LAB 2.1

1. /*Write a program that will display “Hello world! Message on the screen.*/

```
#include <iostream>
using namespace std;
int main()
{
   cout << "Hello World!";
   return 0;
}
```

2. /*Write a program to ask the user for two numbers and print the sum, difference and product of those two numbers.*/

```
#include <iostream>
using namespace std;
int main()
{
      int a , b , sum , diff , prod;
      cout << "Enter two numbers : \n";
      cin >> a >> b;
```

```
        cout << "\nSum = " << a+b;
        cout << "\nDifference = " << a-b;
        cout << "\nProduct = " << a*b;
}
```

3. /* Write a program to calculate the simple interest from the values of principle, time and rate of interest input from the user. [Hint: I=PTR/100]*/

```
#include<iostream>
using namespace std;
int main()
{
        nt si , p , t , r;
        cout << "Enter the principle : ";
        cin >> p;
        cout << "Enter the time : ";
        cin >> t;
        cout << "Enter the rate of interest : ";
        cin >> r;
```

```
    si = p*t*r/100;
    cout << "The simple interest is " << si;
}
```

4. /*Write a program to calculate area and perimeter of a circle .[Hint area= PI*r*r and perimeter= 2*PI*r].*/

```
#include<iostream>
#define PI 3.14
using namespace std;
int main()
{
    float r , area , perimeter;
    cout << "Enter the radius : ";
    cin >> r;
    area = PI * r * r ;
    perimeter = 2 * PI * r;
    cout << "\nThe area of circle is " << area << "\nThe perimeter of circle is " << perimeter;
}
```

5. /*Write a program that identifies largest of three input numbers.*/

```
#include<iostream>
using namespace std;
int main()
{
	int a , b , c;
	cout << "Enter any three numbers : \n";
	cin >> a >> b >> c;
	if((a>b) && (a>c))
		cout << "\nThe largest number is " << a;
		if((b>a) && (b>c))
		cout << "\nThe largest number is " << b;
		if((c>a) && (c>b))
		cout << "\nThe largest number is " << c;
}
```

6. /*Write a program to identifies user inputted number whether it is odd or even.*/

```
#include<iostream>
```

```
using namespace std;
int main()
{
	int a , b ;
	cout << "Enter any number : \n";
	cin >> a ;
	if ((a%2) ==0)
		cout << "The entered number is even.";
	else
		cout << "The entered number is odd.";
}
```

7. /*Write a program to display the following output using a single cout statement.

Math=90 physics=70

English= 75*/

```
#include<iostream>
using namespace std;
int main()
{
	cout << "Math=90 \t physics=70 \nEnglish= 75";
```

}

LAB 2.2

1. /* Write a program that reads the two numbers and one arithmetic operator and perform the respective operation. (use switch case statement)*/

```
#include<iostream>
using namespace std;
int main()
{
	char c;
	float x,y;
	cout << "Enter any arithemetic operators : ";
	cin >> c;
	cout <<"Enter two numbers x and y:\n";
	cin >> x >> y;
	switch(c)
	{
		case '+':
			cout << "\nx + y = " <<x+y;
			break;
```

```
            case '-':
                cout << "\nx - y = " <<x-y;
                break;
            case '*':
                cout << "\nx * y = " <<x*y;
                break;
            case '/':
                cout << "\nx / y = " <<x/y;
                break;
            default:
                cout << "\nInvalid Operator.";
                break;
            return 0;
        }
}
```

2. /*Write a program that will ask for the roll number and marks obtained by a student in seven

different subjects and display the percentage score of that student.*/

```
#include<iostream>
```

```
using namespace std;
int main()
{
	int a , b , sum=0 , i;
	float percent;
	cout << "Enter the Roll Number: ";
	cin >> a;
	cout << "\nEnter the marks of students in the seven subjects :\n";
	for(i=0;i<7;i++)
	{
		cin >> b;
		sum = sum+b;
	}

	percent = sum/7;
cout << "\nThe percentage obtained by student number " << a <<" is " << percent;
}
```

