Lecture 8

Chapter 4.1
Topics

- Call-by-value parameters
- Call-by-reference parameters
- Mechanism behind call-by-reference
- Mixed parameter lists
Call-by-value parameters

• The coding

```c
main
{
    int m = 2;
    m = myFunc(m);
}

int myFunc(int var1)
{
    return var1++;
}
```
Call-by-value parameters

• The coding
  
  ```
  main
  {
    int m = 2;
    m = myFunc(m);
  }
  int myFunc(int var1)
  {
    return var1++;  
  }
  ```

• When myFunc is called
  – The function is give a copy of the value of m.
  – It initializes this var1 to this value.
  – In this case this is what to code does functionally.
Call-by-value parameters

- The coding
  ```c
  int m = 2;
  m = myFunc(m);
  ```
  ```c
  int myFunc(int var1)
  {
      return var1++;  
  }
  ```

- Functionality
  ```c
  int m = 2;
  m = myFunc(m);
  ```
  ```c
  int myFunc()
  {
      int var1 = 2;
      return var1++;  
  }
  ```
Call-by-value parameters

- var1 is initialize as a variable of myFunc
- So in this case since m is equal to 2.
- Var1 is set to 2.

```c
int main()
{
    int m = 2;
    m = myFunc(m);
}
int myFunc()
{
    int var1 = 2;
    return var1++;
}
```
Call-by-reference parameters

• The coding

```cpp
main
{
    int m = 2;
    myFunc(m);
}
myFunc(int& var1) // Could also be myFunc(int &var1)
{
    var1++;
}
```
Call-by-reference parameters

• The coding
  main
  {
    int m = 2;
    myFunc(m);
  }
myFunc(int& var1)
  {
    var1++;
  }

• When myFunc is called
  – The function is m.
  – Var1 is m.
  – In this case this is what to code does functionally.
Call-by-reference parameters

• The coding

```c
main
{
    int m = 2;
    myFunc(m);
}
myFunc(int& var1)
{
    var1++;
}
```

• Functionality

```c
main
{
    int m = 2;
    myFunc(m);
}
int myFunc()
{
    //Because var is m
    m++;
}
```
Mechanism behind call-by-reference

• Program variables are implemented as memory locations.
• Each one has a unique address that is a number.
• For example
  – The memory location of m for our previous code is 1012.
  – So myFunc is given the address of m (1012)
    • It increments the value at that memory address.
Mixed parameter lists

• Yes.
• You can put by reference and by value parameters in the same function.