1. Running the Race

Write a program that asks for the names (single name, no spaces) of three runners and the time (integers) it took each of them to finish a race. The program should display who came in first, second, and third place.

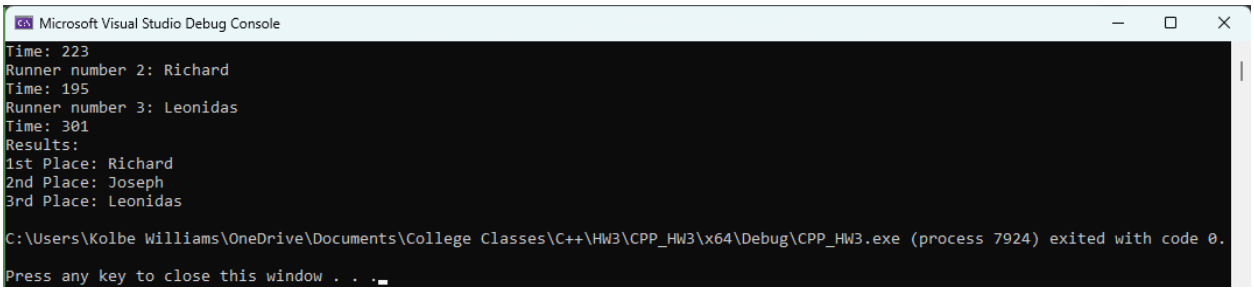
Input Validation: Only accept positive numbers for the times.

Source Code:

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;

int main()
{
    int firstTime, secondTime, thirdTime;

    string runnerOne, runnerTwo, runnerThree;

    //ADD YOUR CODE FROM HERE
    //1. Ask user for runner names and times
    do
    {
        cout << "Runner number 1: ";
        cin >> runnerOne;
        cout << "Time: ";
        cin >> firstTime;
        cout << "Runner number 2: ";
        cin >> runnerTwo;
        cout << "Time: ";
        cin >> secondTime;
        cout << "Runner number 3: ";
        cin >> runnerThree;
        cout << "Time: ";
        cin >> thirdTime;

        if (firstTime < 0 || secondTime < 0 || thirdTime < 0)
            cout << "Please enter positive values for the runner's times." << endl;
    } while (firstTime < 0 || secondTime < 0 || thirdTime < 0);

    //2. Calculate race results
    string first, second, third;

    if (firstTime < secondTime && firstTime < thirdTime)
        first = runnerOne;
    else if (secondTime < firstTime && secondTime < thirdTime)
        first = runnerTwo;
    else if (thirdTime < firstTime && thirdTime < secondTime)
        first = runnerThree;

    if (first == runnerOne)
        secondTime < thirdTime ? (second = runnerTwo, third = runnerThree) : (second
= runnerThree, third = runnerTwo);
    else if (first == runnerTwo)
        firstTime < thirdTime ? (second = runnerOne, third = runnerThree) : (second
= runnerThree, third = runnerOne);
```

```
    else if (first == runnerThree)
        secondTime < firstTime ? (second = runnerTwo, third = runnerOne) : (second =
runnerOne, third = runnerTwo);

    //3. Display race results
    cout << "Results:" << endl;
    cout << "1st Place: " << first << endl;
    cout << "2nd Place: " << second << endl;
    cout << "3rd Place: " << third << endl;
    return 0;
}
```

Output:



2. Fat Gram Calculator

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 30% 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.

Source Code:

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
#include <iomanip>

using namespace std;

int main()

{
    int calories, fatGrams, fatCalories;
    float fatPercent;
```

```
    //1. Input data
    do {
        cout << "How many calories? ";
        cin >> calories;
    } while (calories < 0);
    //ADD YOUR CODE FROM HERE
    cout << "How many fat grams? ";
    cin >> fatGrams;

    //2. Calculate
    fatCalories = fatGrams * 9;
    if (fatCalories > calories)
    {
        cout << "The number of calories or fat grams were entered incorrectly." <<
endl;
        return 0;
    }
    fatPercent = static_cast<float>(fatCalories) / calories * 100;

    //3. Display results
    cout << "Fat percent is: " << fatPercent << "%" << endl;
    if (fatPercent < 30)
        cout << "This food is low in fat." << endl;
    return 0;
}
```

Output: