

University of engineering & technology Peshawar



COMPUTER PROGRAMMING -LAB

Lab report # 6

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Functions

- Functions are basically containers that store lines of code that are executed when the function is called in the main function.
- Every program contains a main function that is necessary and a function that is user defined.
- A user defined function consists of three parts.
- **Function declaration:** where function name is written along with its data type and simple parenthesis are put after name which tells C++ that it's a function(e.g. void sum(int x)). We pass pieces of info. Through parenthesis that are known as parameters.
- **Function definition:** where code of function is written inside code blocks.({
Return x+5;
}).
- **Function call:** when we want to execute the function we call it in the main function. The code definition of function is used as a line of code in main function.(sum(5);)
- Void takes part of a data type that does not return a value. If want function to return value we use int, float or any other return type.

Advantages:

- The code definition can be used as many times as we want and in our desired part in the main function.
- It minimizes the code inside our program and avoids rewriting a code.
- We just call function name and all the code inside it is executed. It minimizes effort and make our program size smaller and professional.

Task 1

Code:

```
[*] Task 01.cpp
3 |
4 | void grade(int marks)
5 | {
6 |     if(marks>=90)
7 |     {
8 |         cout<<"A";
9 |     }
10 |    else if(marks>=82)
11 |    {
12 |        cout<<"A-";
13 |    }
14 |    else if(marks>=73)
15 |    {
16 |        cout<<"B";
17 |    }
18 |    else if(marks>=65)
19 |    {
20 |        cout<<"B-";
21 |    }
22 |    else if(marks>=53)
23 |    {
24 |        cout<<"C";
25 |    }
26 |    else if(marks>=40)
27 |    {
28 |        cout<<"D";
```

```

        else if(marks>=40)
        {
            cout<<"D";
        }
        else
        {
            cout<<"F";
        }
    };

int main()
{
    int mymarks;

    cout<<"Enter marks out of 100 to check your grade: "<<endl;
    cin>>mymarks;

    cout<<"Grade= ";
    grade(mymarks);

}

```

Program:

```

Enter marks out of 100 to check your grade:
79
Grade= B
-----
Process exited after 6.25 seconds with return value 0
Press any key to continue . . .

```

Task 2

Code:

```
Task 02.cpp  Untitled1.cpp
2  using namespace std;
3
4  int minmax(int a,int b,int c,int d)
5  {
6      int min=a;
7      int max=a;
8
9      if(max<b)
10     {
11         max=b;
12     };
13     if(max<c)
14     {
15         max=c;
16     };
17     if(max<d)
18     {
19         max=d;
20     };
21     if(min>b)
22     {
23         min=b;
24     };
25     if(min>c)
26     {
27         min=c;
28     };
```

```

3         {
-             min=c;
3         };
-         if(min>d)
3         {
-             min=d;
-         };
-         cout<<"Max: "<<max<<endl;
-         cout<<"Min: "<<min<<endl;
-     };

int main()
3     {
-         int w,x,y,z;

        cout<<"Enter four numbers: "<<endl;
        cin>>w>>x>>y>>z;

        minmax(w,x,y,z);
-     }

```

Program:

```

Enter four numbers:
234
123
3453
2345
Max: 3453
Min: 123

-----
Process exited after 9.343 seconds with return value 0
Press any key to continue . . .

```

Task 3:

Code:

```
[*] Task 03.cpp
1  #include <iostream>
2  using namespace std;
3
4  int prime(int num)
5  {
6      int j, count=0;
7      bool numisprime;
8
9      for(j=2; j<=num; j++)
10     {
11         if(num%j==0)
12         {
13             count=count+1;
14         };
15         if(count==1)
16         {
17             numisprime=true;
18         }
19         else
20         {
21             numisprime=false;
22         };
23     };
24     return numisprime;
25 };
26
```

```
int main()
{
    int x;

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

    cout<<"Number is prime: ";
    cout<<prime(x);|
}
```

Program:

```
Enter a number: 23
Number is prime: 1
-----
Process exited after 17.36 seconds with return value 0
Press any key to continue . . .
```


Task 4:

