**Problem 1. Running the Race**

Write a program that asks for the names of three runners and the time it took each of them to finish a race. The program should display who came in first, second, and third place.

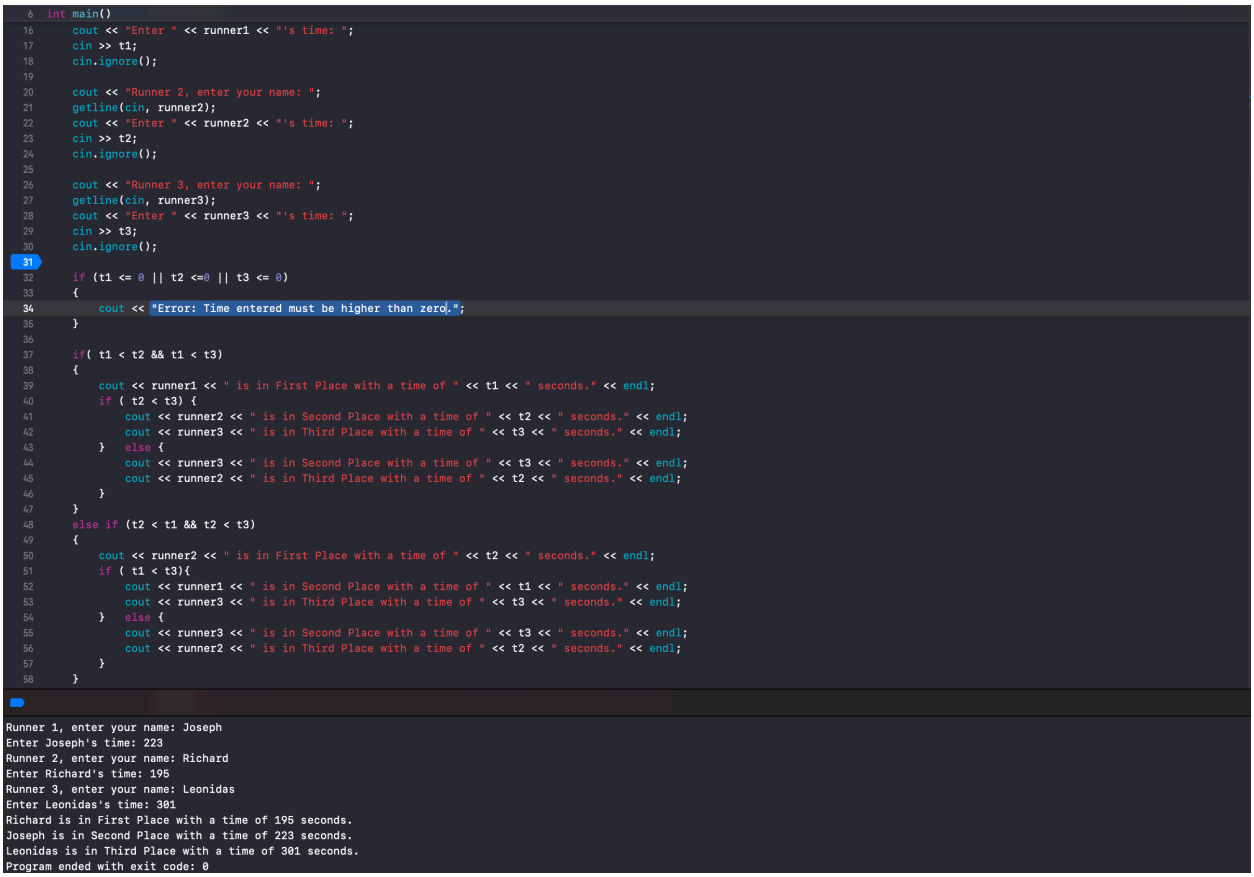
Input Validation: Only accept positive numbers for the times.

USE THE NEXT TEMPLATE (MANDATORY):

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;
int main()
{
    int t1, t2, t3;

//ADD YOUR CODE FROM HERE



}
```

Example:

```
Runner number 1: Joseph
Time: 223
Runner number 2: Richard
Time: 195
Runner number 3: Leonidas
Time: 301
Results:
1st place: Richard
2nd place: Joseph
3rd place: Leonidas
```



```
int main()
    cout << "Enter " << runner1 << "'s time: ";
    cin >> t1;
    cin.ignore();

    cout << "Runner 2, enter your name: ";
    getline(cin, runner2);
    cout << "Enter " << runner2 << "'s time: ";
    cin >> t2;
    cin.ignore();

    cout << "Runner 3, enter your name: ";
    getline(cin, runner3);
    cout << "Enter " << runner3 << "'s time: ";
    cin >> t3;
    cin.ignore();

    if (t1 <= 0 || t2 <=0 || t3 <= 0)
    {
        cout << "Error: Time entered must be higher than zero.";
    }

