

Programming for Problem Solving

BE SEM-1 Mechanical Engineering

(3110003)

Laboratory Manual

Vision of the Department: To deliver quality engineering education for Mechanical Engineers with Professional competency, Human values and Acceptability in the society.

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Programming for Problem Solving

**L E COLLEGE, MORBI
MECHANICAL DEPARTMENT**

CERTIFICATE

This is to certify that Miss/Mr. _____
of 1st semester Enrollment no. _____ has
satisfactorily completed her/his laboratory work in the
Programming for problem solving Subject as per G.T.U.
Guidelines.

Date Of submission: _____

Head of Department

Faculty

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EXPERIMENT LIST

PRACTICAL-SET—1

1. Write a program to print —HELLO FRIENDS\|.
2. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division, modulo, average.
3. Write a program to convert days into months and days.
4. Write a program to find whether the number is odd or even.
5. Write a program to solve Quadratic Equation.
6. Write a program to select & print the largest of the three nos. using Nested-If-Else statement.

PRACTICAL-SET—2

1. Write a program to display multiplication table.
2. Write a program to print $1+1/2+1/3+1/4+\dots\dots\dots+1/N$ series.
3. Write a program to find sum of all integers greater than 100 & less than 200 and are divisible by 5.
4. The distance between two cities (In KM) is input through key board. Write a program to convert and print this distance in meters, feet, inches & centimeters.
5. Write a program to find sum of first N odd numbers. Ex. $1+3+5+7+\dots\dots\dots+N$.

PRACTICAL-SET—3

1. Write a program for use of putchar() and getchar() function.
2. Program to print
Patterns.
3. a. *
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b. 1 2 3 4 5

2 3 4 5

3 4 5

4 5

5

c. AAAAA

BBBB

CCC

DD

E

d. 1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

PRACTICAL-SET—4

1. Write a program to print Fibonacci series. 1,1,2,3,5,.....N
2. Write a program to reverse the digit.
3. Add, subtract and multiply two nos. using switch statement.
4. Write a program to add two matrixes.
5. Write a program to given no in ascending order.
6. W.A.P to read array of integers and print it in reverse order

PRACTICAL-SET—5

1. Write a program to count total words in text.
2. Find length of string using strlen() function.
3. Write a program to copy one string to another string.

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4. Write a program to join two strings.
5. Write a program convert character into TOggLe character.
6. Find given string is palindrome or not using string library function.

PRACTICAL-SET—6

1. Write a function program to add first N numbers.
2. Write a function find out maximum out of three numbers.
3. Write a function power that computes x raised to the power y for integer x and y and returns double type value.
4. Write a program to find factorial of a number using recursion.

PRACTICAL-SET—7

1. Define a structure type, personal, that would contain person name, date of joining and salary. Using this structure, write a program to read this information for one person from the key board and print the same on the screen.
2. Define a structure called cricket that will describe the following information:
 - a. Player name
 - b. Team name
 - c. Batting average

PRACTICAL-SET—8

1. Write a program using pointer and function to determine the length of string.
2. Write a program using pointer to compare two strings.
3. Write a program using pointer to concate two strings.
4. Write a program using pointer to copy one string to another string.

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PRACTICAL-SET—9

1. Write a program that uses a table of integers whose size will be specified interactively at run time.

PRACTICAL-SET—10

1. A program to illustrate reading files contents.
2. A program to illustrate the use of fgets().

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PRACTICAL-SET—1

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Problem statement:

1. Write a program to print —HELLO FRIENDS

C Program:

```
#include <stdio.h>
void main( )
{
    clrscr( );
    printf("HELLO FRIENDS ");
    getch( );
}
```

Output: HELLO FRIENDS

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Problem statement:

2. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division, modulo, average

C Program:

```
#include <stdio.h>
void main( )
{
    int first, second, add, subtract, multiply;
    float divide,avg;
    clrscr( );

    printf("Enter two integers\n");
    scanf("%d%d", &first, &second);

    add    = first + second;
    subtract = first - second;
    multiply = first * second;
    divide  = first / (float)second;
    avg= (first + second)/2;

    printf("Sum = %d\n",add);
    printf("Difference = %d\n",subtract);
    printf("Multiplication = %d\n",multiply);
    printf("Division = %.2f\n",divide);
    printf("Avg = %.2f\n",avg);

    getch( );
}
```

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Output:

Enter two integers

7 3

Sum = 10

Difference = 4

Multiplication = 21

Division= 2.33

Avg=5.00

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Problem statement:

3. Write a program to convert days into months and days

C Program:

```
#include<stdio.h>
int main( )

{
int days, years;
days=500;
years=days/365;
printf(“\n \n Number of years:%d ”,years);
return ( );

}
```

OUTPUT:

```
.....
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.....
```

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PRACTICAL-SET—2

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Problem statement:

1. Write a program to display multiplication table.

C Program:

```
#include <stdio.h>
void main( )
{
    int n, i;
    clrscr();

    printf("Enter an integer to find multiplication table: ");
    scanf("%d",&n);
    for(i=1;i<=10;++i)
    {
        printf("%d * %d = %d\n", n, i, n*i);
    }
    getch();
}
```

Output:

```
Enter an integer to find multiplication table: 9
9 * 1 = 9
9 * 2 = 18
9 * 3 = 27
9 * 4 = 36
9 * 5 = 45
9 * 6 = 54
9 * 7 = 63
9 * 8 = 72
9 * 9 = 81
9 * 10 = 90
```

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Problem statement:

2. Write a program to print $1+1/2+1/3+1/4+\dots\dots\dots+1/N$ series

C Program:

```
#include <stdio.h>
void main( )
{
    double n, i;
    clrscr( );
    printf("Enter value of n: "); scanf("%d",&n);
    for (i=1; i<=n; i++)
    {
        if(i= =1)
            {printf("\n 1+"); }
        elseif(i= =n)
            {printf(" (1/%d)", i); }
        else
            {printf(" (1/%d) + ", i);}
    }
    getch( );
}
```

OUTPUT:

.....

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PRACTICAL-SET-3

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Problem statement:

1. Write a program for use of putchar() and getchar() function.

C Program:

```
#include <stdio.h>
void main( )
{
    int c;
    clrscr( );
    printf("Enter value of n: ");
    c=getchar( );
    printf("\n you entered: ");
    putchar(c);
    getch( );
}
```

When the above code is compiled and executed, it waits for you to input some text when you enter a text and press enter then program proceeds and reads only a single character and displays it as follows:

Enter value of n: this is test

you entered: t

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Problem statement:

3. Program to print Patterns.

```
*  
* *  
* * *  
* * * *
```

C Program:

```
#include <stdio.h>  
void main( )  
{  
    int i,j,rows;  
    printf("Enter the number of rows: ");  
    scanf("%d",&rows);  
    for(i=1;i<=rows;++i)  
    {  
        for(j=1;j<=i;++j)  
        {  
            printf("* ");  
        }  
        printf("\n");  
    }  
    getch( );  
}
```

Output:

Enter the number of rows: 3

```
*  
* *  
* * *
```

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Problem statement:

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2 2
3 3 3
4 4 4 4
5 5 5 5 5

C Program:

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Problem statement:

1. Write a program to print Fibonacci series. 1,1,2,3,5,.....N

C Program:

```
#include<stdio.h>
void main( )
{
    int n, first = 0, second = 1, next, c;
    clrscr( );

    printf("Enter the number of terms\n");
    scanf("%d",&n);
    printf("First %d terms of Fibonacci series are :-\n",n);
    for ( c = 0 ; c < n ; c++ )
    {
        if ( c <= 1 )
            next = c;
        else
        {
            next = first + second; first = second; second = next;
        }
        printf("%d\n",next);
    }
    getch( );
}
```

Output: Enter the number of terms 4
First 4 terms of Fibonacci series are :-

0
1
1
2

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Problem statement:

2. Write a program to reverse the digit.

C Program:

```
#include <stdio.h>
void main( )
{
    int n, reverse = 0;
    printf("Enter a number to reverse\n");
    scanf("%d",&n);
    while (n != 0)
    {
        reverse = reverse * 10;
        reverse = reverse + n%10;
        n = n/10;
    }
    printf("Reverse of entered number is = %d\n", reverse);
    getch( );
}
```

Output:

Enter a number to reverse 14563

Reverse of entered number is 36541

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Problem statement:

6. W.A.P to read array of integers and print it in reverse order

C Program:

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Problem statement:

1. Write a program to count total words in text.

C Program:

```
#include <stdio.h>
#include <string.h>

void main( )
{
    char s[200];
    int count = 0, i;
    printf("Enter the string:\n");
    scanf("%[^\n]s", s);
    for (i = 0; s[i] != '\0'; i++)
    {
        if (s[i] == ' ')
            count++;
    }
    printf("Number of words in given string are: %d\n", count + 1);
    getch();
}
```

Output:

Enter the string: I am Engineer

Number of words in given string are 3

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Problem statement:

2. Find length of string using strlen() function.

Problem statement:

```
#include<string.h>
#include<stdio.h>
#include<conio.h>
void main( )
{
int strlength;
char *str;
clrscr( );
printf("\nEnter the string: ");
gets(str);
strlength=strlen(str);
printf("\nThe length of the string is %d.",strlength);
getch( );
}
```

Output:

Enter the string: Learn C Online

The length of the string is 14.

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Problem statement:

- Write a program to copy one string to another string.

