Sardar Vallabhbhai Institute of Technology, Surat
Department of Artificial Intelligence
IoP and FCP Lab Assignments

Lab-1

1. PROGRAM TO CALCULATE SIMPLE INTEREST.
2. PROGRAM TO READ MARKS OF FIVE SUBJECT OF A STUDENT AND CALCULATE TOTAL AND PERCENTAGE.
3. PROGRAM TO CALCULATE GROSS SALARY.
4. PROGRAM TO CONVERT TEMPERATURE FROM FAHRENHEIT TO CENTIGRADE DEGREES.
5. PROGRAM TO SWAP TOW VARIABLES USING THIRD VARIABLE.
6. PROGRAM TO SWAP TWO VARIABLES WITHOUT USING THIRD VARIABLE.
7. PROGRAM TO CALCULATE AREA OF A TRIANGLE.
8. EARTH TAKES A PERIOD OF REVOLUTION OF 31558150 SECONDS .WRITE A C PROGRAM TO CONVERT THIS INTO NUMBER OF DAY,HOURS AND MINUTES
9. PROGRAM TO READ TIME IN HR,MIN,SEC AND CONVERT IT INTO TOTAL SECOND.
10. WRITE A C PROGRAM TO CALCULATE THE CUT OFF MARK OF A STUDENT USING THE FORMULA.
    CM = M/2+P/2+C/2+E
    WHERE CM = Cut of f mark
    M = Marks in Mathematics out of 200
    P = Marks in Physics out of 200
    C = Marks in Chemistry out of 200
    E = Marks in entrance examination out of 100
11. PROGRAM TO READ TOTAL SECOND AND CONVERT IT INTO TIME.
12. PROGRAM TO PRINT ASCII CODE OF ANY CHARACTER.
13. PROGRAM TO CHECK WHETHER A NO. IS EVEN OR ODD.
14. PROGRAM TO CHECK WHETHER A GIVEN CHARACTER IS CAPITAL, LETTER, SMALL CASE LETTER, A DIGIT OR A SPECIAL SYMBOL.
15. PROGRAM TO READ MARKS OF FIVE SUBJECT AND PRINT DIVISION.

Lab-2

16. PROGRAM TO READ THREE NOS. AND PRINT MAX.
17. PROGRAM TO READ THREE NOS. AND PRINT MAX USING LOGICAL OPERATOR.(&&)
18. PROGRAM TO READ THREE NOS. AND PRINT MAX USING CONDITIONAL (? :) OPERATOR.
19. PROGRAM TO READ A CHARACTER AND CHECK WHETHER IT IS A SMALL CASE LETTER OR NOT USING CONDATIONAL OPERATOR.
20. PROGRAM WHICH WILL WORK LIKE A SIMPLE CALCULATOR USING SWITCH-CASE.
21. PROGRAM TO READ TWO NOS. AND PERFORM SPECIFIC TASK (USING ARITHMETIC OPERATOR)AND THIS PERFORM USING SWITCH-CASE.(CASE IN CHAR FORM).
22. PROGRAM TO CALCULATE FACTORIAL OF A NO.
23. PROGRAM TO READ TWO NOS. AND CALCULATE **POWER** WITHOUT USING HEADER FILE(<MATH.H>).

Lab 3 and Lab 4

24. WRITE A C PROGRAM TO FIND THE VALUE OF Y USING

$$Y(x,n) = \begin{cases} 1+x & \text{where } n=1 \\ 1+x/n & \text{where } n=2 \\ 1+x^n & \text{when } n=3 \\ 1+nx & \text{when } n>3 \text{ or } n<1 \end{cases}$$

