Subject : **Data Structure and Programming with C++**

Time : 3 Hours

Course: **MCA**
Full Marks : 70
Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

PART A

Q.1)   **All questions are compulsory**

(10x2=20)

a) Explain the principles of function overloading
b) Define constructor and give example
c) Define class and object with an example.
d) Explain about the operations on a singly linked list.
e) Distinguish between Linear search and Binary search
f) Define Recursion with example
g) Write a short note on circular linked list.
h) Distinguish between Selection and Bubble sort
i) What are the characteristics of Member functions?
j) What is a destructor? Give an example.

PART B

Q2.   **Answer any four:**

(4x5=20)

i)   What is a friend function? What are the merits and demerits of using a friend function?
ii)   Discuss the advantages and functions of OOPS.
iii)   Explain different forms of inheritance. Illustrate with an example each type with an example
iv)   How to overload the binary operators. Explain
v)   Differentiate between stack and Queues.
vi)   What are the advantages and disadvantages of doubly linked list?

PART C

Answer any three:

(3x10=30)

Q.3) Write a program to input 10 numbers in a linked list and reverse it.

Q.4) Write a program to input 10 numbers in an array and sort it using Bubble sort.

Q.5) Write a C++ program to overload '+' and '-' to find the sum and difference of two value given in HH:MM:SS format.

Q.6) Write a program to have information about books in a library. Create another class with student information. Derive a class for issue of books the classes 'book' and 'student'. Derive another class for return of books from the class 'issue'. Calculate fine for all the students who have overdues.

Q.7) Write a C++ program to calculate the areas of circle, rectangle and square using function overloading.

Q.8) Write a C++ program that stores Customer accounts with the attributes. Name of the depositor, account no. type of account and balance amount.

(i) To create array of objects to store ten customers.
(ii) Assign initial values to customers.
(iii) To deposit and withdraw an amount
(iv) To display the balance for given valid account no.

ARKA JAIN University, Jharkhand

2nd Semester Final Examination – 2017-18

Subject: **Information System Analysis Design and Implementation**

Time: 3 Hours

Course: **MCA**

Full Marks: 70

Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
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- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

PART A

Q.1)   **All questions are compulsory**

A] Multiple Choice Questions: **(10x1=10)**

a) System Study involves
   i)   identifying current deficiencies and establishing new goals
   ii)   documenting the existing system
   iii)   study of an existing system
   iv)   all of the above

b) In Prototyping
   i)   4GLs are used
   ii)   BASIC is used
   iii)   COBOL is used
   iv)   system is documented

c) The approach used in top-down analysis and design is
   i)   to prepare flow charts after programming has been completed
   ii)   to identify the top level functions by combining many smaller components into a single entity
   iii)   to identify a top level function an d then create a hierarchy of lower-level modules and components
   iv)   All of the above

d) Which are the tools not used for System Analysis
   i)   .   Flowcharts
   ii)   Decision table
   iii)   Pert Chart
   iv)   Process scheduling

e) Which of the following is not a phase of SDLC?
   i)   Maintenance
   ii)   Analysis
   iii)   Testing
   iv)   All of the above

f) Selection of particular life cycle model is based on,
   i)   Requirements
   ii)   Technical knowledge of development team
   iii)   Project types and associated risks

iv) All of the above

g) The fundamental objective of system analysis is to
   v) Understand the computer hardware
   vi) Train managers in mathematical analysis
   vii) Study and understand a complex system and modify it in some way
   viii) None of above

h) The detail study of existing system is refers to as
   i) System Planning
   ii) System Analysis
   iii) Designing DFD
   iv) Feasibility Study

i) What is a Prototype
   i) Mini Model of Existing System
   ii) Mini model of Proposed System
   iii) Working Model of existing System
   iv) None of above

j) After implementation of the system, system maintenance could be done for
   i) Minor changes in the processing logic
   ii) Errors detected during the processing
   iii) Revision of the formats of the reports
   iv) All of the above

B] Very Short question   (5x2=10)
   a) What do you mean by Algorithm?

   b) What is DFD?

   c) What is Flow Chart?

   d) What is E- R diagram?

   e) What is System Analysis?

PART B

Q2.   **Answer any four:**   (4x5=20)

   i)   What do you mean by Project Scheduling?

   ii)   What do you mean by System Testing?

   iii)   What is the function of System Analyst?

   iv)   What is Software Prototype?

   v)   What do you mean by Data Dictionary?

   vi)   What is Software Maintenance?