3. /*Write a program that reads weight and height of boys in a class and then count the number of boys whose weight is less than 50 kg and height is greater than 170 cm.*/

```
#include<iostream>
using namespace std;

int main()
{
	int i , n , w , h , c=0;
	cout << "Enter the number of boys in the class : ";
	cin >> n;
	for(i=0;i<n;i++)
	{
		cout << "\nEnter the weight and height of boy no. " << i+1 << endl;
		cin >> w >> h;
		if((w<=50)&&(h>170))
			c++;
	}

	cout << "\nThe number of students whose weight is less than 50 kg and height is greater than 170 cm is "<<c;
}
```

4. /*Write a program to find the sum of first n natural numbers.*/

```
#include<iostream>
using namespace std;
int main()
{
	int n , sum=0 ,i;
	cout << "Enter any number : ";
	cin >> n;
	for(i=1;i<=n;i++)
	{
		sum += i;
	}
	cout << "The sum of first "<<n<<" natural numbers is "<< sum;
}
```

5. /*Write a program to find the sum of square of first n natural numbers.

*/

```
#include<iostream>
```

```
using namespace std;
int main()
{
	int n , sum=0 ,i;
	cout << "Enter any number : ";
	cin >> n;
	for(i=1;i<=n;i++)
	{
		sum += i*i;
	}
	cout << "The sum of square of first "<<n<<" natural numbers is "<< sum;
}
```

6. /*Write a program to take a number from the user
and then count the number of digits in that number.*/

```
#include<iostream>
using namespace std;
int main()
{
	int c ;
```

```
    long long num;
    cout << "Enter any number : ";
    cin >> num;
    do{
        num/=10;
        ++c;
    }while(num != 0);

    cout << "The number of digit in the entered number is "<<
c;
}
```

7. /*Write a program to find the sum of digits of a number entered by the user.*/

```
#include <iostream>
using namespace std;
int main()
{
    int n, t, sum = 0, rem;
    cout << "Enter any number : ";
    cin >> n;
```

```
        t=n;
        while (t != 0)
        {
                rem = t % 10;
                sum      = sum + rem;
                t        = t / 10;
   }

   cout <<"The sum of digits of "<<n<<" is "<<sum;
 return 0;
}
```

8. /*Write a program to check whether a number entered by the user

is Armstrong number [e.g., 153 =13+53+33] or not.*/

```
#include<iostream>
using namespace std;
int main()
{
        int n, t, result = 0, rem;
```

```
        cout << "Enter any number : ";
        cin >> n;
        t=n;
          while (t != 0)
        {
            rem = t % 10;

       result += rem * rem * rem;
       t /= 10;
    }

    if (result == n)
       cout << n << " is an Armstrong number.";
    else
       cout << n << " is not an Armstrong number.";

    return 0;
}
```

9. /*Write a program to reverse the number entered by the user.*/

```
#include<iostream>
using namespace std;
int main()
{
        int n, t, sum = 0, rem;
        cout << "Enter any number : ";
        cin >> n;
        t=n;
        while (t != 0)
        {
                rem = t % 10;
                sum       = sum*10 + rem;
                t         = t / 10;
   }

   cout <<"The reverse of "<<n<<" is "<<sum;
return 0;
}
```

10. /*Write a program to calculate the sum of 5 numbers, if user enters negative number then display the sum of previous entered numbers [note: use loop, if and break statement]*/

```
#include<iostream>
using namespace std;
int main()
{
	int num,sum=0,i;
	cout << "Enter Postive numbers to add : \n";
	for(i=0;i<5;i++)
	{
		cin >> num;
		if(num<0)
		{
			break;
		}
		sum=sum+num;
	}
	cout << "\nThe sum of the numbers is "<< sum;
	return 0;
}
```

11. /*Write a program to calculate the sum of 5 numbers, if user enters negative number then skip the negative numbers from the calculation [note: use loop, if and continue statement]*/

```
#include<iostream>
using namespace std;
int main()
{
	int num,sum=0,i;
	cout << "Enter Postive numbers to add : \n";
	for(i=0;i<5;i++)
	{
		cin >> num;
		if(num<0)
		{
			continue;
		}
		sum=sum+num;
	}
```

```
    cout << "\nThe sum of the numbers is "<< sum;
    return 0;
}
```

