**Programming for problem solving**

**First Year**

**Laboratory Manual**

**VISION**

To provide quality engineering education and transforming students into professionally competent and socially responsible human beings.

**MISSION**

* + To provide a platform for basic and advanced engineering knowledge to meet global challenges.
	+ To impart state-of-art know- how with managerial and technical skills.
	+ To create a sustainable society through ethical and accountable engineering practices.

Programming for problem solving

**L E COLLEGE, MORBI**

**IT DEPARTMENT**

**CERTIFICATE**

This is to certify that Miss/Mr. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

of 2ND 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: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Head of Department | Faculty |



Programming for problem solving



**EXPERIMENT LIST**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr no** | **Name of experiment** | **CO Mapping** | **PO Mapping** |
| **1** | Introduction to computer programming in C (PRACTICAL-SET—1) | **CO2** | PO1 |
| **2** | Programs of control structure in C (PRACTICAL-SET—2) | **CO3** | PO1, PO5 |
| **3** | Programs of creating patterns in C (PRACTICAL-SET—3) | **CO3** | PO1, PO5 |
| **4** | Programs of arrays used in C (PRACTICAL-SET—4) | **CO3,CO5** | PO1, PO3, PO5, PO9, PO10 |
| **5** | Programs of strings used in C (PRACTICAL-SET—5) | **CO3** | PO1, PO5 |
| **6** | Programs of functions used in C (PRACTICAL-SET—6) | **CO4,CO5** | PO1, PO3, PO5, PO9, PO10 |
| **7** | Programs of structures used in C (PRACTICAL-SET 7) | **CO4,CO5** | PO1, PO3, PO5, PO9, PO10 |
| **8** | Programs of pointers used in C (PRACTICAL-SET—8) | **CO4,CO5** | PO1, PO3, PO5, PO9, PO10 |
| **9** | Programs of dynamic memory management and file management in C (PRACTICAL-SET—9 &10) | **CO4,CO5** | PO1, PO3, PO5, PO9, PO10 |

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+………+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+………..+N.

PRACTICAL-SET—3

1. Write a program for use of putchar( ) and getchar( ) function.
2. Program to print Patterns. a. \*
	* + \*
		+ \* \*
		+ \* \* \*



IT Department, L E College, Morbi Page 3

Programming for problem solving



1. 1 2 3 4 5

2 3 4 5

3 4 5

4 5

5

1. AAAAA BBBB CCC DD

E

1. 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.
	1. 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.
4. Write a program to join two strings.
5. Write a program convert character into TOggLe character.



IT Department, L E College, Morbi Page 4

Programming for problem solving



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:
	1. Player name
	2. Team name
	3. 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.

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( ).



IT Department, L E College, Morbi Page 5

Programming for problem solving



**PRACTICAL-SET—1**



IT Department, L E College, Morbi Page 6

PPS



**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



IT Department, L E College, Morbi Page 7

PPS



**Problem statement:**

1. 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();

}



IT Department, L E College, Morbi Page 8

PPS



Output:

Enter two integers

7 3

Sum = 10

Difference = 4

Multiplication = 21

Division= 2.33

Avg=5.00



IT Department, L E College, Morbi Page 9

PPS



**Problem statement:**

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

**C Program:**

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IT Department, L E College, Morbi Page 10

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**Problem statement:**

4. Write a program to find whether the number is odd or even.

**C Program:**

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IT Department, L E College, Morbi Page 11

PPS



**Problem statement:**

5. Write a program to solve Quadratic Equation.

**C Program:**

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IT Department, L E College, Morbi Page 12

PPS



**Problem statement:**

1. Write a program to select & print the largest of the three nos. using Nested-If-Else statement.

**C Program:**

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IT Department, L E College, Morbi Page 13

PPS



**PRACTICAL-SET—2**



IT Department, L E College, Morbi Page 14

PPS



**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



IT Department, L E College, Morbi Page 15

PPS



**Problem statement:**

2. Write a program to print 1+1/2+1/3+1/4+………+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

Enter value of n: 6

1 + (1/2) + (1/3) + (1/4) + (1/5) + (1/6)



IT Department, L E College, Morbi Page 16

PPS



**Problem statement:**

1. Write a program to find sum of all integers greater than 100 & less than 200 and are divisible by 5.

**C Program:**

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IT Department, L E College, Morbi Page 17

PPS



**Problem statement:**

1. 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.