    if( t1 < t2 && t1 < t3)
    {
        cout << runner1 << " is in First Place with a time of " << t1 << " seconds." << endl;
        if ( t2 < t3) {
            cout << runner2 << " is in Second Place with a time of " << t2 << " seconds." << endl;
            cout << runner3 << " is in Third Place with a time of " << t3 << " seconds." << endl;
        }   else {
            cout << runner3 << " is in Second Place with a time of " << t3 << " seconds." << endl;
            cout << runner2 << " is in Third Place with a time of " << t2 << " seconds." << endl;
        }
    }
    else if (t2 < t1 && t2 < t3)
    {
        cout << runner2 << " is in First Place with a time of " << t2 << " seconds." << endl;
        if ( t1 < t3){
            cout << runner1 << " is in Second Place with a time of " << t1 << " seconds." << endl;
            cout << runner3 << " is in Third Place with a time of " << t3 << " seconds." << endl;
        }   else {
            cout << runner3 << " is in Second Place with a time of " << t3 << " seconds." << endl;
            cout << runner2 << " is in Third Place with a time of " << t2 << " seconds." << endl;
        }
    }
```

```
Runner 1, enter your name: Joseph
Enter Joseph's time: 223
Runner 2, enter your name: Richard
Enter Richard's time: 195
Runner 3, enter your name: Leonidas
Enter Leonidas's time: 301
Richard is in First Place with a time of 195 seconds.
Joseph is in Second Place with a time of 223 seconds.
Leonidas is in Third Place with a time of 301 seconds.
Program ended with exit code: 0
```

```
/* Write a program that asks for the names of three runners
and the time it took each of them to finish a race. The
program should display who came in first, second, and third
place.*/

//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;
int main()
{
    int t1, t2, t3;

    //ADD YOUR CODE FROM HERE

    string runner1, runner2, runner3;

    cout << "Runner 1, enter your name: ";
    getline(cin, runner1);
    cout << "Enter " << runner1 << "'s time: ";
    cin >> t1;
    cin.ignore();
```

```
    cout << "Runner 2, enter your name: ";
    getline(cin, runner2);
    cout << "Enter " << runner2 << "'s time: ";
    cin >> t2;
    cin.ignore();

    cout << "Runner 3, enter your name: ";
    getline(cin, runner3);
    cout << "Enter " << runner3 << "'s time: ";
    cin >> t3;
    cin.ignore();

    if (t1 <= 0 || t2 <=0 || t3 <= 0)
    {
        cout << "Error: Time entered must be higher than
zero.";
    }

    if( t1 < t2 && t1 < t3)
    {
        cout << runner1 << " is in First Place with a time
of " << t1 << " seconds." << endl;
        if ( t2 < t3) {
            cout << runner2 << " is in Second Place with a
time of " << t2 << " seconds." << endl;
            cout << runner3 << " is in Third Place with a
time of " << t3 << " seconds." << endl;
        }   else {
            cout << runner3 << " is in Second Place with a
time of " << t3 << " seconds." << endl;
            cout << runner2 << " is in Third Place with a
time of " << t2 << " seconds." << endl;
        }
    }
    else if (t2 < t1 && t2 < t3)
    {
        cout << runner2 << " is in First Place with a time
of " << t2 << " seconds." << endl;
        if ( t1 < t3){
            cout << runner1 << " is in Second Place with a
time of " << t1 << " seconds." << endl;
            cout << runner3 << " is in Third Place with a
time of " << t3 << " seconds." << endl;
```

```
        }   else {
            cout << runner3 << " is in Second Place with a
time of " << t3 << " seconds." << endl;
            cout << runner2 << " is in Third Place with a
time of " << t2 << " seconds." << endl;
        }
    }
   else if (t3 < t2 && t3 < t1){
        cout << runner3 << " is in First Place with a time
of " << t3 << " seconds." << endl;
        if ( t2 < t1)
        {
            cout << runner2 << " is in Second Place with a
time of " << t2 << " seconds." << endl;
            cout << runner1 << " is in Third Place with a
time of " << t1 << " seconds." << endl;
        }
       else
       {
           cout << runner1 << " is in Second PLace with a
time of " << t1 << " seconds." << endl;
           cout << runner2 << " in in Third Place with a
timne of " << t2 << " seconds." << endl;
       }
    }