LAB 2.3

1. /*Write a function which receives a float and an integer from main(), finds the product of these two and returns the product which is printed through main().*/

```
#include<iostream>
using namespace std;
float prod(int x, float y)
{
    return(x*y);
}
int main()
{
    int x;
    float y;
    cout<<"Enter an integer and a float number :"<<endl;
    cin >>x >> y;
```

```
    cout<<endl<<"Their product is "<<prod(x,y);
}
```

2. /*Write a function areaOfCircle( ) which accepts radius of float value and returns the area of the circle. Use this function to calculate

area of two circles having different radii.*/

```
#include<iostream>
#define PI 3.14
using namespace std;
float areaofcircle(float r)
{
    return(PI*r*r);
}
int main()
{
    float r;

    cout<<"Enter the radius of circle :";
    cin>>r;
```

```
    cout<<endl<<"The area of circle is "<<areaofcircle(r);
}
```

3. /*Write a program which has three user-defined functions named readData( ), processData( ), and displayData(). Use readData( ) function to read the two fractional numbers from keyboard, processData( ) to sum these numbers and displayData() to display the sum*/

```
#include<iostream>
using namespace std;
float processData(float a, float b);
float displayData(float a);
float readData()
{
    float a , b;
    cout<<"Enter any two fractional numbers : "<<endl;
    cin>>a>>b;
    processData(a,b);
}
float processData(float a, float b)
{
    float sum;
```

```
        sum=a+b;
        displayData(sum);

}
float displayData(float a)
{
        cout<<endl<<"The sum of numbers is "<<a;
}
int main()
{
        readData();
}
```

4. /*Write a function calculateArea() which receives length and breadth of a rectangle as its arguments and returns area of the rectangle.*/

```
#include<iostream>
using namespace std;
int calculateArea(int a, int b)
{
        return(a*b);
}
```

```
int main()
{
    int l , b;
    cout<<"Enter the length and breadth of a rectangle :"<<endl;
    cin>>l>>b;
    cout<<endl<<"The area of rectangle is "<<calculateArea(l,b);
}
```

5. /*Write a function prime( ) that returns 1 if its argument is a prime number

and returns zero otherwise.*/

```
#include<iostream>
using namespace std;
int prime(int a)
{
    int i,c=0;
    for(i=2;i<a;i++)
    {
        if(a%i==0)
            return 0;
```

```
        else
            return 1;
    }
}
int main()
{
    int x,a;
    cout<<"Enter any number :"<<endl;
    cin>>x;
    a=prime(x);
    if(a==1)
        cout<<endl<<"1";
    else
        cout<<endl<<"0";
}
```

6. /*Write a function sumNatural( ) which receives number n as its arguments and returns sum of first n natural numbers (e.g., if n=5 then sum of first natural number =1+2+3+4+5=15)*/

```
#include<iostream>
using namespace std;
```

```
int sumNatural(int n)
{
	int sum=0 ,i;
	for(i=1;i<=n;i++)
	{
		sum += i;
	}
	return sum;
}
int main()
{
	int n;
	cout<<"Enter any number : ";
	cin>>n;
	cout<<endl<<"The sum of first "<<n<<" number is "<<sumNatural(n);
}
```

7. /*Write a function sumOfDgits() which receives number n as its

arguments and returns sum of digits of n (e.g., n= 123 then sum

```
of digits= 1+2+3=6).*/

#include<iostream>
using namespace std;
int sumofDigits(int n)
{
        int  sum = 0, rem;
        while (n != 0)
        {
                rem = n % 10;
                sum       = sum + rem;
                n         = n / 10;
   }
   return sum;
}
int main()
{
        int x;

        cout<<"Enter any number :";
        cin>>x;
```

```
    cout<<endl<<"The sum of digits of "<<x<<" is "<<sumofDigits(x);
}
```

8. /*Write a function Reverse() which receives number n as its arguments and returns reverse of n (e.g., if n=123 then reverse of n=321)*/

```
#include<iostream>
using namespace std;
int Reverse(int n)
{
    int  sum = 0, rem;
    while (n != 0)
    {
        rem = n % 10;
        sum      = sum*10 + rem;
        n        = n / 10;
  }
  return sum;
}
int main()
{
```

```
    int x;
    cout<<"Enter any number :";
    cin>>x;
    cout<<endl<<"The reverse of "<<x<<" is "<<Reverse(x);
}
```

