JAGAT GURU NANAK DEV
PUNJAB STATE OPEN UNIVERSITY, PATIALA

(Established by Act No. 19 of 2019 of the Legislature of State of Punjab)

The Motto of the University
(SEWA)

SKILL ENHANCEMENT   **EMPLOYABILITY**   **WISDOM**
ACCESSIBILITY

M.SC. (COMPUTER SCIENCE)
SEMESTER-I
Course: COMPUTER PROGRAMMING LAB (MSCS-1-01P)

LABORATORY MANUAL

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PREFACE

Jagat Guru Nanak Dev Punjab State Open University, Patiala was established in December 2019 by Act 19 of the Legislature of State of Punjab. It is the first and only Open University of the State, entrusted with the responsibility of making higher education accessible to all especially to those sections of society who do not have the means, time or opportunity to pursue regular education.

In keeping with the nature of an Open University, this University provides a flexible education system to suit every need. The time given to complete a programme is double the duration of a regular mode programme. Well-designed study material has been prepared in consultation with experts in their respective fields.

The University offers programmes which have been designed to provide relevant, skill-based and employability-enhancing education. The study material provided in this booklet is self-instructional, with self-assessment exercises, and recommendations for further readings. The syllabus has been divided in sections, and provided as units for simplification.

The Learner Support Centres/Study Centres are located in the Government and Government aided colleges of Punjab, to enable students to make use of reading facilities, and for curriculum-based counselling and practicals. We, at the University, welcome you to be a part of this institution of knowledge.

Prof. G. S. Batra,
Dean Academic Affairs

LABORATORY MANUAL

Computer Programming
Course Code: MSCS-1-01P

M.Sc (Computer Science)
(1st Semester)

SCHOOL OF SCIENCES & EMERGING TECHNOLOGIES

JAGAT GURU NANAK DEV
PUNJAB STATE OPEN UNIVERSITY, PATIALA

Programme Outcomes (POs)

Programme: MSc (Computer Science)

Programme Outcomes (POs)

On successful completion of this programme, the students will be able to:

PO1	Develop an understanding of basic theoretical principles in computer science and perspectives in computer science by critical thinking.
PO2	Identify, formulate, review research literature, and analyze problems reaching substantiated conclusions using principles of computer science
PO3	Design solutions for problems and design system processes that meet the specified needs with appropriate consideration for the public health and safety, and the environmental considerations.
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Create, select and use appropriate techniques, skills, and modern IT tools necessary for computing practice with an understanding of the limitations.
PO6	Apply ethical principles in their research and professional activities and familiar with the professional standards and practices of the field of computer science.
PO7	Work collaboratively with others, both within and outside of their discipline, to solve complex problems and develop innovative solutions.
PO8	Communicate their ideas and research findings effectively to both technical and non-technical audiences, through written reports, oral presentations, and other media.
PO9	Demonstrate knowledge and understanding of the science and management principles and apply these to one's own work, as a member and leader of diverse teams, to manage projects and in multidisciplinary environments.
PO10	Recognize the need for, and have the preparation and ability to engage in continuing professional development and life-long learning in the broadest context of technological change.

Programme: MSc (Computer Science)

Programme Specific Outcomes (PSOs)

On successful completion of this programme, the students will be able to:

PSO1	Design and implement software solutions to complex problems using computer programming languages.
PSO2	Understand computer systems, including operating systems, networks, and databases for designing and developing computer-based systems.
PSO3	develop professional skills such as communication, teamwork, and project management that are essential for success in the computer science industry.
PSO4	Apply software engineering principles to develop and manage software projects, including requirements analysis, design, implementation, and testing.
PSO5	Gain ability to apply knowledge of Computer Science to the real-world issues.

Course Outcomes:

- An ability to design, implement, and evaluate a computer-based system, process, components, or program to meet desired needs.
- An ability to analyse a problem, and identify and define the computing requirements appropriate to its solution.
- Understanding of code organization and functional hierarchical decomposition with using complex data types.
- Understanding a concept of object thinking within the framework of functional model.
- Ability to work with arrays of complex objects.

Note: The content of this Lab Manual is divided into two sections. The Section describes about the Experiments in C Language and second part denotes the C++ Experiments.