25. PROGRAM TO PRINT TABLE OF ANY NO.
26. PROGRAM TO PRINT SUM OF ALL ODD AND EVEN NO B/W 1 TO N.
27. PROGRAM TO CHECK WHETHER A NO IS **PRIME** OR NOT.
28. PROGRAM TO CHECK WHETHER A NO IS **ARMSTRONG** OR NOT.
29. PROGRAM TO CHECK WHETHER A NO IS **PALINDROM** OR NOT.
30. PROGRAM TO REVERSE OF A GIVEN NO.
31. PROGRAM TO PRINT SUM OF INDIVIDUAL DIGITS OF A 'N' DIGIT NO.
32. PROGRAM TO FINDOUT MAX AND SECOND MAX FROM 'N' NOS .
33. PROGRAM TO FINDOUT MAX AND MIN FROM 'N' NOS.
34. PROGRAM TO PRINT FIBONACCI SERIES.(0,1,1,2,3…)
35. READ A NUMBER N AND PRINT A **SINGLE** DIGIT ANSWER SHOWING SUM OF DIGIT OF N
36. PROGRAM TO PRINT 1,3,5,7,9…….N.
37. PROGRAM TO PRINT 2,4,6,8,10,12…….N.
38. PROGRAM TO PRINT 1,4,9,16,25,…….N.
39. PROGRAM TO PRINT 1/1!+2/2!+3/3!+4/4!,…….N.
40. READ NUMBERS TILL A NEGATIVE NUMBER IS ENTERED AND CALCULATE SUM OF A LIST OF NUMBERS READ.
41. READ A NUMBER N AND PRINT FACTOR OF N.(EX 28= 1,2,4,7,14,28)
42. READ A NUMBER N AND PRINT IF N IS PRIME OR COMPOSITE.
43. WRITE A C PROGRAM TO CALCULATE THE COMMISSION FOR A SALES REPRESENTATIVE AS PER THE SALES AMOUNT GIVEN BELOW.

    If sales<=Rs. 500, commission is 5%
    If sales> but <=2000, commission is Rs. 35 plus 10% above Rs. 500
    If sales>2000 but <=5000, commission is Rs. 185 plus 12% above Rs. 2000
    If sales>5000, commission is 12.5%

44. WRITE A PROGRAM IN C FOR THE FOLLOWING.
    AN ELECTRIC DISTRIBUTION COMPANY CHARGES ITS DOMESTIC CONSUMERS AS FOLLOWS.

Consumption in unit	Rate for Charge
0-200	Re 0.50 per unit

210-400	Rs. 100 plus Re 0.65 per unit excess of 200
401-600	Rs. 230 plus Re 0.80 per unit excess of 400
Above 600	Rs. 425 plus Rs. 125 per unit excess of 600

Print the amount to be paid by the consumer.

(Looping AND ARRAY)
Lab-5 and 6

45. **(A GUESSING GAME): With this program the user has to guess a number that the program has picked as the lucky number. It uses one for loop and plenty of if statements. I've also thrown in a conditional operator, just to make sure you haven't forgotten how to use it!**
46. **(USING MULTIDIMENSIONAL ARRAYS):**
    Let's move away from vegetables and turn to a more practical application. You can use arrays in a program to avoid a significant health and safety issue. As you may know, wearing a hat that is too large is dangerous. It can fall over your eyes, so you may bump into things, causing injury or even death. Equally, wearing a hat that is too small can result in persistent headaches and make you look foolish. This invaluable program will use arrays to work out your correct hat size in the units commonly used in the United States and the United Kingdom, where hat sizes typically vary from 6 1/2 to 7 7/8. Other countries have more transparent hat sizes that cause fewer problems at home, but if you are a foreign visitor to the United States or the United Kingdom, buying a hat while you are away can be even more hazardous. You just enter the circumference of your head, in inches of course, and your hat size will be displayed instantly:
    // Program 5.6 Know your hat size - if you dare...
    #include <stdio.h>
    #include <stdbool.h>

47)
```
A
AB
ABC
ABCD
ABCDE
```

48)
```
   1
  12
 123
1234
12345
```

49)
```
*
**
***
****
*****
```

50)
```
A
BB
CCC
DDDD
EEEEE
```

51)
```
10000
01000
00100
00010
00001
```

52)
```
   1
  121
 12321
1234321
```

53)
```
    *
   ***
  *****
 *******
*****
***
*
```

54) PROGRAM TO RED AND ARRAY OF 10 INTEGER AND PRINT SUM OF NUMBERS.

55) PROGRAM TO READ AN ARRAY OF 10 INTEGER AND COUNT TOTAL NO OF ODD AND TOTAL NO. OF EVERY ELEMENT.

56) PROGRAM TO READ AN ARRAY OF 10 INTEGER AND COUNT TOTAL NO. OF POSITIVE, NEGATIVE, AND ZERO ELEMENTS.

57) PROGRAM TO READ N NOS AND FINDOUT MAX AND SECOND MAX.

58) PROGRAM TO READ TWO ARRAYS OF 10 INTEGERS AND STORE ADDATION OF THOSE ARRAYS INTO THIRD.

59) PROGRAM TO READ TWO ARRAYS OF 10 INTEGERS AND SWAP VALUES THESE ARRAYS.

60) PROGRAM TO SORT (SELECTION SORT) AN ARRAY.

