Name of Student:

Scholar No. :

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

PRACTICAL END EXAMINATION NOV – 2017

Semester I

SET-2

Program: MCA **Branch: MCA**

Subject: Programming through C & C++ **Sub. Code: MCA--516**

Note: Attempt all questions. All questions carry equal marks.

Q. No.	Questions
1.	Write a Program to Count No of Lines, Blank Lines, Comments in a given Program ?
2.	Create a structure to specify data on students given below: Roll number, Name, Department, Course, Year of joining Assume that there are not more than 450 students in the collage. (a) Write a function to print names of all students who joined in a particular year. (b) Write a function to print the data of a student whose roll number is given.
3.	Write a Program to implement STACK operations using Linked Lists?

Name of the Student_____ **Roll No**_____

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY

DEPARTMET OF MATHEMATICS & COMPUTER APPLICATIONS

EXAMINATION: Mid Term MONTH & YEAR: September 2017

Subject : Programming Through C & C++ Sub. Code:- MCA 515

Time : 90 min MM:20

Q1. What is an operator? Explain the arithmetic, relational, logical, and assignment operators in C language using examples. 3

Q2. Design and develop a C program to read a *year* as an input and find whether it is *leap year* or not. Also consider end of the centuries. 3

Q3. Write a C program to read n unsorted numbers to an array of size n and pass the address of this array to a function to sort the numbers in ascending order using bubble sort technique. 4

Q4. Write a C program to maintain a record of **"n"** student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Each field is of an appropriate data type. Print the marks of the student given student name as input and passing it as an argument to a function. 5

Q5. Write a C program using functions to calculate difference between two time periods. (use structure variable to store time in hour, minute and second) 5

Name of Student: Priya Kumari

Scholar No.: 172120066

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

MID TERM EXAMINATION SEP– 2017

Semester-I

Program: MCA
Subject: Operating System
Time: 1.30 Hours
Note: Attempt all questions.

Branch: MCA
Sub. Code: MCA-514
Max. Marks: 20

Q. No.	Questions	Marks
Q1	Define and compare various CPU scheduling algorithms. Specify which scheduling algorithms could result in starvation?	05
Q2	What is the meaning of inter process communication? Explain the various approach of achieving inter process communication in operating system.	05
Q3	What is deadlock avoidance? How it could be achieve deadlock avoidance using Banker's Algorithm. Given the following information. a. Compute the Need Matrix. b. Which resource initially available. c. Is the system is in safe state? If yes what is it?	05
Q4	What is the role of critical section? How can be handle Race condition problem? Give solution to the critical section using Peterson's Solutions.	05

	Allocation			Max Need			Available		
	A	B	C	A	B	C	A	B	C
P0	1	0	0	3	2	2	0	1	1
P1	6	1	2	6	1	3			
P2	2	1	1	3	1	4			
P3	0	0	2	4	2	2			

Name of Student:

Scholar No. :

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

MID TERM EXAMINATION SEPTEMBER – 2017

Semester-I

Program: MCA
Subject: Computer Organization & Architecture
Time: 1.30 Hours
Note: Attempt all questions. All questions carry equal marks.

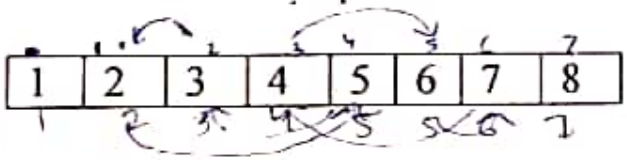
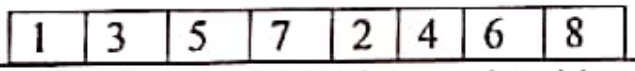
Branch: MCA
Sub. Code: MCA-512
Max. Marks: 20