Section A (List of Programs)

Computer Programming (using C Language)

Sr. No	Name of the program
1	Program to find area of circle.
2	Program to find Simple Interest.
3	Program to perform Arithmetic operations.
4	Program to find area of a triangle using three sides
5	Program to find the largest of two numbers.
6	Program to find the largest of five number.
7	Program to find smallest of two numbers using conditional operator.
8	Program to perform the Sum of N natural numbers.
9	Program to perform factorial of a given number.
10	Program to find the given number is palindrome or not.
11	Program to find the given number is Armstrong or not.
12	Program to reverse the given number.
13	Program to find Sum of digits.
14	Program to find day of the week.
15	Program to find the given character is vowel or not.
16	Program to compute the Sum Using Function Addnums ()
17	Program to Determine The Largest Among Them.
18	Program to Illustrate Passing Array As An Argument To A Called Function.
19	Program Compute The Area Of A Triangle
20	Program to Illustrate A Call By Value Parameter Passing Mechanism
21	Program to Accept Two Positive Integers And Compute Their GCD Using RecursiveFunction.
22	Program to Compute Its Factorial By Recursive Function.
23	Program to Accept The Information Of A C_Book Such As Number, Author, Publisher AndPrice And Also Display It.
24	Program to Accept The Roll Number, Name, Marks Obtained In Three Tests Of 2 Students Of A Class And Display The Rollnum, Name Marks And Their Average.
25	Program to Find The Sum Of Statically Declared 5 Elements.This Program Makes Use Of The Concept Of Pointers (Pass_By Reference) And Function.
26	Program to Illustrate The Call_By_Value Method To Interchange The Contents Of

	TwoInteger Variable
27	Program to Create A File Called Emp.Rec And Store Information About Person, Interms Of His Name, Age And Salary.
28	Program to Illustrate The Function fputc () And fputs () To Write A Single Character And String To A Data File.
29	Program to Draw a Line Using graphics.
30	Program to Draw a Circle Using graphics.

Section B (List of Programs)

Computer Programming (using C++ Language)

Sr. No.	Name of the Program
1	Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.
2	Write a C++ program to declare Struct. Initialize and display contents of member variables.
3	Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.
4	Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.
5	Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).
6	Write a C++ to illustrate the concepts of console I/O operations.
7	Write a C++ program to use scope resolution operator. Display the various values of the same
8	Write a C++ program to allocate memory using new operator.
9	Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3)
10	Write a C++ program to create an array of pointers. Invoke functions using array objects.
11	Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtual keyword.

Section A Solutions (C Language)

1) /* PROGRAM TO FIND THE AREA OF CIRCLE */

```c
#include<stdio.h>
main()
{
    float r,area;
    clrscr();
    printf(" Enter the radius of the circle \n");
    scanf("%f",&r);
    area=3.142*r*r;
    printf(" The area of a circle =%f",area);
}
```

OUTPUT:

Enter the radius of the circle5

The area of a circle= 78.54999

2) /* PROGRAM TO FIND THE SIMPLE INTEREST*/

```c
#include<stdio.h>
main ()
{
    float p,r,si;
    int t;
    clrscr();
    printf(" Enter the values of p,r, and t \n");
    scanf("%f%f%d",&p,&r,&t);
    si=(p*r*t)/100.0;
    printf("Amount=Rs. %5.2f \n",p);
    printf("Rate=Rs. %5.2f% \n",r);
    printf("Time=%d years \n",t);
    printf("Simple Interest=%5.2f \n",si);
}
```

OUTPUT:

Enter the values of p,r, and t
2000
8
3

Amount=Rs. 2000.00

Rate=Rs. 8.00%
Time=3 years
Simple Interest= 480.00

3) /* PROGRAM TO PERFORM ARITHMATIC OPERATOR'S */

```c
#include<stdio.h>
#include<math.h>
main()
{
    int a,b,sum,sub,mult,div,rem;
    printf("Enter the values of a & b \n");
    scanf("%d%d",&a,&b);
    sum=a+b;
    sub=a-b;
    mult=a*b;
    div=a/b;
    rem=a%b;
    printf("The addition of two number's is %d \n",sum); printf("The
    subtraction of two number's is %d \n",sub); printf("The
    multiplication of two number's is %d \n",mult);printf("The division
    of two number's is %d \n",div); printf("The remainder of two
    number's is %d \n",rem); getch();
}
```

OUTPUT:
Enter the values of a & b
50 5
The addition of two number's is
55
The subtraction of two number's is45
The multiplication of two number's is
250
The division of two number's is
10
The remainder of two number's is0

4) /* PROGRAM TO FIND AREA OF A TRIANGLE USING 3 SIDES */

```c
#include<stdio.h>
#include<math.h>
main()
{
    int a,b,c,s;
    float area;
    printf(" Enter the values \n");
    scanf("%d%d%d",&a,&b,&c);s=(a+b+c)/2;
    area=sqrt(s*(s-a)*(s-b)*(s-c));
    printf(" The area of triangle is= %f",area);
}
```

OUTPUT:

Enter the values2
2
2

The area of triangle is= 1.7320

5) /* PROGRAM TO FIND THE LARGEST OF TWO NUMBERS */

```c
#include<stdio.h>
main()
{
    int a,b,large;
    clrscr();
    printf(" Enter the two numbers \n");
    scanf("%d%d",&a,&b);
    large=a;
    if (b>large)
{
    large=b;
}
    printf("Largest of two numbers =%d \n",large);
    getch();
}
```