9. /*Write a function factorial() which receives number n as its arguments and returns factorial of n (e.g., if n=5 then factorial of n =120)*/

```
#include<iostream>
using namespace std;
int factorial(int x)
{
    int i, f=1;

    for(i=1;i<=x;i++)
    {
        f=f*i;
    }
    return f;
}
```

```
int main()
{
	int a;
	cout<<"Enter any number : ";
	cin>>a;
	cout<<endl<<"The factorial of "<<a<<" is "<<factorial(a);
}
```

10. /*Write a program to swap two number by using call by value.*/

```
#include<iostream>
using namespace std;
void exc(int a, int b)
{
	int temp;

	temp=a;
	a=b;
	b=temp;
}
int main()
```

```
{
	int x=5 , y=3;
	exc(x,y);
	cout<<"After calling function"<<endl<<"x= "<<x<<endl<<"y= "<<y;
}
```

11. /*Write a program to swap two number by using call by reference.*/

```
#include<iostream>
using namespace std;
void exc(int &a, int &b)
{
	int temp;
	temp=a;
	a=b;
	b=temp;
}
int main()
{
	int x=5 , y=3;
```

```
    exc(x,y);
    cout<<"After calling function"<<endl<<"x= "<<x<<endl<<"y= "<<y;
}
```

12. /*Write a program to find the simple interest using inline function.*/

```
#include<iostream>
using namespace std;
inline int si(int p, int t , int r)
{
    return(p*t*r/100);
}
int main()
{
    int p,t,r;
    cout<<"Enter the principle, rate of interest and time :"<<endl;
    cin>>p>>t>>r;

    cout<<"The simple interest is "<<si(p,t,r);
```

```
}
```

13. /*Write a program to find the area of a circle using inline function.*/

```
#include<iostream>
#define PI 3.14
using namespace std;
inline float area(int r)
{
	return(PI*r*r);
}
int main()
{
	int p,t,r;
	cout<<"Enter the radius of circle :";
	cin>>r;
	cout<<"The area of circle is "<<area(r);
}
```

14. /*Write a program to find the largest of three numbers using the concept of function with default

argument.*/

```
#include<iostream>
using namespace std;
int large(int a, int b, int c=100)
{
	if((a>b)&&(a>c))
		return a;
	if((b>a)&&(b>c))
		return a;
	if((c>a)&&(c>b))
		return c;
}
int main()
{
	int x , y , z;
	cout<<"Enter any three numbers : "<<endl;
	cin>>x>>y>>z;
	cout<<endl<<"The largest number is "<<large(x,y);
}
```

15. /*Write a program to find the minimum value among the inputs given. Your program should contain two functions with

signature int min (int, int) and int min (int , int, int) i.e., the first function takes 2 arguments and second function takes three arguments and both returns minimum.. Use the concept of function overloading.*/

```
#include<iostream>
using namespace std;
int min(int a, int b)
{
	if(a<b)
		return a;
	else
		return b;
}
int min(int a, int b, int c)
{
	if((a<b)&&(a<c))
		return a;
	if((b<a)&&(b<c))
		return b;
	if((c<b)&&(c<a))
		return c;
}
```

```
int main()
{
    int x, y , z;
    cout<<"Enter three numbers x, y and z :"<<endl;
    cin>>x>>y>>z;
    cout<<endl<<"The smallest number between x and y is "<<min(x,y);
    cout<<endl<<"The smallest number between x , y and z is "<<min(x,y,z);
}
```

16. /*Write a program to display the integer, float and character using

overloaded display function.*/

```
#include<iostream>
using namespace std;
void disp(int a)
{
    cout<<endl<<a;
}
void disp(float a)
{
```

```
        cout<<endl<<endl<<a;
}
void disp(char a)
{
        cout<<endl<<endl<<a;
}
int main()
{
        int x=1;
        float y=1.1;
        char z;
        cout<<"Enter any charcter :";
        cin>>z;
                disp(x);
        disp(y);
        disp(z);
}
```

17. /*Write a program to find the volume of cube (l*l*l), rectangular box (l*b*h) and cylinder (PI * r*r*h) by using overloaded function area.*/

```
#include<iostream>
#define PI 3.14
using namespace std;
int vol(int l)
{
	cout<<"The volume of cube is "<<l*l*l;
}
int vol(int l, int b, int h)
{
	cout<<endl<<"The volume of rectangular box is "<<l*b*h;
}
float vol(int r, int h)
{
	cout<<endl<<"The volume of cylinder is "<<PI*r*r*h;
}
int main()
{
	int l=10 , b = 5 , h = 8 , r = 7;
	vol(l);
	vol(l,b,h);
	vol(r,h);
```

```
}
```