61) PROGRAM TO SORT (BUBBLE SORT) AN ARRAY.

62) PROGRAM TO REVERSE AN ARRAY.

63) PROGRAM TO READ A 3*3 MATRIX AND FINDOUT MAX AND MIN ELEMENT.

64) PROGRAM TO READ A 3*3 MATRIX AND PRINT SUM OF ALL ROWS.

65) PROGRAM TO READ A 3*3 MATRIX AND PRINT ITS TRANSPOSE.

66) PROGRAM TO READ A 3*3 MATRIX AND ADD THEIR VALUE AND STORE THEM IN THIRD MATRIX.

67) PROGRAM TO READ A 3*3 MATRIX AND SUBTRACT THEIR VALUE AND STORE THEM IN THIRD MATRIX.

68) PROGRAM TO READ A 3*3 MATRIX AND MULTIPLY THEIR VALUE AND STORE THEM IN THIRD MATRIX.

69) PROGRAM TO PERFORM LINEAR SEARCH ON AN ARRAY.

70) PROGRAM TO READ AN ARRAY AND PRINT THE OCCURRENCE OF ANY PARTICULAR ELEMENT IN THE ARRAY.

71) Write a program in C to find the pivot element of a sorted and rotated array using binary search. Pivot element is the only element in input array which is smaller than its previous element. A pivot element divided a sorted rotated array into two monotonically increasing array.

72) Write a program in C to rotate an array by N positions.

73) An election is contested by 5 candidates. The candidate is numbered are 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case, a number, read is outside the range 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots.

74) Given are one dimensional arrays A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item form array A and B, in ascending order.

75) The annual examination results of 10 students are tabulated as follows:

Roll No.	**Subject1**	**Subject2**	**Subject3**

.
.
.
.

Write a program to read the data and determine the following:
(a) Total marks obtained by each student.
(b) The highest marks in each subject and the Roll No. of the student who secured it.
(c) The student who obtained the highest total marks.

FUNCTION
Lab-7

76) WRITE A FUNCTION TO CHECK WHETHER A NUMBER IS EVEN OR ODD.

77) WRITE A FUNCTION TO CHECK WHETHER A NUMBER IS PALINDROME OR NOT.

78) WRITE A FUNCTION TO CHECK WHETHER A NUMBER IS ARMSTRONG OT NOT.

79) WRITE A FUNCTION EXCHANGE TO INTERCHANGE THE VALUE OF TWO VARIALBLE ,SAY X AND Y .

80) WRITE A FUNCTION THAT WILL GENERATE AND PRINT THE FIRST N FIBONACCI NUBERS.TEST THE FUNCTION FOR N=5,10,AND 15.

81) WRITE A FUNCTION THAT RETURN 1 IF ITS ARGUMENT IS PRIME NUMBER AND RETURN ZERO OTHERWISE.

82) WRITE A FUNCTION TO CALCULATE (NCR) FACTORIAL OF A GIVEN NUMBERS.

NCR = (!N/(!R*!(N-R)));

83) WRITE A FUNCTION TO READ AN ARRAY AND FOUND OUT MAXIMUM.

84) WRITE A FUNCTION TO READ INFORMATION OF BOOK AND DISPLAY THE INFORMATION.

84) WRITE A FUNCTION TO READ INFORMATION OF BOOK AND DISPLAY THE INFORMATION USING POINTER TO STRUCTURE.

85) WRITE A FUNCTION TO READ CHARACTER AND CHECK WHETHER IT IS VOWEL OR NOT.

86) WRITE A FUNCTION TO RADE LINE OF TEXT AND FIND OUT LENGTH OF STRING.

87) WRITE A PROGRAM TO READ INFORMATION OF 10 STUDENT AND DISPLAY THE INFORMATION OF THOSE STUDENT WHOSE MARKS ARE GREATHER THAN 500.(PASSING ARRAY OF STRUCTURE INTO FUNCTION).

Lab 8 to 10

(POINTER)

88) WRITE A PROGRAM TO COPY ELEMENT OF ONE ARRAY TO ANOTHER ARRAY USING POINTERS.

89)WRITE A PROGRAM TO COPY ONE ARRAY INTO ANOTHER ARRAY .ORDER OF ELEMENTS OF SECOND ARRAY SHOULD BE OPPOSITE TO FIRST ARRAY.

90) WRITE A PROGRAM TO FIND LENGTH OF A GIVEN STRING INCLUDING AND EXCLUDING SPACES USING POINTERS.