OUTPUT:

Enter the two numbers9
3

Largest of two numbers=9

6) /* PROGRAM TO FIND THE LARGEST OF FIVE NUMBERS */

```
#include<stdio.h>
main()
{
    int a,b,c,d,e,l;
    clrscr();
    printf(" Enter 5 numbers \n");
    scanf("%d%d%d%d%d",&a,&b,&c,&d,&e);l=a;
    if (l<b)
{
    l=b;
}
    if (l<c)
{
    l=c;
}
    if (l<d)
{
    l=d;
}

    if (l<e)
{
    l=e;
}
    printf(" The largest among these is : %d \n",l);
    getch();
}
```

 OUTPUT:
Enter 5 numbers
6
3
9
5
1
The largest among these is: 9

7) /* PROGRAM TO FIND THE SMALLEST OF TWO NUMBERS USING
CONDITIONAL OPERATOR*/

```c
#include<stdio.h>
main()
{
        int a,b,s;
        clrscr();
        printf(" Enter the two numbers \n");
        scanf("%d%d",&a,&b);
        s=a>b?a:b;
        printf(" The smallest of 2 number's : %d \n",s);
}
```

OUTPUT:

Enter the two numbers9
5
The smallest of 2 number's: 5

8) /* PROGRAM TO PERFORM THE SUM OF N NATURAL NUMBER */

```c
#include<stdio.h>
main()
{
    int n,sum,i;
    clrscr();
    printf(" Enter the value of n \n");
    scanf("%d",&n);
    sum=0;
    i=1;
    do
    {
        sum=sum+i;
        i=i+1;
    }
    while (i<=n);
    printf("Sum of first %d number =%d",n,sum);
}
```

OUTPUT:

Enter the value of n4

Sum of first 4 number =1

9) /* PROGRAM TO PERFORM FACTORIAL OF A GIVEN NUMBER */

```c
#include<stdio.h>
main()
{
    int n,fact,i;
    clrscr();
    printf(" Enter the value of n \n");
    scanf("%d",&n);
    fact=1; if
    (n==0)
    {
     printf("Factorial of %d is %d",n,fact);
    }
    else
    {
    for (i=1;i<=n;i++)
    {
      fact=fact*i;
    }
     printf("Factorial of %d is %d",n,fact);
    }
     getch();
}
```

OUTPUT:

Enter the value of n4
Factorial of 4 is 24

10)   /* PROGRAM TO FIND THE GIVEN NUMBER IS PALINDROM OR NOT */

```c
#include<stdio.h>
main()
{
    int num,rem,sum,temp;
    clrscr();
    printf(" Enter any number \n");
    scanf("%d",&num);
    sum=0;
    temp=num;
    while(num>0)
    {
        rem = num % 10;
        sum = sum * 10 + rem;
        num = num /10;
    }
    if(tem = = sum)
    {
        printf("The given number is palindrome %d",sum);
    }
    else
    {
        printf("The given number is not palindrome %d",sum);
    }
    getch( );
}
```

OUTPUT:

Enter any number
121
The given number is palindrome 121

Enter any number
234
The given number is not palindrome 432

11) /* PROGRAM TO FIND THE GIVEN NUMBER IS ARMSTRONG OR NOT */

```c
#include<stdio.h>
main()
{
    int n,r,s,t;
    clrscr();
    printf(" Enter any number \n");
    scanf("%d",&n);
    s=0;
    t=n;
    while(n>0)
    {
        r = n % 10;
        s = s + (r * r * r);n
        = n /10;
    }
    if(t = = s)
    {
        printf("The given number %d is Armstrong ",s);
    }
    else
    {
        printf("The given number  %d is not Armstrong " ,s);
    }
    getch( );
}
```

OUTPUT:

```
Enter any number
153
The given number 153 is Armstrong

Enter any number
123
The given number 123 is not Armstrong
```

12)   /* PROGRAM TO REVERSE THE GIVEN NUMBER */

```c
#include<stdio.h>
main()
{
    long int r,rev,n;
    clrscr();
    printf(" Enter any 4 digit  number \n");
    scanf("%ld",&n);
    rev=0;
    while(n ! = 0)
    {
        r = n % 10;
        rev = rev * 10 +r;
        n = n/10;
    }
      printf("The reverse of a given number is  %ld",rev);
    getch( );
}
```

OUTPUT:

Enter any 4 digit number
1234
The reverse of given number is 4321

13)   /* PROGRAM TO FIND SUM OF DIGITS */

```c
#include<stdio.h>
main()
{
    int number, n, sum=0;
    clrscr();
    printf(" Enter a positive number \n");
    scanf("%d",&number);
     n=number;
     do
    {
        sum = sum+ n % 10;n
        = n/10;
    }
     while(n>0);
       printf("The sum of digits of %d is %d", number, sum);getch( );
}
```