Q. No.	Questions	Marks
Q1	For the following Boolean expression- F (A, B, C, D) = ∑ (1, 4, 6, 7, 8, 9, 10, 11, 15). Simplify using tabulation method? Also verify the results using K Maps?	4
Q2	What do you mean by combinational circuit? Write the steps for designing combinational circuit? Design full adders and full subtractors using decoders?	4
Q3	Answer the following- 1. Draw a combinational circuit for BCD to excess-3 generator. 2. What do you mean by indeterminate condition in SR Flip flop? Explain by giving proper inputs? 3. Draw a 6 X 64 decoder with 3 X 8 decoders. Which output line will be activated on input of 100100 and 110011? 4. Simplify the following Boolean expression with multiplexer: F (A, B, C, D) = ∑ (0, 1, 2, 4, 6, 7, 8, 10, 11, 13, 15).	4*3=12

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL
MID-TERM EXAMINATION SEPTEMBER 2017

Program: M.C.A.
Subject: Data Structure
Time: 90 Min

Semester: I
Subject Code: MCA-513
Max. Marks: 20
(On Scale of 100)

Q 1	What are primitive data types? Explain the range of each data types. Explain ASCII coding scheme. Write an algorithm to convert decimal number to binary number.	25
Q 2	What is a pseudo code? Explain sequence, selection and iteration using example. Write an algorithm that rearranges the elements of an array so that all those originally stored at odd suffixes are placed before those at even suffixes for example  would be transformed to 	25
Q 3	What is a stack? Write an algorithm for reversing elements of an array using stack.	25
Q 4	Obtain a data representation, mapping a Stack and a Queue into a single array V(1:n). Write algorithm to add and delete elements from these two data objects.	25

Subject Coordinator: Sujoy Das

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY
DEPARTMENT MATHEMATICS
END TERM EXAMINATION NOVEMBER 2017

Course: MCA
Subject: Mathematics-I
Time: 3 hrs.
Note: *All questions are compulsory.*

Semester: I
Subject Code: MCA-511
Max Marks:60

1(a) What is graph? Explain Konigsberg bridge problem and its Euler representation by means of a graph. 05

(b) Prove that a tree with n vertices has $n-1$ edges. 05

2(a) Prove that in a Boolean algebra the following four statements are equivalent: 05
(i) $a.b'=0$ (ii) $a+b=b$ (iii) $a'+b=1$ (iv) $a.b=a$

(b) Define irreflexives, symmetric, anti-symmetric and asymmetric relations. 05
Let $A=\{1,2,3,4\}$.
Give an example of a relation R in A which is:
(i) neither symmetric nor anti-symmetric.
(ii) anti-symmetric and reflexive but not transitive.
(iii) transitive and reflexive but not anti-symmetric.

3(a) Determine the generating function for each of the following discrete numeric functions 05
(i) 2, 5, 13, 35,..... (ii) $a_r = 5^r + {}^3C_r$; $r = 0,1,2,3,.....$

(b) Determine the discrete numeric function corresponding to the following generating functions 05
(i) $\dfrac{7z^2}{(1-2z)(1+3z)}$ (ii) $\dfrac{(1+z)^2}{(1-z)^3}$

4(a) Prove that n^{th} is a cyclic group with respect to multiplication. 04

(b) Prove that every subgroup of a finite group is a divisor of the order of the group. 04

(c) Show that $W=\{(a,0,0): a,b \in R\}$ is a subspace of R^3. 02

5 (a) Show that the mapping $T: R^2 \to R^3$ defined by $T(a, b)=(a-b, b-a, -a)$ is a linear transformation from R^2 into R^3. Also find the range and nullity of T 05

(b) Find the matrix representation of linear transformation T on R^3 defined by 05
$$T(a,b,c)=(a+b,\ a-2c,\ b-c).$$
corresponding to the basis $B=\{\alpha_1, \alpha_2, \alpha_3\}$, where $\alpha_1=(1,1,1)$, $\alpha_2=(1,1,0)$, $\alpha_3=(1,0,0)$.