91)WRITE A PROGRAM TO CALCULATE THE SQUARE AND CUBE OF AN ENTERED NUMBER USING POINTER OF A VARIABLE CONTAINING THE ENTERED NUMBER.

92).WRITE A C PROGRAM USING POINTERS TO FIND THE BIGGEST OF GIVEN LIST OF N INTEGERS.

93) WRITE A C PROGRAM USING POINTER TO COUNT THE NUMBERS OF WORDS IN A GIVEN STRING.

94).WRITE A PROGRAM TO COPY A STRING IN REVERSE ORDER TO ANOTHER STRING VARIABLE USING POINTERS.FOR EXAMPLE,

ST ="SVNITJAVA" IS COPIED AS "AVAJTINVS"

95)WRITE A C PROGRAM TO DECLARE A STRUCTURE WITH DATA MEMBERS EMPLOYEE NUMBER ,EMPLOYEE NAME AND BASIC PAY OF THE EMPLOYEE. DECLARE A STRUCTURE POINTER AND AN ARRAY EMPLOY WITH 50 ELEMENTS .THE PROGRAM SHOULD READ 'N' EMPLOYEE DETAILS AND PRINT THE LIST OF ALL EMPLOYEE ALONG WITH THE BASIC A PAY.

96) WRITE A C PROGRAM TO SORT THE GIVEN N NUMBER OF STRINGS IN ASCENDING ORDER USING POINTERS.

97) WRITE A C PROGRAM TO COUNT THE NUMBER OF VOWELS IN A STRING USING POINTER.

98)WRITE A C PROGRAM TO FIND THE PRODUCT OF 2 MATRICES USING POINTER USING DYNAMIC MEMORY ALLOCATION.

(FILE HANDALING & Structure)

99) WRITE A C PROGRAM TO READ THE TEXT FILE AND ALSO COUNT THE NUMBER OF VOWELS PRESENT IN THE FILE.

100) A FILE CALLED **"LNMIITSTUDENT.JAVA"** CONTAINS INFORMATION SUCH AS STUDENT ROLL NUMBER, NAME AND TOTAL MARKS. WRITE A C PROGRAM TO CREATE A FILE TO STORE DETAILS OF N STUDENTS.

101) WRITE A C PROGRAM TO ADD /APPEND INFORMATION TO THE FILE **"LNMIITSTUDENT.DAT".**

102) WRITE A C PROGRAM TO COUNT NUMBER OF CHARACTERS, WORDS AND LINES IN A TEXT FILE.

103) WRITE A C PROGRAM TO DEFINE A MACRO TO FIND BIGGEST NUMBER OF TWO GIVEN NUMBERS.

104) AN ENUMERATION WITH COLOR NAMES CAN BE USED IN A SWITCH STATEMENT TO DISPLAY THE HEXADECIMAL COLOR CODE.

105) WRITE A PROGRAM IN C TO PRINT ALL PERMUTATIONS OF A GIVEN STRING USING POINTERS. THE PERMUTATIONS

OF THE STRING ARE: ABCD ABDC ACBD ACDB ADCB ADBC BACD BADC BCAD BCDA BDCA BDAC CBAD CBDA

CABD CADB CDAB CDBA DBCA DBAC DCBA DCAB DACB DABC

106). CREATE A STRUCTURE NAMED ITEM THAT HAS MEMBERS NAMELY, ITEM_NAME, QUANTITY, PRICE AND

AMOUNT. IMPLEMENT A USER-DEFINED FUNCTION THAT TAKES READ ITEM_NAME, QUANTITY AND PRICE AS

INPUT AND CALCULATE AMOUNT= QUANTITY * PRICE AND PRINT THE SAME AS OUTPUT.

107). IMPLEMENT A FUNCTION NAMED AS FLIP; WHICH WILL TAKE A NUMBER AS INPUT AND FLIP ITS LAST N DIGITS

FOR EXAMPLE FLIP(123, 2)= 132 ; (HERE N=2) FLIP(12345,3)= 12543 (HERE N=3).

108). WITHOUT USING INBUILT STRING FUNCTIONS, PERFORM THE FOLLOWING IN C LANGUAGE:

A. COPY ONE STRING INTO ANOTHER

B. COMPARE TWO STRINGS

C. CONCAT TWO STRINGS

D. REVERSE A GIVEN STRING

109). MODIFY VALUE STORED IN OTHER VARIABLE USING A POINTER IN C

A. INITIALIZE THE POINTER WITH THE OTHER (A NORMAL VARIABLE WHOSE VALUE WE HAVE TO MODIFY)