LAB 2.4

1. /*Write a program with two name spaces (A and B) each defines add function to add two numbers. Use add( ) function in each namespace in main method to add two numbers.*/

```
#include<iostream>
using namespace std;
namespace A
{
	void add(int x , int y)
	{
		cout<<"The sum of x and y is "<<x+y;
	}
}
namespace B
{
	void add(int x , int y)
	{
		cout<<endl<<"The sum of x and y is "<<x+y;
	}
```

```
}
int main()
{
	int x=1, y=3, c=2, d=5;
	A::add(x,y);
	B::add(c,d);
}
```

2. /*Write a program to display the value and address of a variable using pointer variable.*/

```
#include<iostream>
using namespace std;
int main()
{
	int a;
	int *p;

	cout<<"Enter any number : ";
	cin>>a;

	p = &a;
```

```
        cout<<endl<<"The value of integer is "<<a;
        cout<<endl<<"The address of integer is "<<p;
}
```

3. /*Write a program to find the sum and average of all the elements of an array using pointer.*/

```
#include<iostream>
using namespace std;
int main()
{
   float x[5], sum=0.0, avg;
   int i;
   float *px, *psum, *pavg;
px = &x[0];
   psum = &sum;
        pavg = &avg;
cout<<"Enter array Elements: "<<endl;
   for (i=0;i<5;i++)
   {
      scanf("%f",(x+i));
```

```
        *psum += *(x + i);
    }

    *pavg = *psum / 5;
    cout<<"Sum= "<<*psum<<endl<<"Average= "<<*pavg;
    return 0;
}
```

4. /*Write a program to find the sum and average of all the elements of an array by passing through function using pointer.*/

```
#include<iostream>
using namespace std;
double Average(int *arr, int size);
int main ()
{
        int i, n;
    double avg;
        cout<<"Enter The Size Of Array :";
        cin>>n;
        int average[n];
```

```
	cout<<endl<<"Enter The Array Elements :"<<endl;
	for(i=0; i<n; i++)
	{
	cin>>average[i];
	}
	cout << endl<<"Average Value of An Array Is: " << Average(average , n)<< endl;
	return 0;
}

double Average(int *arr, int size)
{
	int i, sum = 0;
	double avg;
	for (i = 0; i < size; ++i)
	{
		sum += arr[i];
   }
	avg = double(sum) / size;
	return avg;
}
```

5. /*Write a program to find the sum of all the elements of a 2-D array of size 3x4 using pointer.*/

```
#include<iostream>
using namespace std;
int main()
{
   int array[3][4]={{1,2,3,4},{5,6,7,8},{9,10,11,12}};
   int sum =0, (*p)[4];
   p = array;
  for (int i = 0; i < 3 ; i++)
   {
         for(int j=0 ; j<4 ; j++)
         {
            sum += (p[i][j]);
         }
   }
   cout<<"The sum of the elements is " <<sum;
}
```

6. /*WAP that contains the function larger that receives the pointer of two variables and decides the largest of two.*/

```
#include<iostream>
using namespace std;
int largest(int *p , int * ptr)
{
	if((*p)>*ptr)
		return *p;
	else
		return *ptr;
}
int main()
{
	int a,b;
	cout<<"Enter any numbers :"<<endl;
	cin>>a>>b;
	cout<<"The largest number is "<<largest(&a,&b);
}
```

7. /*Write a program to read number of employees, n, working in a company. Reserve the memory required to store age of n employees using new operator.Read age of n employees from user and count the number of employees of age above 60 years.*/

```
#include<iostream>
using namespace std;
int main()
{
	int n , i , count =0;
	cout<<"Enter the no. of employees : ";
	cin>>n;
	int *age = new int[n];
	cout<<"Enter the ages :"<<endl;
	for(i=0;i<n;i++)
	{
		cin>>*age;
		if(*age>60)
			count++;
	}
	cout<<"The employees above 60 years old are "<<count;
}
```