Code:

```
Task 04.cpp
1  #include <iostream>
2  using namespace std;
3
4  void fact(double num)
5  {
6      double fact=1.00;
7
8      for(int i=1;i<=num;i++)
9      {
10         fact=fact*i;
11     }
12     cout<<fact<<endl;
13 }
14
15 int main()
16 {
17     double x;
18     cout<<"Enter a num: ";
19     cin>>x;
20
21     cout<<"Factorial of "<<x<<" = ";
22     fact(x);
23 }
```

Program:

```
Enter a num: 21
Factorial of 21 = 5.10909e+019

-----
Process exited after 2.395 seconds with return value 0
Press any key to continue . . .
```

Task 5:

Code:

```
Task 05.cpp
4  int minbits(int x)
5  {
6      int count=0;
7      while(x)
8      {
9          count++;
10         x=x>>1;
11     }
12     return count;
13 };
14
15 int main()
16 {
17     int x;
18
19     cout<<"Enter an integer number: "<<endl;
20     cin>>x;
21
22     int count=minbits(x);
23     cout<<"Minimum no. of bits to store "<<x<<"= "<<count;
24 }
25
```

Program:

```
Enter an integer number:
245123214
Minimum no. of bits to store 245123214= 28
-----
Process exited after 3.647 seconds with return value 0
Press any key to continue . . .
```

Task 6:

Code:

Task 6.cpp

```
1 #include <iostream>
2 #include <cmath>
3 using namespace std;
4
5 void roots(double a,double b,double c)
6 {
7     double d;
8     if(a!=0)
9     {
10         d=b*b-4*a*c;
11     }
12     else
13     {
14         exit(1);
15     }
16     double r1,r2;
17     if(d>0)
18     {
19         r1=(-b+sqrt(d))/(2*a);
20         r2=(-b-sqrt(d))/(2*a);
21         cout<<"The roots are real and distinct i.e: "<<r1<<" "<<r2;
22     }
23     else if(d<0)
24     {
25         r1=-b/(2*a);
26         r2=sqrt(-d)/(2*a);
27         cout<<"The roots are imaginary. Real and imaginary roots are: "<<r1<<" "<<r2;
28     }
29 }
```

```
    }
    else
    {
        r1=-b/(2*a);
        r2=r1;
        cout<<"The roots are equal i.e: "<<r1<<" "<<r2;
    }
};
```

```
int main()
{
    double num1,num2,num3;

    cout<<"Enter the numbers a(a not = 0),b,c:"<<endl;
    cin>>num1>>num2>>num3;

    roots(num1,num2,num3);
}
```

Program:

```
Enter the numbers a(a not = 0),b,c:
1
4
9
The roots are imaginary. Real and imaginary roots are: -2, 2.23607
-----
Process exited after 9.179 seconds with return value 0
Press any key to continue . . .
```

Task 07

Code:

```
Task 07.cpp
1  #include <iostream>
2  #include <cmath>
3  #define PI 3.14159265
4  using namespace std;
5
6  double factorial(float x)
7  {
8      int fact;
9      fact=1;
10     for(int i=x;i>=1;i--)
11     {
12         fact=fact*x;
13     }
14     return fact;
15 };
16
17 double power(float x,float y)
18 {
19     float output=1.0;
20     for(int i=y;i>0;i--)
21     {
22         output=output*x;
23     }
24     return output;
25 };
26
```

```

    return output;
};

float mysin(float degree)
{
    float ans;
    ans=degree-(power(degree,3)/factorial(3))+(power(degree,5)/factorial(5))
    -(power(degree,7)/factorial(7));
    return ans;
};

int main()
{
    double param,result,result2;
    param=30.0;
    result=sin(param*PI/180);
    result2=mysin(param*PI/180);
    cout<<"The sine of "<<param<<" degree using builtin function is: "<<result<<endl;
    cout<<"The sine of "<<param<<" degree using user defined function is: "<<result2;
}

```

Program:

```

The sine of 30 degree using builtin function is: 0.5
The sine of 30 degree using user defined function is: 0.518295
-----
Process exited after 0.02033 seconds with return value 0
Press any key to continue . . .

```