OUTPUT:

Enter a positive number
12345
The sum of digits of 12345 is 15

14)   /* PROGRAM TO FIND DAY OF THE WEEK */

```c
#include<stdio.h>
main()
{
    int dayno;
    clrscr();
    printf("Input day number of the week \n");
    scanf("%d",&dayno);
    switch(dayno)
    {
        case 1: printf("Sunday \n");
                break;
        case 2: printf("Monday \n");
                break;
        case 3: printf("Tuesday \n");
                break;
        case 4: printf("Wednesday \n");
                break;
        case 5: printf("Thursday \n");
                break;
        case 6: printf("Friday \n");
                break;
        case 7: printf("Saturday \n");
                break;
        default: printf("Invalid Input \n");
                break;
    }
    getch();
}
```

OUTPUT:

Input day number of the week5
Thursday

15) /* PROGRAM TO FIND THE GIVEN CHARACTER IS VOWEL OR NOT */

```c
# include<stdio.h>
main()
{
    char ch;
    clrscr();
    printf("Input a character \n");
    ch=getchar();
    if (ch=='a' || ch=='e' || ch=='i' || ch=='o' || ch=='u' || )
    {
      printf("The given character is vowel \n");
     }
    else
    {
      printf("The given character is not vowel \n");
    }
 getch();
}
```

OUTPUT:

Input a characterA
The given character is vowel
 Input a characterB
The given character is not vowel

16) Program to compute their sum using function addnums()

```c
#include<stdio.h>
Void main()

{

int
n1,n2,result;
clrscr();

printf("Enter the two
numbers");
scanf("%d%d",&n1,&n2);
result=addnums(n1,n2);

printf("The sum of %d and %d %d\n",n1,n2,result);
getch();          `

 }
```

```
intaddnums(val1,val2)
int val1,val2;

 {

int sum;
sum=val1+val2;
return sum;

 }


OUTPUT

 Enter the two
 numbers12

 23

 The sum of 12 and 23 is=35
```

17) Program to accept the two numbers and determine the largest among them.

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

{

floatx,y,max;

float large(float m,float n);
clrscr();

printf("Enter the two
numbers");
scanf("%f%f",&x,&y);
printf("x=%f and y=%f\n",x,y);
max=large(x,y);

printf("The largest=%f\n",max);
getch();

}

float large(float m,float n)

{
```

```
if(m>n)
return
m;else
return n;

}
```

OUTPUT

Enter the two
numbers10.0

20.0

x=10.000000 and y=20.000000

The largest=20.000000

18)   Program to illustrate passing array as an argumunt to a called function

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

{

int a[6];
int i;

voidarrpass(int a[]);
clrscr();

printf("Enter array
elemnts\n");for(i=0;i<5;i++)

 {

scanf("%d",&a[i]);

 }

arrpass(a)
;getch();

}
```

```c
voidarrpass(int a[])

{

int i;

printf("Array elements are\n");for(i=0;i<5;i++)

 {

printf("%d\n",a[i]);

 }

}
```

OUTPUT

Enter array
elemnts1

2

3

4

5

Array elements
are1

2

3

4

5

19)   Program to accept three sides of a triangle and pass them to a function to computethe area of a triangle

```c
#include<stdio.h>
#include<math.h
> void main()

{

float side1,side2,side3,area;
floattri_area(); /* Function Declaration
*/clrscr();

printf("Enter the three sides of a
triangle\n");
scanf("%f%f%f",&side1,&side2,&side3);
area=tri_area(side1,side2,side3);

printf("The area of the
triangle=%f\n",area);getch();

}

/* Function to compute the area of triangle
*/floattri_area(a,b,c)

floata,b,c;

{

floats,area;
  s=(a+b+c)/2;

area=sqrt(s*(s-a)*(s-b)*(s-c));
return area;

}
```

OUTPUT

Enter the three sides of a
triangle3.0

4.0

5.0

The area of the triangle=6.000000

20) Program to illustrate a call by value parameter passing mechanism.

```c
#include<stdio.h>
void main()

{

int n1,n2,x;
intcal_by_val(int p1,int p2);
clrscr();

 n1=6;
 n2=9;

printf("n1=%d and n2=%d\n",n1,n2);
 x=cal_by_val(n1,n2);

printf("n1=%d and n2=%d\n",n1,n2);
printf("x=%d\n",x);

getch();

}

intcal_by_val(int p1,int p2)

{

int sum;
sum=p1+p2;
p1+=2;

 p2*=p1;

printf("p1=%d and p2=%d\n",p1,p2);
return sum;

}
```