6(a) Solve the recurrence relation 05
$$a_r - 4a_{r-1} + 4a_{r-2} = (r+1)2^r.$$

(b) Solve by the method of generating functions the recurrence relation 05
$$a_r - 5a_{r-1} + 6a_{r-2} = 2,\ r \geq 2$$
with the boundary conditions $a_0 = 1$ and $a_1 = 2$.

Name of the Student: _____ Roll No. _____

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL
DEPARTMENT OF MATHEMATICS & COMPUTER APPLICATIONS

Examination : End Term Examination | **Month & Year : Nov 2017**
Program: M.C.A. | **Semester : I**
Subject: Data Structure | **Sub. Code: MCA-513**
Time: 180 Minutes | **Max. Marks: 60**
Note: All questions are compulsory.

Q 1 a) How Single and Multidimensional array are organized in memory? Give the mathematical formula for the said organization. 02

b) Convert the following infix notation to postfix and prefix notation 03
i) (A+B) *D +E/(F+A*D)+C
ii) A/B**C+D*E-A*C

c) What is a stack? Explain the working of Push and Pop algorithms. Three stacks are to be represented in an array. Write an algorithm to add and delete an item from these stacks. Also specify the overflow and underflow conditions. 05

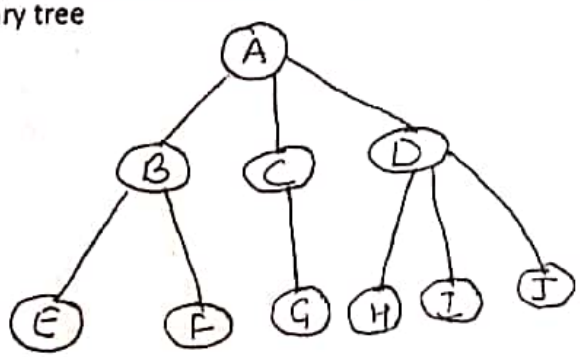
Q 2 a) What is queue? Write the algorithm for inserting and deleting an element from queue. The queue is organized in such a way that its FRONT is at high end of memory and REAR at low end of the memory. In this case what changes need to be incorporated in add and delete algorithms? 05

b) Explain the advantage of circular queue over queue with an example. Design a data representation sequentially mapping n queues into an array V(1:m). Represent each queue as circular queue with in V. Write the algorithms ADDQ and DELETEQ for this representation. 05

Q 3 a) What is a link list? Write an algorithm for 05
i) Creation of a link list.
ii) Searching a node in the link list.
iii) Splitting a link list into two link list such that two nodes are in one list and next two nodes are in the second list.

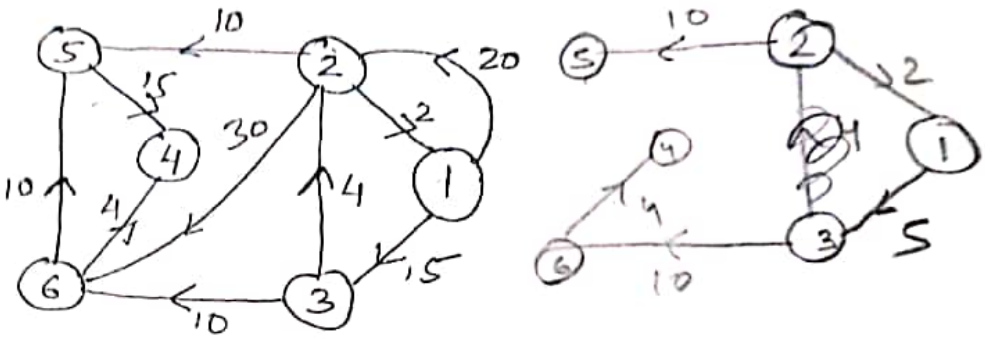
b) What is a doubly link list? Write an algorithm for 05
i) Creation of a doubly link list.
ii) Write an algorithm for inserting a node in a doubly link list at first, middle and last place.