    return 0;
}
```

**Problem 2. Calories calculator** (book Ch4-18)

Write a program that asks for the number of calories and fat grams in a food. The program should display the percentage of calories that come from fat. If the calories from fat are less than 18% of the total calories of the food, it should also display a message indicating that the food is low in fat.

One gram of fat has 9 calories, so

Calories from fat = fat grams * 9

The percentage of calories from fat can be calculated as

Calories from fat ÷ total calories

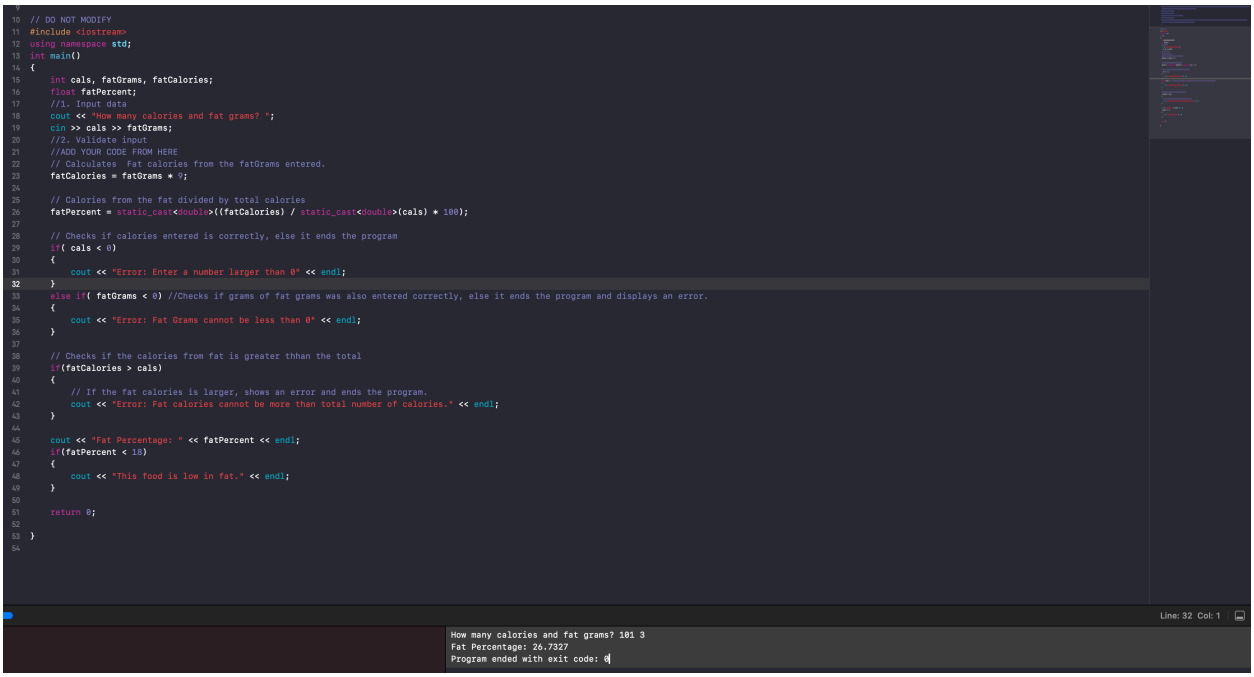
**Input Validation**: Make sure the number of calories and fat grams are not less than 0. Also, the number of calories from fat cannot be greater than the total number of calories. If that happens, display an error message indicating that either the calories or fat grams were incorrectly entered.

USE THE NEXT TEMPLATE (MANDATORY)

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;
int main()
{
     int cals, fatGrams, fatCalories;
     float fatPercent;
     //1. Input data
     cout << "How many calories and fat grams? ";
     cin >> cals >> fatGrams;
     //2. Validate input

//ADD YOUR CODE FROM HERE
```

Examples of execution:

```
How many calories and fat grams? 101 3
Fat percent is: 26.7327

How many calories and fat grams? 101 2
Fat percent is: 17.8218
This food is low in fat.

How many calories and fat grams? 101 -2
Wrong number of calories or fat grams!

How many calories and fat grams? 102 12
Either the calories or fat grams were incorrectly entered.
```




/*

Write a program that asks for the number of calories and fat grams in a food. The program should display the percentage of calories that come from fat. If the calories from fat are less than 18% of the total calories of the food, it should also display a message indicating that the food is low in fat.

One gram of fat has 9 calories, so

Calories from fat = fat grams * 9

The percentage of calories from fat can be calculated as

Calories from fat ÷ total calories

Input Validation: Make sure the number of calories and fat grams are not less than 0. Also, the number of calories from fat cannot be greater than the total number of calories. If that happens, display an error message indicating that either the calories or fat grams were incorrectly entered.

*/

// DO NOT MODIFY

#include <iostream>

```
using namespace std;
int main()
{
   int cals, fatGrams, fatCalories;
   float fatPercent;
   //1. Input data
   cout << "How many calories and fat grams? ";
   cin >> cals >> fatGrams;
   //2. Validate input
   //ADD YOUR CODE FROM HERE
   // Calculates  Fat calories from the fatGrams entered.
   fatCalories = fatGrams * 9;

   // Calories from the fat divided by total calories
   fatPercent = static_cast<double>((fatCalories) / static_cast<double>(cals) * 100);

   // Checks if calories entered is correctly, else it ends the program
   if( cals < 0)
   {
      cout << "Error: Enter a number larger than 0" << endl;
   }
   else if( fatGrams < 0) //Checks if grams of fat grams was also entered correctly, else it ends the program and displays an error.
   {
      cout << "Error: Fat Grams cannot be less than 0" << endl;
   }
```

```
    // Checks if the calories from fat is greater thhan the total
    if(fatCalories > cals)
    {
        // If the fat calories is larger, shows an error and ends the program.
        cout << "Error: Fat calories cannot be more than total number of calories." << endl;
    }

    cout << "Fat Percentage: " << fatPercent << endl;
    if(fatPercent < 18)
    {
        cout << "This food is low in fat." << endl;
    }

    return 0;

}
```