Flow Network? Explain Ford Fulkerson algorithm to find maximum flow and illustrate it on the following network where $s$ is the source and $t$ is the sink.



f) Explain Travelling salesperson problem using dynamic programming. Find the shortest path for following instance of TSP defined by cost matrix.

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

✷✷✷

**Total No. of Questions :5]** **[Total No. of Pages : 3**

**P1061**

# [3733]-201
# M.Sc. - I
# COMPUTER SCIENCE
# CS -201 : Advanced Networking
# (Old & New) (Sem. - II)

***Time :3Hours]*** ***[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.***

***Q1)*** Attempt all of the following : **[ 8 × 2 = 16]**

a) State the advantages of frame relay over x.25.

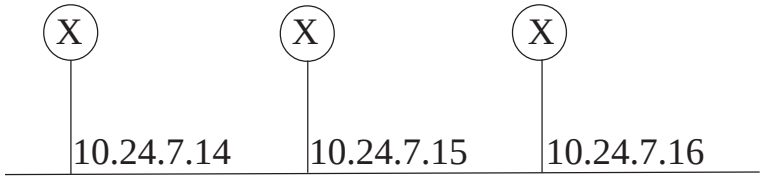
b) Define partially qualified domain name.

c) Why CSMA/CD is not needed in Gigabit ethernet?

d) Define streaming stored audio/video.

e) Why does a newly added host need to know the address of a router?

f) Give the network link LSA.




g) What is the significance of the following address.

| 8 bits | 120 bits |
|---|---|
| 00000000 | 0000.....0000001 |

h) State the limitations of TCP segment size.

***Q2)*** Attempt any four of the following : **[ 4 × 4 = 16]**

a) Discuss design goals of ATM.

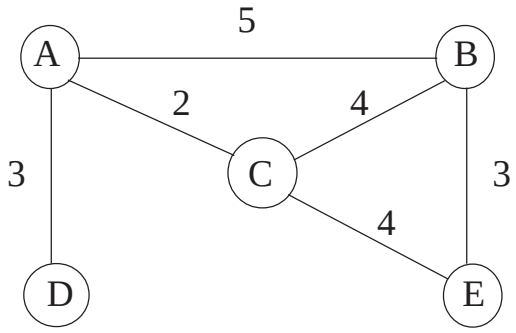
b) Discuss the use of control characters used in TELNET for controlling the server.

***P.T.O.***

c) Explain any two types of method proposed for connection relase in transport layer.

d) Explain ICMP's destination unreachable message with all codes.

e) Create shortest path tree by using Dijkstra algorithm for node A. Explain the steps.




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

a) Explain the operations supported by BOOTP.

b) Explain the different types of resolutions used in DNS.

c) Where in the protocol stack RTP is placed? Explain the working of RTP.

d) Explain socket interface for connection oriented concurrent server.

e) To reduce the complexity of multicast routing, explain which approches are used.

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

a) A user wants to make a directory called

Jan under the directory /usr/usrs/letters.

The host is called "Magraw. com". Show all of the commands & responsed used in FTP.

b) Explain how silly window syndrome & clark's solution are complement each other.

c) What is jitter? Explain any two solutions of jitter.

d) Explain the automatic & configured tunneling used in IP v 6.

e) How dynamically buffer management is done in transport layer.

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

a) Why do we need an RRQ or WRQ message in TFTP but not in FTP?

b) Explain different types of responses used by SMTP server.

c) Discuss the features of TCP service model.

d) Explain upward and downward multiplexing used in transport layer.

e) Explain the role of SNMP & MIB.