Q 4 a) What is the difference between a general tree and binary tree? How a given tree can be convert into binary tree 05



What is tree traversal? Write algorithm for in order, post order and pre order traversal.

b) What is graph? Write the difference between graph and network. Represent the following graph using adjacency matrix. 05



Write the algorithm for shortest path algorithm.

Q5 a) How bubble sort works? What is the difference between pass and iteration? Write the algorithms for sorting a given list using bubble sort. Depict the steps of the bubble sort algorithm for sorting the following list. 05

80, 25, 32, 11, 14 ,60, 45, 53 , 39, 96, 1, 92

b) Write the algorithm for sorting a given list using quick sort. Depict the steps of the quick sort algorithm for sorting the following list. 05

41, 27, 34, 15, 19 ,62, 45, 58 , 36, 92, 10, 93

Q6 a) What is a minimum spanning tree? Write the algorithm for creating a minimum spanning tree form given graph. 04

b) Write short notes on 06

1. Threaded Binary Tree
2. Hashing
3. Heighted Balance Tree

V_1 V_2 V_3 V_4 V_5

V_1

Name of Student: Priya Kumari

Scholar No.: 172120066

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL
END TERM EXAMINATION NOVEMBER 2017

Course: MCA | Semester: I
Subject: Operating System | Subject Code: MCA-514
Time: 3.00 Hours | Max. Marks: 60
Note: Attempt all questions. All questions carry equal marks.

<table>
<tr><th>Q. No.</th><th>Questions</th><th>Marks</th></tr>
<tr><td>Q1 (a)</td><td>Explain the concept of Process. Draw a process transition diagram and explain the various process states?</td><td>5</td></tr>
<tr><td>(b)</td><td>How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.</td><td>5</td></tr>
<tr><td>Q2 (a)</td><td>Give memory partition of 100K,500K,200K,300K and 600K(in order).How would each of the first fit, best fit and worst fit algorithm place process of 212k,417k,112k,and 426k (in order)? Which algorithm makes the most efficient use of memory?</td><td>5</td></tr>
<tr><td>(b)</td><td>Consider a system with five processes P0 through P4 and three resources types A, B, and C. Resources type A has seven instances, resource type B has two instances and resource type C has six instances suppose at time T0 we have the following allocation.
<table>
<tr><th rowspan="2">Process</th><th colspan="3">Allocation</th><th colspan="3">Request</th><th colspan="3">Available</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>P0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>P1</td><td>2</td><td>0</td><td>0</td><td>2</td><td>0</td><td>2</td><td></td><td></td><td></td></tr>
<tr><td>P2</td><td>3</td><td>0</td><td>3</td><td>0</td><td>0</td><td>0</td><td></td><td></td><td></td></tr>
<tr><td>P3</td><td>2</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td></td><td></td><td></td></tr>
<tr><td>P4</td><td>0</td><td>0</td><td>2</td><td>0</td><td>0</td><td>2</td><td></td><td></td><td></td></tr>
</table>
If we implement Deadlock detection algorithm we claim that system is in deadlock state or not in deadlock state.</td><td>5</td></tr>
<tr><td>Q3 (a)</td><td>Describe following file allocation methods with their relative advantages and disadvantages:
i. Contiguous allocation method
ii. Linked allocation method
iii. Indexed allocation method</td><td>5</td></tr>
<tr><td>(b)</td><td>Give difference between:
1. Multilevel queue and Multilevel feedback queue
2. External fragmentation and Internal fragmentation</td><td>5</td></tr>
<tr><td>Q4</td><td>Write short note on:
1. Belady's Anomaly
2. Thrashing
3. RAID
4. Threads</td><td>10
(2.5*4)</td></tr>
</table>

b) $2^5 + 2^9 =$ (14 bits)

a) $2^6 + 2^9 =$ (15 bits)