OUTPUT

```
n1=6 and n2=9
p1=8 and p2=72
n1=6 and n2=9
x=15
```

21) Program to accept two positive integers and compute their GCD using recursive function.

```c
#include<stdio.h>
void main()

{

inta,b,gcd;

int GCD(intx,int y);

printf("Enter the value of A and B");
scanf("%d%d",&a,&b);
gcd=GCD(a,b);

printf("The GCD of %d and %d =%d\n",a,b,gcd);
getch();

}

int GCD(intx,int y)

{

int  rem;
if(y==0)
return
x;else

 {

rem=x%y;
return(GCD(y,rem));

 }

}
```

OUTPUT

Enter the value of A and B

12

8

The GCD of 12 and 8 =4

22) Program to accept a number from the keyboard and compute its factorial byrecursive function.

```c
#include<stdio.h>
#include<conio.h>
void main()

{

intnum,fact;
intrec_funct(int N);
clrscr();

printf("Enter a
number\n");
scanf("%d",&num);
fact=rec_funct(num);

printf("factorial of %d=%d\n",num,fact);
getch();

}

intrec_funct(int N)

{

intfct;
if(N==0)

return
1;else

fct=N*rec_funct(N-1);
returnfct;

}
```

OUTPUT

Enter a
number5

factorial of 5=120

23) Program to accept the information of a C_book such as number, author, publisherand price and also display it.

```c
#include<stdio.h>
void main()

{

struct C_BOOK

 {

intbook_num;
char author[20];
char publish[20];
float price;

 };

struct C_BOOK bkinfo;
clrscr();

printf("Enter the book number\n");
scanf("%d",&bkinfo.book_num);
printf("Enter the Name of the
author\n");scanf("%s",bkinfo.author);

printf("Enter the name of the
publisher\n");scanf("%s",bkinfo.publish);

printf("Enter the price of the
book\n");scanf("%f",&bkinfo.price);

printf("_____
_____\n");printf("      C_BOOK
          \n");

printf("_____
_____\n");printf("Book Number :
%d\n",bkinfo.book_num);printf("Author
           : %s\n",bkinfo.author);
printf("Publisher   : %s\n",bkinfo.publish);
printf("Price    : Rs.%6.2f\n",bkinfo.price);
```

```
printf("

_____\n")

;getch();

}
```

OUTPUT

Enter the book
number12345

Enter the Name of the
authorkottur

Enter the name of the
publishersapna

Enter the price of the
book200.00

_____

        C_BOOK

_____

Book Number : 12345
Author   : kottur
Publisher   : sapna
Price   : Rs.200.00

_____

24)   Program to accept the roll number, name, marks obtained in three tests oftwo students of a class and display the rollnum, name marks and their average.

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

{

structstud_rec

 {

intRollno;
```

```c
char Name[20];
int M1;

int   M2;
int   M3;
floatavg;

 };

inti,total;

structstud_rec student[2];

printf("Type in information of 2
students\n");for(i=0;i<2;i++)

 {

printf("Enter the rollno of
student%d=\n",i+1);
scanf("%d",&student[i].Rollno);

printf("Enter the nameof the student
%d=\n",i+1);scanf("%s",student[i].Name);

printf("Enter            the
marks1\n");
scanf("%d",&student[i].M1);
printf("Enter            the
marks2\n");
scanf("%d",&student[i].M2);
printf("Enter            the
marks3\n");
scanf("%d",&student[i].M3);

 }

printf("_____\n");
printf("Rollno Name Mark1 Mark2 Mark3 Average \n"):

printf("

_____\n")
;for(i=0;i<2;i++)

 {
```

```c
total=student[i].M1+student[i].M2+student[i].M3;student[i].avg=total/3.0;
printf("%d%s%d%d%d%5.2f\n",student[i].Rollno,student[i].Name,student[i].M1,student[i].M2,student[i].M3,student[i].avg);

}

printf("
_____\n")
;getch();

}
```

OUTPUT

Type in information of 2 studentsEnter the rollno of student 1=

1

Enter the name of the student 1=abhi

Enter the marks180

Enter the marks290

Enter the marks380

Enter the rollno of student 2=2

Enter the name of the stydent 2=akash

Enter the marks170

Enter the marks280

Enter the marks360

Rno	Name	Mark1	Mark2	Mark3	Average
1	abhi	80	90	80	83.33
2	akash	70	80	60	70.00

25) Program to find the sum of statically declared 5 elements.Thisprogram makes useof the concept of pointers (pass_by reference) and function.

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

{

staticint array[5]={200,400,600,800,1000};
intaddnum(int *ptr);

int sum;
sum=addnum(array)
;

printf("Sum of all array elements=%d\n",sum);
getch();

}

intaddnum(int *ptr)

{

inti,total=0;
for(i=0;i<5;i++)
total=total+*(ptr+i);
Return(total);

}
```