# # # #

**Total No. of Questions :5]** **[Total No. of Pages : 4**

**P1062**

# [3733]-202
# M.Sc. - I
# COMPUTER SCIENCE
# CS - 202 : Unix Internals
# (2005 Pattern (Old) & 2008 Pattern (New)) (Sem. - II)

***Time :3Hours]*** ***[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.***
5) ***Assume suitable data, if necessary.***

***Q1)*** Attempt all of the following : **[ 8 × 2 = 16]**

a) What is callout table? What is its usage?

b) What is inode reference count? What do you mean by inode reference count = 0 and inode reference count > 0?

c) Define context of a process.

d) Which system calls can be used in following situations? Give and explain its syntax.

   i) When a user wants to change a current directory of a process.

   ii) If a user wants to simulate the usual file system hierarchy and run processes there.

e) What is signal? What do you mean by following? Signal (SIGINT, sigcatcher).

f) Discuss the cases in which a process can incur protection fault.

g) Give any four functions of line discipline.

h) Justify. A buffer cannot be on both hash queue and on free list at the same time.

***P.T.O.***

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

a) A process can unlink a file while another process has the file open.

b) A successful exec system call never returns.

c) A disk block may belong to more than one inode or to the list of free blocks and an inode.

d) Text and data of a process occupy same region of a process.

e) A process sleeping and waiting for completion of disk I/O has a higher priority than a process waiting for a free buffer.

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

a) In algorithm iput for releasing in _core inode, consider.

i) reference count = 0 and link _count > 0

ii) reference count = 0 and link _count = 0

What would happen in each case?

b) How does wait algorithm respond to the death of child signal?

c) Discuss the swap out function of a swapper process.

d) What are block and character device switch tables? Which system call is used to create the device file?

e) Describe the actions taken by kernel for detaching a region from a process.

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

a) What is the output of the following program?

What are the contents of file ‘test.txt’?

```
# include   < stdio.h >
# include   < fcntl.h >
Main ( )
{
      int fd1, fd2, fd3 ;
      fd1 = open ( “test.txt”, O–RDWR | O–TRUNC);
      printf ( “ fd1 = %.d\n”, fd1);
      write ( fd1, “Rose is’’, 7);
```

```
        fd2 = dup (fd1);
        Printf ( "fd2 = %d \n", fd2);
        Write (fd2, "beautiful",10)  ;
        Close (0);
        fd3 = dup (fd1) ;
        Printf ( " fd3 = %d\n", fd3) ;
        Write ( 0, "flower", 7) ;
        dup2 (3,2) ;
        write (2, "!\n" ), 2) ;
}
```

b) Write a program in C in which parent process will write into unnamed pipe and child will read from it.

c) What does the following program demonstrate? Explain its working.

```
# include < signal.h >
main (int argc, char * argv [ ] ) ;
{
        Char buf [256] ;
        if (argc ! = 1)
                signal (SIGCLD, SIGIGN)
        While ( read (0, buf, 256))
                if ( fork ( ) = = 0)
                {
                        exit (0) ;
                }
}
```

d) Write a program in C to print the inode number of every file of a directory.(Accept directory name from user.)

e) Explain the behaviour and output of the following program.

```
Main ( )
{
        int i ;
        char * cp ;
        extern char  *sbrk ( );
        cp = sbrk (10) ;
```

```
        for ( i = 0 ; i < 10 ; i + + )
              *cp ++ = 'a' + i ;
        sbrk ( –10 ) ;
        cp = sbrk ( 10 ) ;
        for ( i = 0; i < 10 ; i ++)
              Printf ( " char % d = % c \n", i, * cp ++) ;
  }
```

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

a) Explain fork swap and expansion swap.

b) Answer in brief :

i) A delayed write is different from asynchronous write. Comment.

ii) Convert logical byte offset 1,25,000 into actual physical byte offset using bmap algorithm. Assume block size 1024 bytes.

c) List and explain the syntax of time related system calls.

d) Which are the actions taken by kernel while unmounting a file system?

e) Consider block size = 512 bytes. Determine the offset, no. of bytes read in each of the following read statement.