C Program:

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Problem statement:

1. Write a function program to add first N numbers.

C Program:

```
#include <stdio.h>
int sum(int n);
int main( )
{
    int num,add;

    printf("Enter a positive integer:\n");
    scanf("%d",&num); add=sum(num);
    printf("sum=%d",add);

}
int sum(int n)
{
    if(n==0)
        return n;
    else
        return n+sum(n-1); /*self call to function sum() */
}
```

Output:

Enter a positive integer: 5

15

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Problem statement:

2. Write a function find out maximum out of three numbers.

C Program:

```
#include <stdio.h>

/* function declaration */
int max(int num1, int num2, int num3);

int main ( )
{
    /* local variable definition
    int a,b,c;
    printf("Enter the value of three number a, b and c");

    int ret;

    /* calling a function to get max value
    ret = max(a, b, c);
    printf( "Max value is : %d\n", ret );

    return 0;
}

/* function returning the max between two numbers
int max(int num1, int num2, int num3)
{
    int result; /* local variable declaration */
    if (num1 > num2)
    {
        if(num1>num3)
            result = num1;
        else
            result = num3;
    }
}
```

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```
else
{
    if(num2>num3)
        result = num2;
    else
        result = num2;
}
return result;
}
```

OUTPUT:

.....

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PRACTICAL-SET-7

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Problem statement:

1. Define a structure called cricket that will describe the following information:
 - d. Player name
 - e. Team name
 - f. Batting average

C Program:

```
#include<stdio.h>
#include<conio.h>

struct cricket
{
    char pname[20];
    char tname[20];
    float bavg;
};

void main( )
{
    struct cricket s[5],t;
    int i,j,n=5;

    float p;
    clrscr( );
    printf("\nEnter data of %d players",n);
    for(i=0;i<n;i++)
    {
        printf("\nEnter PName TName BAvg for player-%d = ",i+1);
        scanf("%s %s %f",s[i].pname,s[i].tname,&p);
        s[i].bavg=p;
    }
}
```

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```
for(i=1;i<=n-1;i++)
{
    for(j=1;j<=n-i;j++)
    {
        if(strcmp(s[j-1].tname,s[j].tname)>0)
        {
            t=s[j-1];
            s[j-1]=s[j];
            s[j]=t;
        }
    }
}

printf("\nAfter teamwise sorting... Player list is ");
for(i=0;i<n;i++)
{
    printf("\n%-20s %-20s %.2f",s[i].pname,s[i].tname,s[i].bavg);
}

getch();
}
```

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PRACTICAL-SET-8

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Problem statement:

1. Write a program using pointer and function to determine the length of string.

C Program:

```
#include<stdio.h>

#include<conio.h>
int string_ln(char*);

void main( )
{
    char str[20];
    int length;
    clrscr( );
    printf("\nEnter any string : ");
    gets(str);
    length = string_ln(str);
    printf("The length of the given string %s is : %d", str, length);
    getch( );
}

int string_ln(char*p) /* p=&str[0] */
{
    int count = 0;
    while (*p != '\0')
    {
        count++;
        p++;
    }
    return count;
}
```

Output:

Enter the String : pritesh

Length of the given string pritesh is : 7

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Problem statement:

- Write a program using pointer to compare two strings.

C Program:

```
#include<stdio.h>
#include<conio.h>
main( )
{
char *p,*q;
int i,j,flag=0;

printf("To compare two strings using pointers \n");
printf("\nInput two strings\n");
gets(p);
gets(q);
for(*p!='\0' || *q!='\0';*p++,*q++)
{
if(*p!=*q)
flag=1;
}
if (flag==1)
{ printf("\nTwo Strings are different");}
else
{ printf("\nTwo Strings are same"); }
}
```

OUTPUT : To compare two strings using pointers

Input two strings :

clanguage

clanguage

Strings are same

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Problem statement:

- 4. Write a program using pointer to copy one string to another string.

C Program:

```
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Vision of the Department: To deliver quality engineering education for Mechanical Engineers with Professional competency, Human values and Acceptability in the society.

Mission of the Department:

- To nurture engineers with basic and advance mechanical engineering concepts
- To impart Techno-Managerial skill in students to meet global engineering challenges
- To create ethical engineers who can contribute for sustainable development of society

PRACTICAL-SET-9

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Problem statement:

- 1. Write a program that uses a table of integers whose size will be specified interactively at run time.

C Program:

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PRACTICAL-SET-10

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Problem statement:

1. A program to illustrate reading files contents.

C Program:

```
#include <stdio.h>
#include <stdlib.h>

int main( )
{
    char ch, file_name[25];
    FILE *fp;
    printf("Enter the name of file you wish to see\n");
    gets(file_name);

    fp = fopen(file_name,"r"); // read mode
    if( fp == NULL )
    {
        perror("Error while opening the file.\n");
        exit(EXIT_FAILURE);
    }

    printf("The contents of %s file are :\n", file_name);

    while( ( ch = fgetc(fp) ) != EOF )
    {
        printf("%c",ch);
        fclose(fp);
        return 0;
    }
}
```

Enter the name of file you wish to see

Computer-programmming.txt

The contents of Computer-programmming.txt file are: Computer programming is logical.

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