PART C

Answer any three: **(3x10=30)**

Q.3) Discuss different phases of Waterfall Model.

Q.4) What do you mean by Feasibility Study? Explain the types of Feasibility study.

Q.5) what do you mean by Cost Benefit Analysis? Explain its types with examples

Q.6) what are the vital points are measured during Database Design of developing a software ?

Q.7) Explain the functioning of Spiral Model.

Q.8) what is Risk Analysis? Explain in Detail.

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Subject :OPERATING SYSTEM	Course: MCA
	Full Marks : 70
Time : 3 Hours	Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

PART A

Q.1) **All questions are compulsory**

  A] Multiple Choice Questions :   (10x1=10)

  a) Scheduling is done so as to
   i)   increase the throughput
   ii)   decrease the throughput
   iii) increase the duration of a specific amount of work
   iv)   None of the mentioned
  b) Turnaround time is :
   i)   the total waiting time for a process to finish execution
   ii)   the total time spent in the ready queue
   iii) the total time spent in the running queue
   iv)   the total time from the completion till the submission of a process

  c) Response time is
   i)   the total time taken from the submission time till the completion time
   ii)   the total time taken from the submission time till the first response is produced
   iii) the total time taken from submission time till the response is output
   iv)   none of the mentioned

  d) Physical memory is broken into fixed-sized blocks called _____
   i)   frames
   ii)   pages
   iii) Both i and ii
   iv)   none of the mentioned

  e) Logical memory is broken into blocks of the same size called _____
   i)   frames
   ii)   Pages
   iii) Backing store
   iv)   None of the above
   v)

  f) Every address generated by the CPU is divided into two parts :
   i)   frame bit & page number
   ii)   page number & page offset
   iii) page offset & frame bit
   iv)   frame offset & page offset

g) The _____ is used as an index into the page table.
   v) frame bit
   vi) page number
   vii) page offset
   viii) frame offset

h) The _____ table contains the base address of each page in physical memory.
   i) process
   ii) memory
   iii) page
   iv) frame

i) With paging there is no _____ fragmentation.
   i) internal
   ii) external
   iii) either type of
   iv) none of the mentioned

j) For every process there is a _____
   i) page table
   ii) copy of page table
   iii) pointer to page table
   iv) All the above

B] Very Short question   (5x2=10)
   a) What is Convoy effect
   b) What is Multi processing Operating system
   c) What is Internal and External Fragmentation
   d) What is Process Synchronization
   e) What is Segmentation and demand Paging

PART B

Q2.   Answer any four: (4x5=20)

   i) Briefly define Semaphore
   ii) Explain any Preemptive Process Scheduling algorithm
   iii) What is Hard and soft real time System
   iv) Mention advantages of Two-level directory structure over One-level directory
   v) What is System call
   vi) Explain Process Control Block

Answer any three: (3x10=30)

Q.3) Briefly define Critical section problem . What is the Peterson's solution to critical section problem

Q.4) Consider the following set of Processes. CPU burst time for them is given in milliseconds.

Process	Burst time
P1	15
P2	5
P3	7
P4	10

Draw Gantt chart for Round-robin scheduling algorithm with quantum=4 millisecond. Calculate Average waiting time and Turn around time.

Q.5) Consider the following page reference string and a memory consisting of 4 frames : 1,2,3,4,5,6,1,2,3,4,5,6. Find the number of page faults considering FIFO page replacement Strategy and LRU page replacement Strategy. Comment on the results obtained

Q.6) Consider the following set of Processes with CPU burst time given in milliseconds.

Process	Burst time	Priority
P1	5	2
P2	10	4(LOW)
P3	3	2
P4	4	3
P5	1	1(HIGH)

The processes are assumed to have arrived in the order P1,P2,P3,P4,P5 all at time 0.

  a. Draw Gantt chart illustrating the Execution of these processes using FCFS, SJF, Priority Scheduling Algorithm.
  b. Find out The Turn around Time and Waiting Time of each process for each scheduling algorithm.
  c. Which algorithm gives minimum Average waiting time.

Q.7) a. What is Virtual memory. How can you implement it.
  b. What is Contiguous and Non-Contiguous Memory allocation.

Q.8) Define Dining Philosopher and Reader-Writer Problem . Suggest a solution to these Problems.

ARKA JAIN University, Jharkhand

2nd Semester Final Examination – 2017-18

Subject : Mathematical Foundation, Probability & Combinatorics — **Course: MCA**

Time : 3 Hours

Full Marks : 70
Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **SIX** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **SIX** questions out of which **THREE** questions are to be answered.

