CIMAGE
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LAB MANUAL

C++ Programming

MCA (AKU 1st Semester)

GENERAL GUIDELINES

- *You should attempt all problems/assignments given in the list session wise.*
- *You may seek assistance in doing the lab exercises from the concerned lab instructor. Since the assignments have credits, the lab instructor is obviously not expected to tell you how to solve these, but you may ask questions concerning the programming language or a technical problem.*
- *For each program you should add comments above each part of your program. This should also include a description of the function written, the purpose of the function, meaning of the argument used in the function and the meaning of the return value (if any).*
- *The program should be interactive, general and properly documented with real Input/ Output data.*
- *It is your responsibility to create a separate directory to store all the programs, so that nobody else can read or copy.*
- *The list of programs (session-wise) is available to you in this lab manual.*
- *You should utilize the lab hours for executing the programs, testing for various desired outputs and enhancements of the programs.*
- *As soon as you have finished a lab exercise, contact one of the lab instructor/ in-charge in order to get the exercise evaluated and also get the signature from him/her on the Lab Manual Report.*
- *Each lab session will be for 1 hour*

LAB MANUAL REPORT

SR. NO.	DATE	LAB REPORT	LAB INSTRUCTOR SIGNATURE	REMARKS
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SESSION-1

1. Write a program to find the roots of the quadratic equation $ax_2 + bx + c = 0$.
2. Write a program to find the largest number among the given list.
3. Write a program to input any number after that find factorial number.

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SESSION-2

4. Write a program to input any number after that check number is Armstrong or not.
5. Write a program to find nCr using function with parameter and return value.
6. Write a program to calculate the compound interest using the formula $A = P \times (1 + r/100)n$.

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SESSION-3

7. Write a program to calculate the factorial of a given number using recursion.
8. Write a program to generate Fibonacci series using recursion.
9. Write a program to apply arithmetic operators to two given values and display the result using function with parameters.

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SESSION-4

10. Write a program for printing a table of a given number using function with parameter and no return value.
11. Write a program for ex=1+x+x2+x3+x4+⋯+xn using function with parameters and return type.
12. Write a program to find the sum of square of first n even natural numbers using function without parameter but with return type

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SESSION-5

13. Write a program to find the greatest number amongst three given numbers by using function with parameters and return value

14. Write a program to search an element in the given two-dimensional array using function
15. Write a program to search and display the position of an element in a single-dimensional array using function.

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SESSION-6

16. Write a program to find the sum of diagonal elements, upper triangular elements and the lower triangular elements.
17. Write a program to check whether the given matrix is orthogonal or not. Use the formula $A \times AT = I$.
18. Write a program to multiply two matrices if multiplication is possible.

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SESSION-7

19. Write a program to insert an element at the given position in single-dimensional array.
20. Write a program to find the number of duplicate elements and remove the duplicate elements from the list.
21. Write a program to concatenate two given strings.

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SESSION-8

22. Write a program to count the number of characters, number of words in the string and to check whether the given string is palindrome or not.
23. Write a program to reverse the string.
24. Write a program for addition of two matrices and to find the transpose of the resultant matrix.

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SESSION-9

25. Write a menu-driven program to add, subtract, multiply and divide complex numbers
26. Write a menu-driven program to perform the following operations on the account of a particular customer according to account number. The account details for various customers are already initialized:
    (a) To deposit money.
    (b) To withdraw money after checking minimum balance.
    (c) To display the information the customer.

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SESSION-11

27. Write a menu-driven program to read distances in meter and centimeter, add and subtract two distances using structure and functions.
28. Declare structure to represent student with the following data: Rollno, Name, Branch, Date of birth, Admission date, City, Father's occupation. Write a program to find all those students whose father is a doctor.

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SESSION-12

29. Write a program to print the bill details of 10 customers with the following data: Meter number, customer name, no. of SESSIONs consumed, bill date, last date to deposit and the city name. The bill is to be calculated according to the following conditions:
    No. of SESSIONsChargeFor first 100 SESSIONsRs 0.75 per SESSIONFor the next 200 SESSIONsRs 1.80For the next 300 SESSIONsRs 2.75
30. Write a program to find the smallest and largest element of an array.

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SESSION-13

31. Write a program to read and display the following details of employees using pointers: ename, designation, age, dob (dd/mm/yyyy).
32. Write a program for the addition of two time values given in hh:mm:ss format using the friend function.

