

Chapter 4 – Input from the Keyboard

Input from the keyboard into a standard C++ program is most often accomplished with the *cin* object, which like *cout*, comes from including *iostream*. *cin* accepts typed input and directs it into an object or series of objects.

cin has the following forms:

```
cin >> variable-object;  
cin >> variable-object >> variable-object;  
cin >> variable-object >> variable-object >> variable-object;  
cin >> variable-object >> variable-object >> ... >> variable-object;
```

The operator `>>` is the *input stream operator*.

When used in a program, the *cin* object halts the execution of the program until the user enters data for each object and presses the Enter key. If there is more than one object in the *cin* statement, input is placed into each object in turn. When entering data, the user must separate input items by spaces or the end of a line. *cin* is usually preceded by a *prompt*. A prompt is a *cout* statement used to output instructions to the user about the type of data to be entered into the *cin*.

The following is an example program that uses a *prompt* and a *cin*. When the program is run, the user will be prompted to input an integer. The program will then output the square of the integer.

```
#include <iostream>  
using namespace std;  
  
void main()  
{  
    cout << "Enter an integer to square: ";  
    long s;  
    cin >> s;  
    cout << s << " squared equals " << s * s << endl;  
}
```

If the user enters 3 when prompted, the program run will look like the following:

```
Enter an integer to square: 3  
3 squared equals 9
```

Here are two examples of programs to receive and output the area of a rectangle.

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

void main()
{
    float l, w;

    cout << "Enter the Length: ";
    cin >> l;
    cout << "Enter the Width: ";
    cin >> w;
    cout << "The area of the rectangle is "
        << w * l << endl;
}
```

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

void main()
{
    float l, w;

    cout << "Enter the Length & Width: ";
    cin >> l >> w;
    cout << "The area of the rectangle is "
        << w * l << endl;
}
```

If the user enters 2.5 as the length and 3.0 as the width, the program runs will look like the following:

```
Enter the Length: 2.5
Enter the Width: 3.0
The area of the rectangle is 7.5
```

```
Enter the Length & Width: 2.5 3.0
The area of the rectangle is 7.5
```

Exercises

1. What is a *prompt*?
2. What is the purpose of a *cin* statement?
3. Given the statements

```
int a, b, c;
cout << "Enter 3 integers between 0 and 100: "
cin >> a >> b >> c
```

If the use enters

```
1 2 3
```

at the prompt, what is the output of the following *cout* statement?

```
cout << c << b << a;
```

Programming Assignment 4.1

Write a program to compute and output the cube of any number input. Be sure and use a prompt before all cin statements.

Programming Assignment 4.2

An employee's contribution to a company's retirement fund is 5% of the employee's salary. Write a program to compute and output the amount of the employee's contribution for any salary entered. Limit precision to 2 decimal places.

Programming Assignment 4.3

Write a program that inputs 4 numeric grades, then computes and outputs the average of the grades.

Programming Assignment 4.4

Using the following formula, write a program that computes the area of a right triangle for any base and height input.

$$\text{area} = 0.5bh$$

Programming Assignment 4.5

Using the following formula, write a program that computes the Celsius temperature for any Fahrenheit temperature input. Precision should be limited to 2 decimal places in addition to the decimal point.

$$C = 5.0 / 9.0 (F - 32.0)$$

Programming Assignment 4.6

Reversing the formula of programming assignment 4.5, write a program that computes the Fahrenheit temperature for any Celsius temperature input. Precision should be limited to 2 decimal places in addition to the decimal point.

Programming Assignment 4.7

Write a program that inputs any five characters and outputs them in reverse order.