PART A

Q.1)   **All questions are compulsory**

   A] Multiple Choice Questions :   **(10x1=10)**

   a) If p and q be two statement then $p \leftrightarrow q$ is
      i)   Conditional statement
      ii)   Biconditional statement
      iii)   Negation of the statement
      iv)   None of these

   b) $p \rightarrow q$=?
      i) $\sim p \vee q$
      ii) $\sim p$
      iii) $\sim q \wedge p$
      iv)   None of these

   c) The dual of $(p \vee q) \wedge r$ is
      i) $(p \vee q) \vee r$
      ii) $(p \wedge q) \vee r$
      iii) $\sim (p \wedge q) \vee r$
      iv)   None of these

   d) A graph G=(V,E) is said to be null graph if
      i)   V is empty
      ii)   V is non empty and E is empty
      iii)   V is empty and E is empty
      iv)   None of these

   e) The no of r- permutation of a set of n objects with repeatation allowed is
      i) n^r
      ii) n^{n-r}
      iii) r^n
      iv)   None of these

   f) What is the mean of the number of tails in two tosses of a coin?

      i)   1
      ii)   1/2
      iii)   3/4
      iv)   None of these

---

g) E and F are two mutually exlusive events then
    i) $E \cap F = \emptyset$
    v) $E \cap F \neq \emptyset$
    vi) $E \cup F \neq \emptyset$
    vii)   None of these

h) How many positive integers less than 1000 are divisible by 2?
    i)   573
    ii)   625
    iii)   350
    iv)   None of these

i) Let G be the group and $a, b \in G$ then
    i) $(ab)^{-1} = a^{-1}b^{-1}$
    ii) $(ab)^{-1} = b^{-1}a^{-1}$
    iii) $(ab)^{-1} = (ba)^{-1}$
    iv)   None of these

j) How many ways are there to select 5 players from a 10 –members
    i)   250
    ii)   252
    iii)   152
    iv)   200

B] Very Short question
                                                     (5x2=10)

a) Define disjunction of statement?
b) Define Abelian group?
c) Find the dual of the following

    (i) $p \wedge q) \vee t$

    (ii) $\sim (p \vee q) \wedge (p \vee \sim (p \wedge s))$

d) Define following

    (i) Null graph   (ii) Simple graph

e) How many words can be formed from the letters of the word" SUNDAY" ?how many of these

begins with D?

PART B

Q2. **Answer any four:** (4x5=20)

i) Prove that $\sim(p \wedge q) = \sim p \vee \sim q$.

ii) There are three urns containing 3 white and 2 black balls; 2 white and 3 black balls; 1 black and 4 white balls respectively. There is equal probability of each urn being Chosen, one ball is drawn from a urn chosen at random. What is the probability that a White ball is drawn?

iii) Prove that the identity element in a group is unique.

iv) Find the mean, variance and standard deviation of the number of tails in two tosses Of a coin?

v) A problem of mathematics is given to three students whose chances of solving it correctly Are ½,1/3,and1/4 respectively. What is the probability that only one of them solves it correctly?

vi) How many triangles can be obtained by joining 12 points, four of which are collinear

PART C

Answer any three: (3x10=30)

Q.3) Define conditional and biconditional statements with truth table? Also define converse, inverse and contra positive, of $p \rightarrow q$.

Q.4) The probability density function of a variate X is

X:	0	1	2	3	4	5	6
P(X):	k	3k	5k	7k	9k	11k	13k

(i) find P(X<4)   (ii) P(X≥ 5)   (iii) P(3<X≤ 6)   (iv) p(X≤ 2)>0. 3

Q.5) find the mean and standard deviation of binomial distribution

Q.6) A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both spades. Find the probability of the lost card being a spade.

Q.7) Examine if the set Z of all integers forms a group with respect to the operation ∗ defined by a∗ b=a+b+1 for all a,b∈ Z

Q.8) find the number of arrangements of the letters of the word" INDEPENDENCE", in how many of these arrangements (i) do the words start with P (ii) do all vowels occur together (iii) do the vowels never occur together ? (iv) do the words begins with I and end with P.