Q5 (a)	A memory management system has 64 pages with 512 bytes page size. Physical memory consists of 32 page frames. Numbers of bits required in logical and physical address are respectively.	5
(b)	Consider the virtual page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Suppose a demand paged virtual memory system running on a computer system such that the main memory has 3 page frames. Find out among following page replacement algorithm which has minimum number of page faults? i. FIFO replacement ii. Optimal replacement iii. LRU replacement	5
Q6 (a)	Consider the disk queue with request for I/O to blocks on cylinders 98, 183, 37, 122, 14, 124, 65, 67. Suppose SSTF and C-SCAN disk scheduling algorithms implemented to meet the requests then the how many total number of head moments if the disk head is initially at 53.	5
(b)	Consider the following four processes with the arrival time and length of CPU burst given in milliseconds:	5

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Find out average waiting time and turnaround time for preemptive and non preemptive SJF scheduling algorithms.

TAT =

Peterson's algo.

classification of synchronization.

$2^6 + 2^9 =$ 15 bits

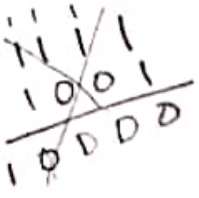
MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL

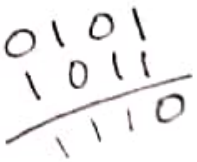
END TERM EXAM (NOV 2017)

Program	: MCA	Semester	: III I
Subject	: **Computer Organization & Architecture**	Subject Code:	**MCA-512**
Time	: 3.00 hrs.	MM	: 60

Note: Attempt all the questions..

Q1	(a) What is Counter ? Compare ripple and Synchronous counter. (b) Explain 2's Complement method of substraction of binary numbers.	05 05
Q2	(a) Write a micro operation to add the contents of two registers and store the sum in third register.The operation will execute when P=1. (b) Draw the schematic diagram of Master Slave JK Flipflop.Explain its working example.	05 05
Q3	(a) Categorize Microperation. Explain the Shift Microoperation. (b) Explain Sequential Logic Circuits.	05 05
Q4	(a) Explain execution of Instruction cycle with suitable flowchart and examples. (b) Draw and explain bus system for four registers using four ~~full adder~~ Multiplexers circuits.	05 05
Q5	(a) Draw a circuit diagram and explain ALU perform microoperations. (b) What is a interrupt?Expalin its concept and hardware used.	05 05
Q6	(a) Draw a four bits Combinational circuit shifter and explain its working. (b) Explain Instruction set.Also explain Memory Reference Instruction.	05 05





Name of Student _____ Roll Number _____

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER APPLICATIONS

EXAMINATION END TERM MONTH &YEAR NOV-2017

Course: MCA — Semester: I

Subject Name: Programming through C and C++ — Subject Code: MCA-515

Time: 3 Hrs. — Max Marks: 60

NOTE: Answer all questions

Question		Marks
Q1: (a)	Explain the different characteristics of top- down approach.	5 3
Q1: (b)	Explain the difference between break and continue by writing a C program to print all prime numbers less than 100.	5 3
Q2: (a)	What do you understand by term storage classes? Describe different storage classes and their applications available in C.	5
Q2: (b)	Write a program to display content of a file using command line argument.	5 2
Q 3 (a)	Write a program to multiply two 2-D matrix using pointer notations.	5 1
Q3: (b)	What is polymorphism? What are different types of polymorphisms? Explain in details its merits and demerits.	5 2
Q4: (a)	Write a program to copy the string by overloading "=" operator using this pointer.	4 1.2
Q4: (b)	List down the various types of inheritance supported by C++ using suitable eg. of each.	6 5
Q 5	Define a class to represent books in a library, which includes following members: Data Member : Book Number, Book Name, Author, publisher, price,No of copies, No, of copies issued. Member Functions: (i) To assign initial values . (ii) To issue a book after checking its availability. (iii)To return a book. (iv)To display book information. (v) To list all books alphabetically.	10 7
Q6	Write a program to implement class template for using any type of stack. Using the template create different types (char, int,float) of stack.	10