

C++ Functions

Lecture 1

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Object Oriented Programming
Second Class
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Outlines

Functions:

- C++ Standard Functions
- User-defined C++ Functions
- Examples

Functions and subprograms

- The Top-down design approach is based on dividing the main problem into smaller tasks which may be divided into simpler tasks, then implementing each simple task by a subprogram or a function
- A C++ function or a subprogram is simply a chunk of C++ code that has
 - A descriptive function name, e.g.
 - *computeTaxes* to compute the taxes for an employee
 - *isPrime* to check whether or not a number is a prime number
 - A returning value
 - The *computeTaxes* function may return with a double number representing the amount of taxes
 - The *isPrime* function may return with a Boolean value (true or false)

C++ Standard Functions

- C++ language is shipped with a lot of functions which are known as standard functions
- These standard functions are groups in different libraries which can be included in the C++ program, e.g.
 - Math functions are declared in `<cmath>` library
 - C++ is shipped with more than 100 standard libraries, some of them are very popular such as `<iostream>` and `<stdlib>`.

Example of Using Standard C++ Math Functions

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

main()
{
    int x;
    cout << "Please enter an integer number: ";
    cin >> x;
    cout << x << "to the power 5 is " << pow(x, 5) << endl;
}
```

Example of Using Standard C++ Math Functions

#A_modified_code

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

    int x,y;
    cout << "Please enter two integer numbers: ";
    cin >> x>> y;
    cout << x << "to the power 5 is " << pow(x, 5) << endl;
    cout << x << "to the power y is " << pow(x, y) << endl;

}
```

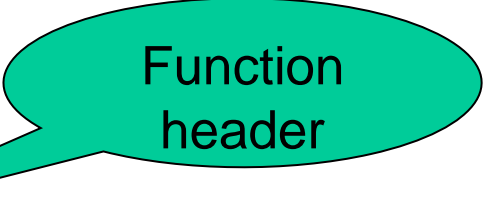
What is The Structure of a user-defined C++ Function?

- A C++ function consists of two parts
 - The function header, and
 - The function body
- The function header has the following syntax
<return value> <name> (<parameter list>)
<or return type>
↑
- The function body is simply a C++ code enclosed between { }

Example of User-defined C++ Function

```
double computeTax(double income)
{
    if (income < 5000.0) return 0.0;
    double taxes = 0.07 * (income-5000.0);
    return taxes;
}
```


Example of User-defined C++ Function



Function
header

```
double computeTax(double income)
```

```
{
```

```
    if (income < 5000.0) return 0.0;
```

```
    double taxes = 0.07 * (income-5000.0);
```

```
    return taxes;
```

```
}
```

Example of User-defined C++ Function

Function
header

Function
body

```
double computeTax(double income)
```

```
{
```

```
    if (income < 5000.0) return 0.0;
```

```
    double taxes = 0.07 * (income-5000.0);
```

```
    return taxes;
```

```
}
```

Example

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

double computeTax(double income)
{
    if (income < 5000.0) return 0.0;
    double taxes = 0.07 * (income-5000.0);
    return taxes;
    //return (0.07 * (income-5000.0));
}

double getIncome( ){
    double YourIncome;
    cout << "Please enter your income: ";
    cin >> YourIncome;
    return YourIncome;
}
```

```
void printIncome(double Money){

    cout << "your income tax is " <<
    computeTax(Money) << endl;
}

main(){
    double z;
    z=getIncome();
    printIncome(z);
    printIncome(12000);
}
```

Example: Write a function to test if a number is an odd number

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

bool checkOdd(int xfromMain ){
    if (xfromMain%2==0)
        return 0;
    else
        return 1;
}
```

```
main(){
    int x;
```

```
    for (int i=1; i<5; i++){
        cout<< "enter an integer no.";
        cin>>x;

        if (checkOdd(x))
            cout<<"Odd"<<endl;
        else
            cout<<"Even"<<endl; }
}
```