Subject : Data Structure and Programming with C++ Practical   Course: MCA

Time : 2 Hour

- Question Paper is divided into **Two Parts –A & B**
- **Part-A & B** are compulsory. Answer one question each from both the Parts
- Students are first to write the answers on their answer sheets and then go to the Computer lab to code the program.
- After coding, the print out of the program along with its output need to be attached with the answer sheet.
- Pen/Pencil/Eraser etc. are not allowed in the Computer Lab

PART - A

Answer any One question

1. Write a C++ program to overload binary + operator to add two objects A and B and store the output in a third object C. The class has an int data member as x. Example: C = A + B

2. Define a STUDENT class with USN, Name and Marks in 3 tests of subject. Declare an array of 1O STUDENT objects. Using appropriate functions, find the average of two better marks for each student. Print the USN, Name and average marks of all the students.

3. Write a C++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a COMPLEX number.
i. ADD(a , s2) - where a is an integer (real part) and s2 is a complex number.
ii. ADD(s1, s2) - where s1 and s2 are complex numbers.

PART - B

Answer any One question

4. Write a program to input 10 numbers in a linked list and reverse it.

5. Write a program to Implement Stack using Array

6. Program to Sort an Array using BUBBLE SORT

ARKA JAIN University, Jharkhand

2nd Semester End Semester Examination – 2017-18
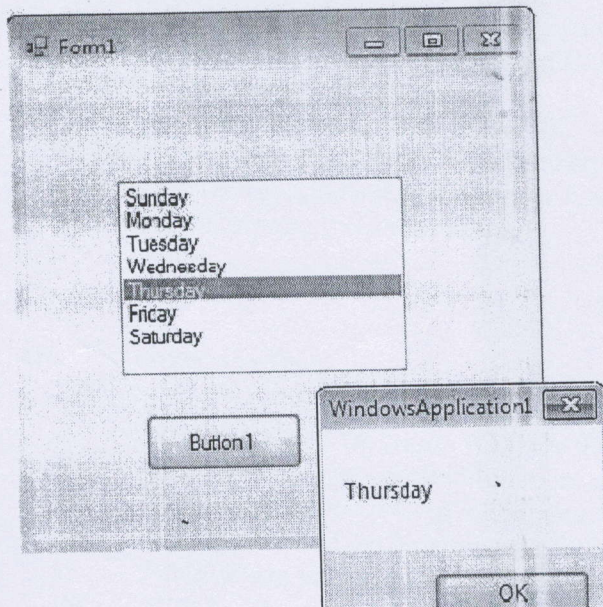
Subject : Windows Programming

Time : 2 Hour
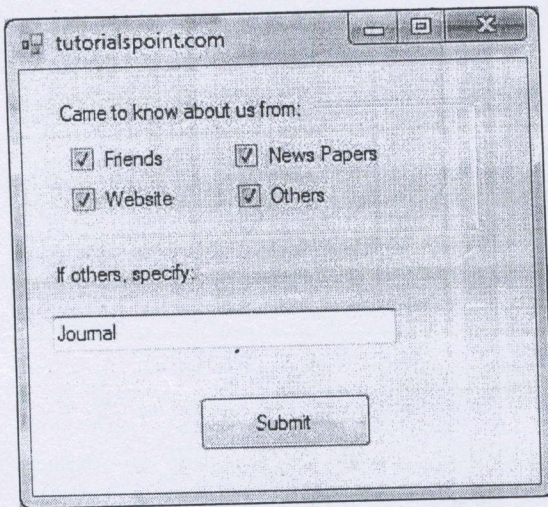
Course: MCA
Full Marks : 30
Pass Marks: 12

- Answer any one question.
- Students are first to write the answers on their answer sheets and then go to the Computer lab to code the program.
- After coding, the print out of the program alongwith its output need to be attached with the answer sheet.
- Pen/Pencil/Eraser etc. are not allowed in the Computer Lab. Only Question Paper and Answer sheet is allowed inside the Computer Lab

Answer any One question

1. Design the following Interface through VB.Net using ListBox Control that show the day name and user can select specific day name and show the selected day name .

2. Design the following Interface through VB.Net using CheckBox Control and after selctecing specific option the output should look like given window.

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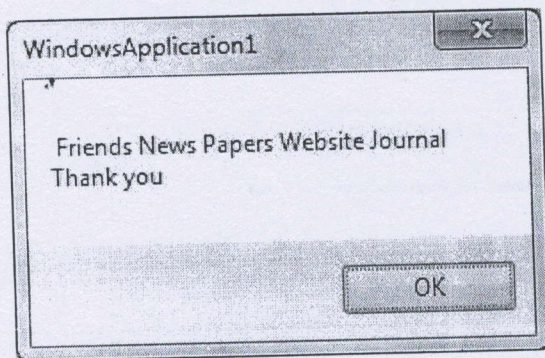
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