OUTPUT

Sum of all array elements=3000

26) Program to illustrate the call_by_value method to interchange the contents of two integer variable

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

{

inta,b;
 a=10;b=20;

clrscr();

printf("\n The main before
exchanging");printf("\n a=%d and
b=%d\n",a,b); exchang(a,b);

printf("\n The main after
exchanging");printf("\n a=%d and
b=%d\n",a,b); getch();

}

voidexchang(intm,int n)

{

int temp;

printf("\n Function before exchanging
\n");printf("\n m=%d and n=%d\n",m,n);
temp=m;

 m=n;
 n=temp
 ;

printf("\n The function after
exchanging\n");printf("\n m=%d and
n=%d\n", m,n);

}
```

OUTPUT

The main before exchanging
a=10 and b=20

Function before exchanging

m=10 and n=20

The function after exchanging

m=20 and n=10

The main after exchanging

a=10 and b=20

27)   Program to create a file called emp.rec and store information about person, in terms of his name, age and salary.

```c
#include<stdio.h>
#include<conio.h>
void main()

{

 FILE *fptr;
char
name[20];int
age;

float salary;
clrscr();

fptr=fopen("emp.rec","w");
if(fptr==NULL)

 {

printf("File doesnot exist
\n");return;

 }

printf("Enter the name \n");
scanf("%s",name);
fprintf(fptr,"Name=%s\n",name);
printf("Enter the age\n");
scanf("%d",&age);
fprintf(fptr,"Age =%d\n",age);
printf("Enter the salary \n");
scanf("%f",&salary);

fprintf(fptr,"Salary = %2.2f\n",salary);
fclose(fptr);

getch();

}
```

OUTPUT

Enter the
namemadhu

Enter the
age30

Enter the
salary40000

Emp.rec

Name=madh
uAge =30

Salary = 40000.00

28)   Program to illustrate the function fputc() and fputs() to write a single charatcterand string to a data file.

```c
#include<stdio.h>
#include<conio.h>
void main()

{

  FILE *fptr;
charmychar;
char string[20];
clrscr();

fptr=fopen("out.txt","w");
if(fptr==NULL)

 {

printf("File doesnot Exist \n");
return;

 }

printf("Enter a character
\n");scanf("%c",&mychar);
```

```c
fputc(mychar,fptr);
fflush(stdin);

printf("Enter a string
\n");gets(string);
fputs(string,fptr);
fclose(fptr);

getch();

}
```

OUTPUT

Enter a
characterh

Enter a string
hello

out.txt

hello

29)   Program To Draw a Line Using graphics.


```c
#include<stdio.h>
#include<graphics.h>
#include<math.h>
void main()

{

inta,b;
detectgraph(&a,&b);
initgraph(&a,&b,"");

line(75,50,150,50);

getch();
closegraph();

}
```
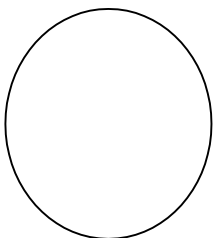
OUTPUT:

_____

30)   Program To Draw a Circle Using graphics.

```
#include<stdio.h>
#include<graphics.h>
#include<math.h>
void main()

{

inta,b;
detectgraph(&a,&b)
;
initgraph(&a,&b,"");
circle(100,120,75);
getch();
closegraph();

}
```

OUTPUT

Section B: Experiments using C++ Languages

1.   Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.

```cpp
#include <iostream> using namespace std; #define MAX 10
class student
{
private:
char name[30]; int rollNo;
int total; float perc;
public:
void getDetails(void);            //member function to get student's details void
putDetails(void);    //member function to print student's details
};

void student:: getDetails(void)    //member function definition, outside of the class
{
cout << "Enter name: " ; cin >> name;
cout << "Enter roll number: "; cin >> rollNo;
cout << "Enter total marks outof 500: "; cin >> total;
perc=(float)total/500*100;
}

void student:: putDetails(void)    //member function definition, outside of the class
{
cout << "Student details:\n";
cout << "Name:"<< name << ",Roll Number:" << rollNo << ",Total:" << total <<
",Percentage:" << perc;

}

int main()
{
student std[MAX]; //array of objects creation int n,loop;
cout << "Enter total number of students: "; cin >> n;
for (loop=0;loop< n; loop++)
{
cout << "Enter details of student " << loop+1 << ":\n"; std[loop].getDetails();
}
cout << endl; for(loop=0;loop< n; loop++)
{
```

```cpp
cout << "Details of student " << (loop+1) << ":\n"; std[loop].putDetails();
}
return 0;
}
```

Output:

Enter total number of students: 3 Enter details of student 1:
Enter name: Karthik Enter roll number: 1201
Enter total marks out of 500: 456

Enter details of student 2:
Enter name: Mahesh Enter roll number: 1202
Enter total marks out of 500: 398

Enter details of student 3:
Enter name: Kiran Enter roll number: 1203
Enter total marks out of 500: 456

Details of student 1:
Student details:
Name: Karthik, Roll Number: 101, Total: 456, Percentage: 91.2 Details of student 2:

Student details:
Name: Mahesh, Roll Number: 1202, Total: 398, Percentage:79.6

Details of student 3:
Student details:
Name: Kiran, Roll Number: 1203, Total: 398, Percentage:79.6

2.   Write a C++ program to declare Struct. Initialize and display contents of member variables.