**C Program:**

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IT Department, L E College, Morbi Page 18

PPS



**Problem statement:**

**5.** Write a program to find sum of first N odd numbers. Ex. 1+3+5+7+………..+N

**C Program:**

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IT Department, L E College, Morbi Page 19

PPS



**PRACTICAL-SET-3**



IT Department, L E College, Morbi Page 20

PPS



**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



IT Department, L E College, Morbi Page 21

PPS



**Problem statement:**

1. 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("%d ",j);

}

printf("\n");

}

getch();

}

Output:

Enter the number of rows: 5

\*

* \*
* \* \*
* \* \* \*
* \* \* \* \*

1

1 2

1 2 3

1 2 3 4



IT Department, L E College, Morbi Page 22

PPS



**Problem statement:**

1 2 3 4 5

2 3 4 5

3 4 5

4 5

5

**C Program:**

**………………………………………………………………………………………………………**

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IT Department, L E College, Morbi Page 23

PPS



**Problem statement:**

1. AAAAA BBBB CCC DD

E

**C Program:**

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IT Department, L E College, Morbi Page 24

PPS



**Problem statement:**

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

**C Program:**

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IT Department, L E College, Morbi Page 25

PPS



**PRACTICAL-SET-4**



IT Department, L E College, Morbi Page 26

PPS



**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 6



IT Department, L E College, Morbi Page 27

PPS



First 6 terms of Fibonacci series are :-

0

1

1

2

3

5



IT Department, L E College, Morbi Page 28

PPS



**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



IT Department, L E College, Morbi Page 29

PPS



**Problem statement:**

**3.** Add, subtract and multiply two nos. using switch statement.

**C Program:**

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IT Department, L E College, Morbi Page 30

PPS



**Problem statement:**

4. Write a program to add two matrixes.

**C Program:**

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IT Department, L E College, Morbi Page 31

PPS



**Problem statement:**

**5.** . Write a program to given no in ascending order.

**C Program:**

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IT Department, L E College, Morbi Page 32

PPS



**Problem statement:**

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

**C Program:**

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IT Department, L E College, Morbi Page 33

PPS



**PRACTICAL-SET-5**



IT Department, L E College, Morbi Page 34

PPS



**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



IT Department, L E College, Morbi Page 35

PPS



**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.



IT Department, L E College, Morbi Page 36

PPS



**Problem statement:**

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

**C Program:**

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IT Department, L E College, Morbi Page 37

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**Problem statement:**

4. Write a program to join two strings.

**C Program:**

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IT Department, L E College, Morbi Page 38

PPS



**Problem statement:**

**5.** Write a program convert character into toggle character

**C Program:**

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IT Department, L E College, Morbi Page 39

PPS



**Problem statement:**

**6.** Find given string is palindrome or not using string library function.

**C Program:**

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IT Department, L E College, Morbi Page 40

PPS



**PRACTICAL-SET-6**



IT Department, L E College, Morbi Page 41

PPS



**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



IT Department, L E College, Morbi Page 42

PPS



**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)

{



IT Department, L E College, Morbi Page 43

PPS



/\* local variable declaration \*/ int result;

if (num1 > num2)

{

if(num1>num3) result = num1; else

result = num3;

}

else

{

if(num2>num3) result = num2; else

result = num2;

}

return result;

}



IT Department, L E College, Morbi Page 44

PPS



**Problem statement:**

1. Write a function power that computes x raised to the power y for integer x and y and returns double type value.

**C Program:**

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IT Department, L E College, Morbi Page 45

PPS



**Problem statement:**

1. Write a program to find factorial of a number using recursion.

**C Program:**

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IT Department, L E College, Morbi Page 46

PPS



**PRACTICAL-SET-7**



IT Department, L E College, Morbi Page 47

PPS



**Problem statement:**

1. Define a structure called cricket that will describe the following information:
	1. Player name
	2. Team name
	3. 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;

}



IT Department, L E College, Morbi Page 48

PPS



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();

}



IT Department, L E College, Morbi Page 49

PPS



**Problem statement:**

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.

**C Program:**

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IT Department, L E College, Morbi Page 50

PPS



**PRACTICAL-SET-8**



IT Department, L E College, Morbi Page 51

PPS



**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;

}



IT Department, L E College, Morbi Page 52

PPS



Output:

Enter the String : pritesh

Length of the given string pritesh is : 7



IT Department, L E College, Morbi Page 53

PPS



**Problem statement:**

2. 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



IT Department, L E College, Morbi Page 54

PPS



**Problem statement:**

3. Write a program using pointer to concate two strings.

**C Program:**

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IT Department, L E College, Morbi Page 55

PPS



**Problem statement:**

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

**C Program:**

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IT Department, L E College, Morbi Page 56

PPS



**PRACTICAL-SET-9**



IT Department, L E College, Morbi Page 57

PPS



**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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IT Department, L E College, Morbi Page 58

PPS



**PRACTICAL-SET-10**



IT Department, L E College, Morbi Page 59

PPS



**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;

}

Output:

Enter the name of file you wish to see



IT Department, L E College, Morbi Page 60

PPS



Computer-programmming.txt

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



IT Department, L E College, Morbi Page 61

PPS



**Problem statement:**

2. A program to illustrate the use of fgets( ).

**C Program:**

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IT Department, L E College, Morbi Page 62

PPS



IT Department, L E College, Morbi Page 63