Consider the statements are executed in the same process.

read (fd, buffer, 250) ;
read (fd, buffer, 400) ;
read (fd, buffer, 700) ;

# # # #

**Total No. of Questions :5]** **[Total No. of Pages : 2**

**P1063** **[3733]-203**

# M.Sc. - I
# COMPUTER SCIENCE
## CS - 203 : Software Architecture
## (2005 Pattern (Old) & 2008 Pattern (New)) (Sem. - II)

***Time :3Hours]*** ***[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 is a pattern?

c) What do you mean by coupling?

d) What are the types of responsibility?

e) What makes a pattern?

f) Briefly explain "Baracudda" framework.

g) Give the features of "Cacoon" framework.

h) What are the advantages of components?

***Q2)*** Attempt the following (Any four) **[ 4 × 4 = 16]**

a) What is the UML? How to apply UML?

b) What is Software Architecture? What is not software architecture?

c) Explain pipe and filter 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) Consider a drawing editor that lets users draw and arrange graphical elements ( lines, polygon, text, etc.) into pictures and diagrams. The drawing editor's key abstraction is the graphical object, which has an editable shape and can draw itself.

***P.T.O.***

The interface for graphical objects is defined by an abstract class called shape. The editor defines a subclass of shape for each kind of graphical object : a lineshape class for lines, a polygonshape class for polygon, and so forth.

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

b) With the help of example illustrate "Information Expert" GRASP.

c) Explain intent and applicability of Singleton Design Pattern.

d) What are the participants of Adaptor Design Pattern?

e) Give structure and collaboration of Interator Design Pattern.

***Q4)*** Attempt the following (Any Four) **[ 4 × 4 = 16]**

a) What are the consequenses and implementation issues of Command Design Pattern?

b) Write a short note on Creator GRASP.

c) Define the term framework. What are the characteristics of framework?

d) Write a short note on MVC Model.

e) Which are the scopes of resources in struts framework?

***Q5)*** Attempt the following (Any Four) **[ 4 × 4 = 16]**

a) With the help of diagram, explain client tier of struts framework.

b) Explain the concept of container in struts framework.

c) What are the different approches for component based development?

d) An online admission form contains information such as Name, Date of Birth, Qualification, Email Address, Mobile Number, and Course Name, Mobile No. is optional field.

Apply validation framework for the above application.

e) The website contains a home page displaying information about Bikes. On clicking the Bike'VRL, a home page asks for model, type, and price range. When a page is submitted, an index page displays a list of bikes, and prices along with the link to the bike details.

Design a struts application along with the struts components needed to design the above application.

# # # #

**Total No. of Questions :5]** **[Total No. of Pages : 2**

**P1064**

# [3733]-301
# M.Sc.
# COMPUTER SCIENCE
## CS -301 : Software Metrics & Project Management
## (Old & New) (Sem. - III)

***Time :3Hours]*** ***[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 the following : **[ 8 × 2 = 16]**

a) What do you mean by personel software process?

b) What is metric Plan?

c) Define MTTF.

d) Define internal and external quality attributes.

e) What is risk factor?

f) What is EVA?

g) What is the need of CCB's?

h) What is project management?

***Q2)*** Attempt any four of the following : **[ 4 × 4 = 16]**

a) What is project plan? Discuss project plan execution in detail.

b) Write a note on WBS? Explain how it is useful to project manager.

c) Discuss merits and demerits of organizational structure.

d) State and explain the outputs of administrative closure process.

e) Discuss various types of contracts with its merits and demerits.

**P.T.O.**

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

a) Write a note on "Rolls & Responsibilities".

b) What are the tools for activity sequencing? Explain each one in brief.

c) Explain McCall's software quality model in detail.

d) What are different processes involved in project quality management? Explain quality control planning in detail.

e) Differentiate software reliability and Hardware reliability.

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

a) What do you mean by project integration management? State its importance.

b) Write a note on cost budgeting and cost control.

c) What are different processes of risk management? Explain risk quantification in detail.

d) What is project procurement management?

e) Explain different processes involved in project Human Resource Management? Explain team development planning in detail?

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

a) Write a note on GQM paradigm.

b) "Software reliability measurement is a prediction problem" comment & justify.

c) Explain process of change control.

d) Why 'revising the metric plan' is necessary?

e) Discuss key components of project management frame work.