```cpp
#include <iostream> using namespace std; struct student
{
char name[50]; int roll;
float marks;
};
int main()
{
student s;
cout << "Enter information," << endl; cout << "Enter name: ";
```

```
cin >> s.name;
cout << "Enter roll number: "; cin >> s.roll;
cout << "Enter marks: "; cin >> s.marks;
cout << "\nDisplaying Information," << endl; cout << "Name: " << s.name << endl;
cout << "Roll: " << s.roll << endl; cout << "Marks: " << s.marks << endl; return 0;
}
```

Output:

Enter information, Enter name: Bill Enter roll number: 4 Enter marks: 55.6
Displaying Information, Name: Bill
Roll: 4
Marks: 55.6

2.   Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

```
#include <iostream> using namespace std;
class Box
{
public:
Box(double l = 2.0, double b = 2.0, double h = 2.0)
{
cout <<"Constructor called." << endl; length = l;
breadth = b; height = h;
}
double Volume()
{
return length * breadth * height;
}
private:
double length; double breadth; double height;
};

int main(void)
{
Box Box1(3.3, 1.2, 1.5);
Box Box2(8.5, 6.0, 2.0);
Box *ptrBox; ptrBox = &Box1;
cout << "Volume of Box1: " << ptrBox->Volume() << endl; ptrBox = &Box2;
cout << "Volume of Box2: " << ptrBox->Volume() << endl; return 0;
}
```

Output:

Constructor called. Constructor called. Volume of Box1: 5.94 Volume of Box2: 102

4. Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.

```
#include<iostream.h> #include<conio.h> class employee
{
int  emp_num;
char emp_name[20]; float emp_basic; float sal;
float emp_da; float net_sal; float emp_it; public:
void get_details(); void find_net_sal();
void show_emp_details();
};
void employee :: get_details()
{
cout<<"\n Enter employee number:\n"; cin>>emp_num;
cout<<"\n Enter employee name:\n"; cin>>emp_name;
cout<<"\n Enter employee basic:\n"; cin>>emp_basic;
}
void employee :: find_net_sal()
{
emp_da=0.52*emp_basic; emp_it=0.30*(emp_basic+emp_da);
net_sal=(emp_basic+emp_da)-emp_it;
}

void employee :: show_emp_details()
{
cout<<"\n\n\n Details of  : "<<emp_name;


cout<<"\n\n Employee number:  "<<emp_num; cout<<"\n Basic salary    : "<<emp_basic;
cout<<"\n Employee DA                 : "<<emp_da; cout<<"\n Income Tax          :
"<<emp_it; cout<<"\n Net Salary       : "<<net_sal;
}
int main()
{
employee emp[10]; int i,num;
clrscr();
cout<<"\n Enter number of employee details\n"; cin>>num;
for(i=0;i<num;i++)
emp[i].get_details(); for(i=0;i<num;i++)
emp[i].find_net_sal(); for(i=0;i<num;i++)
emp[i].show_emp_details(); getch();
```

```
return 0;
}
```
Output:

Enter number of employee details Enter employee number: 5123 Enter employee name:
Madhav Enter employee basic: 10000

Details of : Madhav Employee number: 5123 Basic salary   :   10000
Employee DA   : 5200 Income Tax   : 4560 Net Salary : 10640

5.   Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).

```cpp
#include<iostream.h> #include<conio.h> #define SIZE 5
class emp
{
float basic,da,it,netsal; char name[20],num[10]; public:
void getdata(); void net_sal(); void dispdata();
};
void emp::getdata()
{
cout<<"\n Enter employee number: " ; cin>>name;
cout<<"\n Enter employee name: " ; cin>>num;
cout<<"Enter employee basic salary in Rs: " ; cin>>basic;
}
void emp::net_sal()
{
da=((0.52)*basic ); float gsal=da+basic; it=((0.3)*gsal); netsal=gsal-it;
}

void emp::dispdata()
{
cout <<"\n Employee number: "<<name cout <<"\n Employee name: "<<num
cout <<"\n Employee netsalary: "<<netsal<<" Rs.";
}
void main()
{
clrscr();


emp ob[SIZE]; int n;
cout<<"\n\n**********************************"
<<"\n Calculation of Employee Net Salary"
```

