CSCI 275 Assignment #7
Due: Saturday 3/12/22
Late: Saturday 3/26/22 (10 point penalty)
Points: 60

Task:

1. Class **FeetInches** stores the number of feet and number of inches in a measurement. Use **FeetInches.h** and finish the function code in **FeetInches.cpp** Use **TestCode.cpp** to test your functions.

```
class FeetInches
{  private:
      int feet;                          // number of feet
      int inches;                        // number of inches (0..11)
      void simplify();                   // POST: feet and inches set and inches < 12
   public:
      FeetInches (int f = 0, int i = 0);  // PRE: f and i >= 0
                                         // POST: set feet to f and inches to i and simplify
      int getFeet() const;
      int getInches() const;
      void setFeet (int f);
      void setInches (int i);            // POST: set inches and simplify

      // relational operators
      bool operator== (const FeetInches& other) const;    // POST: feet values same, inch values same
      bool operator!= (const FeetInches& other) const;
      bool operator< (const FeetInches& other) const;     // POST: total inches less than other
      bool operator<= (const FeetInches& other) const;
      bool operator> (const FeetInches& other) const;     // POST: total inches more than other
      bool operator>= (const FeetInches& other) const;

      // math operator
      // POST: add feet and inches from other and simplify
      FeetInches operator+ (const FeetInches& other) const;
      // increment and decrement operators
      FeetInches operator++ ();              // POST: add 1 to inches (prefix)
      FeetInches operator++ (int);           // POST: add 1 to inches (postfix)

      operator int () const;                 // POST: return total inches (2 feet, 1 inch --> 25)
      operator double ( ) const;             // POST: return total inches in units of feet (2 feet, 6 inches --> 2.5)
   };

   ostream& operator<< (ostream&, const FeetInches& object); // POST: display feet:inches
   istream& operator>> (istream&, FeetInches& object);       // POST: reads feet inches
```

Sample Output from TestCode:

```
f1 contents: 0 0
f2 contents: 2 3
Enter data for f3 in format: feet inches 1 13
f3 contents: 2 1
Sum of 3 8 and 2 8 is 6 4
3 8 equals 3 8
3 8 not equals 2 8
3 8 greater than 2 8
2 8 less than 3 8
f10 currently is 1 0
Test prefix increment, f10 now is: 1 1
f11 currently is 1 0
Test postfix increment, f11 now is: 1 1
Total inches in 2 3 is 27
Total feet in 2 3 is 2.25
```

2. The application uses the **FeetInches** class to help a person compute costs for painting a room. The user enters the number of rooms and their dimensions in feet/inches and a cost report is produced.

Constants:
One gallon of paint costs $31.75 and this value should be stored in a **named constant**.
One can of paint covers 400 square feet and this value should be stored in a **named constant**.

Processing:

- Read the number of rooms from the keyboard.
- For each room, read the room name and paint color. Read length, width, and height of the room in feet and inches using **FeetInches** >> operator and store in **FeetInches** objects. See sample output.
- For each room compute the square footage by calling user-defined method **computeFootage**. This value-returning method is passed the three **FeetInches** objects for the room and returns the square footage in units of feet for the four walls. Ignore ceiling, windows, doors, etc. Use **FeetInches** functions where possible to help in this computation.
- Compute the actual number of cans needed as a double and compute the whole number of cans of paint to purchase. Hint: use **ceil** function in the **cmath** library. Compute the cost of painting the room based on the whole number of cans of paint that must be purchased.
- Display the name of room, color, square footage to one decimal, actual number of paint cans to one decimal, whole number of paint cans to purchase and room cost to two decimals. See sample output.

```
Room Painting Cost Program by Your Name
Enter number of rooms and their dimensions and get painting cost
The current cost of paint per gallon is 31.75

Enter number of rooms: 2

Enter name of room: Living Room
Enter color of paint: Almond
Enter length feet and inches: 18 0
Enter width feet and inches: 16 6
Enter height feet and inches: 10 0

Living Room:
Color: Almond
Square Footage: 954.00
Actual Cans:    2.38
Purchase Cans:  3
Paint Cost:     $95.25

Enter name of room: Bathroom
Enter color of paint: Light Blue
Enter length feet and inches: 12 0
Enter width feet and inches: 12 0
Enter height feet and inches: 8 8

Bathroom:
Color: Light Blue
Square Footage: 496.00
Actual Cans:    1.24
Purchase Cans:  2
Paint Cost:     $63.50
```