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.

```cpp
#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;
}
```

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
```

**Exercises**

1. What is a *prompt*?

2. What is the purpose of a *cin* statement?

3. Given the statements

   ```cpp
   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?

   ```cpp
   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.

\[ C = \frac{5.0}{9.0} (F-32.0) \]

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.