```
<<"\n**********************************"
<<"\n Enter the number of employees"; cin>>n;
for(int i=0;i<n;i++)
{
ob[i].getdata();
ob[i].net_sal();
}
clrscr();
cout<<"\n      "
<<"\n Employee Detail::"
<<"\n ";
for( i=0;i<n;i++)
{
cout<<"\n\n Employee:"<<i+1
<<"\n ";
ob[i].dispdata();
}
getch();
}
```

Output:

```
**********************************" Calculation of Employee Net Salary
**********************************" Enter the number of employees: 1

Enter employee number: 22 Enter employee name: Sanath
Enter employee basic salary in Rs: 10000
Employee Detail::
Employee:1 Employee number: 22
Employee name: Sanath Employee netsalary: 10000 RS.
```

6.   Write a C++ to illustrate the concepts of console I/O operations.

```cpp
#include <iostream> #include <fstream> #include <cstdlib> #include <string> using
namespace std;
int main()
{
string filename = "test.txt";
ofstream fout(filename.c_str()); // default mode is ios::out | ios::trunc

if (!fout)
{
cerr << "error: open file for output failed!" << endl; abort(); // in <cstdlib> header
}
```

```
fout << "apple" << endl; fout << "orange" << endl; fout << "banana" << endl; fout.close();
ifstream fin(filename.c_str()); // default mode ios::in
if (!fin)
{
cerr << "error: open file for input failed!" << endl; abort();
}
char ch;

while (fin.get(ch))
{ // till end-of-file cout << ch;
}
fin.close(); return 0;
}
```

Output:
apple orange banana

7.   Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.

```
#include <iostream> using namespace std;
class programming
{
public: void output(); //function declaration
};
void programming::output()
{
cout << "Function defined outside the class.\n";
}

int main()
{
programming x; x.output(); return 0;
}
```

Ouput:
Function defined outside class

8. Write a C++ program to allocate memory using new operator.

```cpp
#include <iostream> using namespace std;
int main ()
{
int* p = NULL;
p = new(nothrow) int; if (!p)
cout << "allocation of memory failed\n"; else
{
*p = 29;
cout << "Value of p: " << *p << endl;
}
float *r = new float(75.25);
cout << "Value of r: " << *r << endl; int n = 5;
int *q = new(nothrow) int[n];

if (!q)
cout << "allocation of memory failed\n"; else
{
for (int i = 0; i < n; i++) q[i] = i+1;
cout << "Value store in block of memory: "; for (int i = 0; i < n; i++)
cout << q[i] << " ";
}
delete p; delete r; delete[] q;
return 0;
}
```

Output:
Value of p: 29 Value of r: 75.25
Value store in block of memory: 1 2 3 4 5

9. Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3)

```cpp
#include <iostream> using namespace std;
class base //single base class
{
public:
int x;
void getdata()
{
cout << "Enter value of x= "; cin >> x;
}
```

```cpp
};

class derive1 : public base // derived class from base class
{
public:
int y;
void readdata()
{
cout << "\nEnter value of y= "; cin >> y;
}
};

class derive2 : public derive1  // derived from class derive1
{
private:
int z; public:
void indata()
{
cout << "\nEnter value of z= "; cin >> z;
}
void product()
{
cout << "\nProduct= " << x * y * z;
}
};
int main()
{
derive2 a; a.getdata();
a.readdata();
a.indata();
a.product(); return 0;
}
```

Output:
Enter value of x= 2 Enter value of y= 3 Enter value of z= 3 Product= 18

10.   Write a C++ program to create an array of pointers. Invoke functions using array objects.

```cpp
#include<iostream.h> #include<constream.h>
class A
{
public:
virtual void show()
{
cout<<"A\n";
}
};

class B : public A
{
public:
void show()
{
cout<<"B\n";
}
};

class C : public A
{
public:
void show()
{
cout<<"C\n";
}
};


class D : public A
{
public:
void show()
{
cout<<"D\n";
}
};
```

```cpp
class E : public A
{
public:
void show()
{
cout<<"E";
}
};

void main()
{
clrscr();
A a;
B b;
C c;
D d;
E e;
A *p a[]={&a,&b,&c,&d,&e}; for ( int j=0;j<5;j++)
pa[j]->show();
}
```

Output:
A B C D E

11.   Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtual keyword.

```cpp
#include<iostream> using namespace std; class base
{
public:
virtual void print ()
{
cout<< "print base class" <<endl;
}
void show ()
{
cout<< "show base class" <<endl;
}
};
class derived: public base
{
public:
```

```cpp
void print ()
{
cout<< "print derived class" <<endl;
}
void show ()
{
cout<< "show derived class" <<endl;
}
};
int main()
{
base *bptr; derived d; bptr = &d; bptr->print(); bptr->show();
}
```

Output:
print derived class show base class