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SESSION-14

33. Write a menu-driven program for addition, subtraction, display result of two distances (given in meter and centimeter) using member functions and friend function.
34. Write a menu-driven program for deposition, withdrawal and display balance for the bank account of a particular customer.

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SESSION-15

35. Generate a result sheet for all students who have secured honors in CSE branch with the following details
    (a) Roll number
    (b) Name
    (c) Semester
    (d) Branch
    (e) Institute
    (f) Marks in different subjects
    (g) Grade
36. Write a program in C++ that prints the factorial of a given number using a constructor and a destructor member function.

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SESSION-16

37. Write a program in C++ that prints the Fibonacci series using parameterized constructor and a destructor member function.
38. Develop a reservation system in C++ with the following data:
    (a) Train number
    (b) Train name•
    (c) Source
    (d) Destination
    (e) Journey date
    (f) Total amount
    (g) Category (Sleeper, AC-1, AC-2, AC-3)
    (h) Passenger's name
    (i) Passenger's age

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SESSION-17

39. Develop a mark sheet in C++ for the university examination with the following data:
    (a) Students' name•
    (b) Enrollment number
    (c) Roll number
    (d) Theory marks in five subjects

(e) Practical marks in five subjects
(f) Sessional marks in five subjects
(g) Grade
Use any form of constructors to develop the system.

40. Develop a library information system in C++ with the base class named "author" containing following information:
• ISBN no.
• Title of the book
• Author's name
and the derived class named "pubdetails" which contains the following information:
• Publisher's name
• Year of publication
• Price of the book
Define functions to create the database and retrieve individual information as and when required.

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SESSION-18

41. An institute maintains the following details about the faculty:
• Name
• Address
(a) City
(b) State
(c) Country
(d) House number
(e) Pin code
• DOB
• DOJ
• Salary
• Contact number
• Designation
Also the following details about the students:
• Name
• Address
(a) City
(b) State
(c) Country
(d) House number
(e) Pin code
• DOB
• DOA (Admission)
• Branch
• Course•
and the following details about the departments are maintained:
• Dname
• Dno
• Name of head

Define functions to create the database and retrieve individual information as and when required.

42. Write a program to swap different types of values using function overloading so that changes made in formal parameter should be reflected in actual parameter.

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SESSION-19

43. Write a program to carry out the sum, difference, multiplication and division of rational numbers using operator overloading through member function.
44. Write a program to concatenate two strings “Department of Computer Science and Engineering” and “ABC Institute of Science and Technology Bhopal” using operator overloading through friend function.

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SESSION-20

45. Write a program to concatenate two strings “Prof Rajesh K Shukla” and “Computer Science & Engineering” using operator overloading through member function and without using constructors.
46. Write a program using virtual function to find the area of circle, area of rectangle and area of triangle.

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SESSION-21

47. Write a program to calculate the sum and find the greatest element in the list using member function of a class as a template function.
48. Write a program to calculate the sum and the smallest element in the list, and to check whether the given number is present in the list and the number of times of the occurrence of that number using member function of a class as a template function.

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SESSION-22

49. Write a program to read an array of any type of any size using non-type arguments in a template.•

50. Write a program to read and write students information into the file using the data members in a private access mode.

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SESSION-23

51. Program to read and write the employees' information, that is, name, designation, salary and phone numbers using class and the read() and write() functions with files.
52. Write a menu-driven program to append, display, modify students information (rollno, age, phnum and height) in the file.

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SESSION-24

53. Write a menu-driven program to append, modify, display all, display current students' information (rollno, name, branch, semester, address, email) in the file using class.
54. Write a menu-driven program to append, display current, display all, search and delete students' information from the file.

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SESSION-25

55. Write a program to read a string using the getline() function and display how many times the particular character appears in the string.
56. Write a program to read a string using the getline() function and count the number of vowels in the string.

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Lab Assignment Evaluation **Signature**

0: **Not Done** ☐ 2: **Late Complete** ☐ 4: **Complete** ☐

1: **Incomplete** ☐ 3: **Needs Improvement** ☐ 5: **Well Done** ☐

STUDENT FEEDBACK

(To be submitted by student at the end of the each year)

Student ID: **Course:** **Year/Sem:**

Student Name:

DATE: _____

SIGNATURE:_____