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**Total No. of Questions :5]** **[Total No. of Pages : 2**

**P1065**

# [3733]-302
# M.Sc.
# COMPUTER SCIENCE
# CS -302 : Mobile Computing
# (Sem. - III) (Old & New)

***Time :3Hours]*** ***[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 profile? Name different types of profiles.

b) Define record store. Why record enumeration is needed?

c) Which Network protocols does J2ME supports for establishing connection?

d) Define : Cluster and MIDlet.

e) What is gossip protocol?

f) What is variable timing advance in GSM?

g) List different command types in J2ME

h) What is the purpose to AUC in GSM?

***Q2)*** Attempt any FOUR of the following : **[16]**

a) What are the main reasons for using cellular system?

b) Compare FDMA and TDMA.

c) Why handover is needed in GSM? What are the different handover scenarios.

d) What are the goals of Mobile IP?

e) How does Indirect - TCP isolate problems on the wireless link? What are the main drawbacks of this isolation?

**P.T.O.**

***Q3)*** Attempt any FOUR of the following : **[16]**

a) Why has a scripting language been added to WML? How can this language help saving bandwidth and reducing delay?

b) What are the main benefits of spread spectrum system? What are the advantages of DSSS over FHSS?

c) Explain logical reference model of location services?

d) What is reverse tunneling? Why it is needed?

e) What are the advantages and disadvantages of Mobile TCP?

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

a) Explain following optimizations :

i) Fast Retransmit/Fast Recovery.

ii) Transaction oriented TCP.

b) What are the features of WSP/B?

c) What are the constraints possible on Text Box?

d) What are the different identifiers associated with mobile stations in GSM? Why these identifiers are required?

e) Explain cellular IP with its advantages and disadvantages.

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

a) Why CSMA | CD fails in wireless network?

b) Explain network and switching subsystems.

c) Why is routing in multihop ad-hoc network is complicated?

d) Explain the architecture of WAP with diagram.

e) List the entities of mobile IP and describe data transfer from a mobile node to a fixed node. Why and where encapsulation is needed?

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**Total No. of Questions :5]** **[Total No. of Pages : 2**

**P1066**

# [3733]-303
# M.Sc.
# COMPUTER SCIENCE
## CS -303 : Information Systems Security
## (Old & New Course) (Sem. - III)

***Time :3Hours]*** ***[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 all of the following : **[8 × 2 = 16]**

a) Explain meet-in-middle attack.

b) What is algorithm modes? State four algorithm modes.

c) What is cross certification?

d) Differentiate between authentication and authorization.

e) What is stenography? Give an example.

f) State e-mail related crimes.

g) What is mean by delta - CRL?

h) What is mean by message digest? Explain collision.

***Q2)*** Attempt any four of the following : **[4 × 4 = 16]**

a) Explain working of RC-5 with suitable example.

b) Write a note on Blowfish.

c) Explain key generation and management using RSA.

d) Explain working of HMAC.

e) Explain how PGP provides authentication as well as confidentiality?

**P.T.O.**

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

a) Write a note on VPN architecture.

b) Explain approches for achieving SSO.

c) Alis and Bob want to establish a secret key using Deffie Hellman key exchange protocol. Assuming the values are $n = 10$, $g = 3$, $x = 5$, $y = 11$.

Find out values of A, B, $K_1$ & $K_2$.

d) How challenge/responce tokens are used for authentication?

e) Explain the processes of generating digital signature using RSA.

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

a) Explain 3-D secure protocol.

b) What is intruder? Explain different types of intruders.

c) Consider plain text alphabet D. Using RSA algorithm and value of public key P = 5, E = 3, Q = 11. Find out the private key & cipher text.

d) Explain digital Immune system for virus protection.

e) Describe how master secret is created from pre-master secret in SSL.

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

a) Write a note on SHA.

b) What are the services provided by IP Sec?

c) Explain broad level steps in PEM.

d) Explain key transformation process by DES.

e) What is electronic money? Discuss the types of electronic money.

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