Week# 3
Arithmetic Operators & Mathematical Expressions

Lecture# 8
Arithmetic Expression & Practice Programs

Practice Program 1

- Write a program which inputs a number in inches from a user and converts into cm.

Program output:

```
Enter value in inches:20
There are 50.8 centimeters in 20 inches
```

```cpp
/* Lecture# 8
   Example code 1: Convert inches to cm
*/

#include <iostream>
// #include <cmath>
using namespace std;

int main()
{
 float inches;
 float cm;
 cout << "Enter value in inches:";

 cin >> inches;

 cm = 2.54*inches;                    // 1 inch = 2.54 cm

 cout << "There are " << cm << " centimeters in "
 << inches << " inches";

return 0;

}
```

Practice Program 2

- Write a program which inputs temperature in Fahrenheits and converts to Celsius.

Program output:

```
Input temperature in Farenheit: 20
180 degree Fahrenheit = 82.222 degree
Celsius
```

```
1   /* Lecture# 8
2      Example code 2: Converts Farenheit to Celsius
3   */
4
5   #include <iostream>
6   #include<cmath>          // using math file to perform mathematic operations
7
8   using namespace std;
9
10  int main()
11  {
12      float far, cel;
13
14      cout <<"Input temperature in Farenheit: ";
15
16      cin >> far;
17
18      cel = 5.0*(far - 32.0)/9.0;
19
20      cout << far << "degrees Farenheit = "
21           << cel << "degrees Celsius";
22
23      return 0;
24  }
```

Practice Program 3

- Convert user defined hours to weeks, days and hours

Program output:

```
Enter number of hours: 25
0weeks, 1 days, and 1 hours.
```

```
1  /* Lecture# 8
2     Example code 3: Calculate entered hours into
3     weeks, days and hours
4  */
5
6  #include <iostream>
7  #include<cmath>
8  using namespace std;
9
10 int main()
11 {
12     int hours, days, weeks;
13
14     cout<< "Enter number of hours: ";
15
16     cin >> hours;       //25 hours
17
18     days = hours/24;    // 1 days
19 // cout << days;
20
21     hours %= 24;            // same as hours = hours % 24, 25%24 = 1
22 //  cout << hours;
23
24     weeks = days/7;
25 // cout << weeks;
26
27     days %= 7;              // same as days = days % 7
28 // cout << days;
29
30     cout << weeks << "weeks, " << days <<" days, and "
31          << hours << " hours. \n";
32
33     return 0;
34 }
```

Practice Program 4

- Calculate cube root of a number

```
/* Lecture# 8
   Example code 4: Calculate cube root of a number
*/

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

int main()
{
    int num;
    double ans;

    cout << "Enter number which you want to find cube root: ";
    cin >> num;

    ans = pow(num,(1/3.0));

    cout << "Cube root of " << num << " is " << ans;

    return 0;
}
```

Program output:

```
Enter number which you want to find cube root: 125
Cube root of 125 is 5
```

Arithmetic Functions

- Using different arithmetic functions in a program

```
/* Lecture# 8
   Example code 5: Shows different functions in C++
*/

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

int main()
{
    double x = 2.718;

    cout << "sqrt(x) = " << sqrt(x) << endl;

    cout << "pow(x,2) = " << pow(x,2) << endl;

    cout << "log(x) = " << log(x) << endl;

    cout << "sin(x) = " << sin(x) << endl;

    cout << "cos(x) = " << cos(x) << endl;

    cout << "exp(x) = " << exp(x) << endl;

    return 0;
}
```

Program output:

```
sqrt(x) = 1.64864
pow(x,2) = 7.38752
log(x) = 0.9999896
sin(x) = 0.411038
cos(x) = -0.911618
exp(x) = 15.15
```