CS 271 - Oct 5, 2017

For strings that may contain spaces, use the getline function.

```
getline ( cin, stringName );
```

The C++ library needed for strings is

```
#include <string>
```

UML - unified modeling language

Class diagram

Three parts:
1) class name
2) attributes (data, Java: instance variables)
3) behaviors (actions, Java: methods)

Instance variables (Java) are called data members (C++)

Methods (Java) are called member functions (C++)

Box
- width : float - length : float - height : float
+ << constructor >> Box ( ) + << constructor >> Box (w : float, l : float, h : float) + getWidth ( ) : float + getLength ( ) : float + getHeight ( ) : float + setWidth (w : float) : void + setLength (l : float) + setHeight (h : float) + volume ( ) : float

C++ for the Box class

Class definition - includes the declarations of data members and prototypes of the member functions.

Box.h

```
#ifndef BOX_H
#define BOX_H
#include <iostream>
#include <iomanip>

class Box {

    private:
         float width;
         float length;
         float height;

   public:
        Box ( );
        Box ( float, float, float );
        float getWidth ( );
        float getLength ( );
        float getHeight ( );
        void setWidth ( float );
        void setLength ( float );
        void setHeight ( float );
        float volume ( );
};

#endif
```

In a separate file.

Box.cpp

```
// this file will contain the function definitions.

#include "Box.h"
#include <iostream>
#include <iomanip>

using namespace std;

// default constructor
Box::Box ( ) {  // :: is called
                // the scope resolution
                // operator
     width = 1;
     length = 1;
     height = 1;
}

// next constructor
Box::Box( float w, float l, float h ) {

     width = w;
     length = l;
     height = h;
}

// accessor for width
float Box::getWidth( ) {

   return width;
}

// mutator for width
void Box::setWidth( float w ) {

     if ( w > 0 )
         width = w;
}

// calculate the volume
float  Box :: volume ( ) {

     return width * length * height;

}

double squareRoot ( double x ) {

    // find the square root of x

}
```

that's it for Box.cpp

Review: **Class definition** goes in the .h file.

Function definitions (or function implementations) go in the .cpp file

// Let's test the Box class

TestBox.cpp

```
#include "Box.h"
#include <iostream>
#include <iomanip>

using namespace std;

int main ( ) {

   Box littleCardBoardBox;  // C++ calls the default constructor

   Box biggerCardBoardBox ( 50, 100, 25 );  // C++ calls the other constr

   // print the length of biggerCardBoardBox

   cout << "the length of biggerCardBoardBox is " <<
                biggerCardBoardBox.getLength( ) << endl;

   // change the width of littleCardBoardBox to 3

   littleCardBoardBox.setLength ( 3 );

   // print the volume of biggerCardBoardBox

   cout << "the volume of biggerCardBoardBox is "
                << biggerCardBoardBox.volume( ) << endl;

} // end main function
```

In the UML, technically you use guillemets instead of two less than symbols.

« »

Microsoft Word: Insert Tab, Symbol (at far right), more symbols, choose Normal Text, then look for the guillemets after the small letter z.