



General Computer Science for Engineers CISC 106 Lecture 30

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Lecture Overview

- Definitions and Prototypes
- Examples
- Read Chapter 5 (Ullman and Singer)

C++ Function Definition

- Is the code that implements a function.

Example 1:

```
int main() {  
    cout << "Hello World" << endl;  
}
```

Example 2:

```
int squareArg(int x)  
{  
    return x * 2;  
}
```

C++ Function Definition

Example 1:

```
1. int squareArg(int x)
2. {
3.     return x * 2;
4. }
```

1. Return type, function name, argument lists
2. Open curly brace
3. Function body
 - a) 0 or more return statements
4. Close curly brace

C++ Function Definition

- Function can take multiple arguments

Example 1:

```
int Power(int x, int n)
{
    int powerof = x;
    for (int i = 2; i <= n; i++)
        powerof = powerof * x;
    return powerof;
}
```

C++ Function Calling

- Main function calls the function squareArg.

Example 1:

```
int squareArg(int x)
{
    return x * 2;
}
```

```
int main() {
    int x = squareArg(100);
    cout << "square of 100 is " << x << endl;
}
```



C++ Function Prototypes

- **When you need to call a function before you call it**
- Function prototypes have a specific structure. They require the following parts:
 - Return Type
 - Function Name
 - Argument (aka. Parameter) List



C++ Function Prototypes

- Here is what a function prototype looks like:

`<return type> functionName(<parameter list>);`

- A simple function prototype as a demonstration:

`int squareArg(int);`

`void printStudentName(string);`

C++ Function Prototype Example

```
int i = 100;
```

```
int squareArg(int); // function prototype
```

```
int main() {
```

```
    d = squareArg(i);
```

```
}
```

```
int squareArg(int x) // function definition
```

```
{
```

```
    return x * 2;
```

```
}
```

C++ Function Calling Mistakes!

```
int i = 100;
```

```
int squareArg(int); // function prototype
```

```
int main() {
```

```
    d = squareArg("Hello");
```



```
}
```

```
int squareArg(int x) // function definition
```

```
{
```

```
    return x * 2;
```

```
}
```

C++ Function Calling Mistakes!

```
int i = 100;
```

```
int squareArg(int); // function prototype
```

```
int main() {
```

```
    d = squareArg(i);
```

```
}
```

```
int squareArg(int x) // function definition
```

```
{
```

```
    return "Hello";
```

```
}
```





Putting all together

- Create a function to sum number from 1 to N
- What do we need?

C++ Functions: Putting all together

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

int sumFrom1ToN(int);

int main() {
    int n = 0, sum = 0;
    cout << "Enter a number  \n";
    cin >> n;
    sum = sumFrom1ToN(n);
    cout << "The sum of numbers to " << n;
    cout << " is " << sum << endl;
} // the rest of program is on next slide
```

C++ Functions: Putting all together

// main function above this

```
int sumFrom1ToN(int n) {  
    int sum = 0;  
    for (int i = 1; i <= n; i++) {  
        sum = sum + i;  
    }  
    return sum;  
}
```