Assignment, Standard output and input

- **Expression: valid arrangement of variables, constants, and operators (+, -, *, /, %,=, (),
  >>, <<)**

- **Assignment   variable = expression;**
  **Expression on the right-hand side is evaluated first. Then, the resulting value is stored
  in the variable**
        Examples: length = 12*0.5-10;

- Variable initialization: int length = 12, width = 5, area;

- **cout object -- used to display to the Standard Output**
  cout : standard output stream
  << : insertion operator (put the next data onto the console)

  Example:
  #include <iostream> ← preprocessor directory needed to use the cout object and the cin
  object
  using namespace std;
  int main()
  {
       float price=500.0;

            cout << "There are " << 2 << " tickets available." << endl;
            cout << "Each ticket costs $" << price << endl;
            cout << 2 << "tickets cost " << '$' << 2*price << '.' << endl;

            return 0;
  }

  **Note **
  (1) need to have a "<<" in between every two expressions :
       5*6,   14+7, " AFC Champaign", 50, 'c', …
  (2) differentiate string literal and variable in cout statement
  (3) break output into multiple "cout" statements
  (4) white space in output

- **cin object – used to read from the Standard Input**

  cin :   standard input stream
  >>   :   the extraction operator extracts the next item from the input stream,
             and store its value in the right hand side operand variable

  Example:
  #include <iostream>
  using namespace std;
  int main()
  {
       int   roomNum;

```
        float    price;

        cout << "Enter the room number: ";
        cin >>  roomNum;

        cout << "Enter the price for the room: ";
        cin >> price ;

        /*  Or :
        cout << "Enter the room number and price: ";
        cin >> roomNum >> price;    // the order of the input values needs to be the same as the
                                    // order of variables in cin


        */
        ….
        return 0;
    }
```

** Notes: **
(1) Before the user enters a data, a prompt should be provided to explain what type of information should be entered
(2) the separators for the extraction operator are the white space characters : any number or combination of space, tab, and new-line characters.
(3) Leading white spaces are skipped over.

Program 3-3

```
 1   // This program demonstrates how cin can read multiple values
 2   // of different data types.
 3   #include <iostream>
 4   using namespace std;
 5
 6   int main()
 7   {
 8      int whole;
 9      double fractional;
10      char letter;
11
12      cout << "Enter an integer, a double, and a character: ";
13      cin >> whole >> fractional >> letter;
14      cout << "Whole: " << whole << endl;
15      cout << "Fractional: " << fractional << endl;
16      cout << "Letter: " << letter << endl;
17      return 0;
18   }
```

Program Output with Example Input Shown in Bold
```
Enter an integer, a double, and a character: 4 5.7 b [Enter]
Whole: 4
Fractional: 5.7
Letter: b
```

What if the user input is : 45.7c ?

Practice Problems: <User input is underlined>

1. Write a C++ program that prompts the user to enter 3 integer values, and it displays the mean of the three values.

>*Please enter three integer values: 34 20 8*
>*The mean of the three values: 34, 20, and 8 is 20.677.*

2. Write a C++ program that prompts the user to enter the radius of a circle, and it computes and displays the diameter, the circumference, and the area of the circle.

>*Please enter the radius of the circle (cm): 2.0*
>
>*The radius of a circle = 2.0 cm.*
>*The diameter of the circle = 4.0 cm.*
>*The circumference of the circle = 12.56 cm*
>*The area of the circle = 78.87 cm^2.*