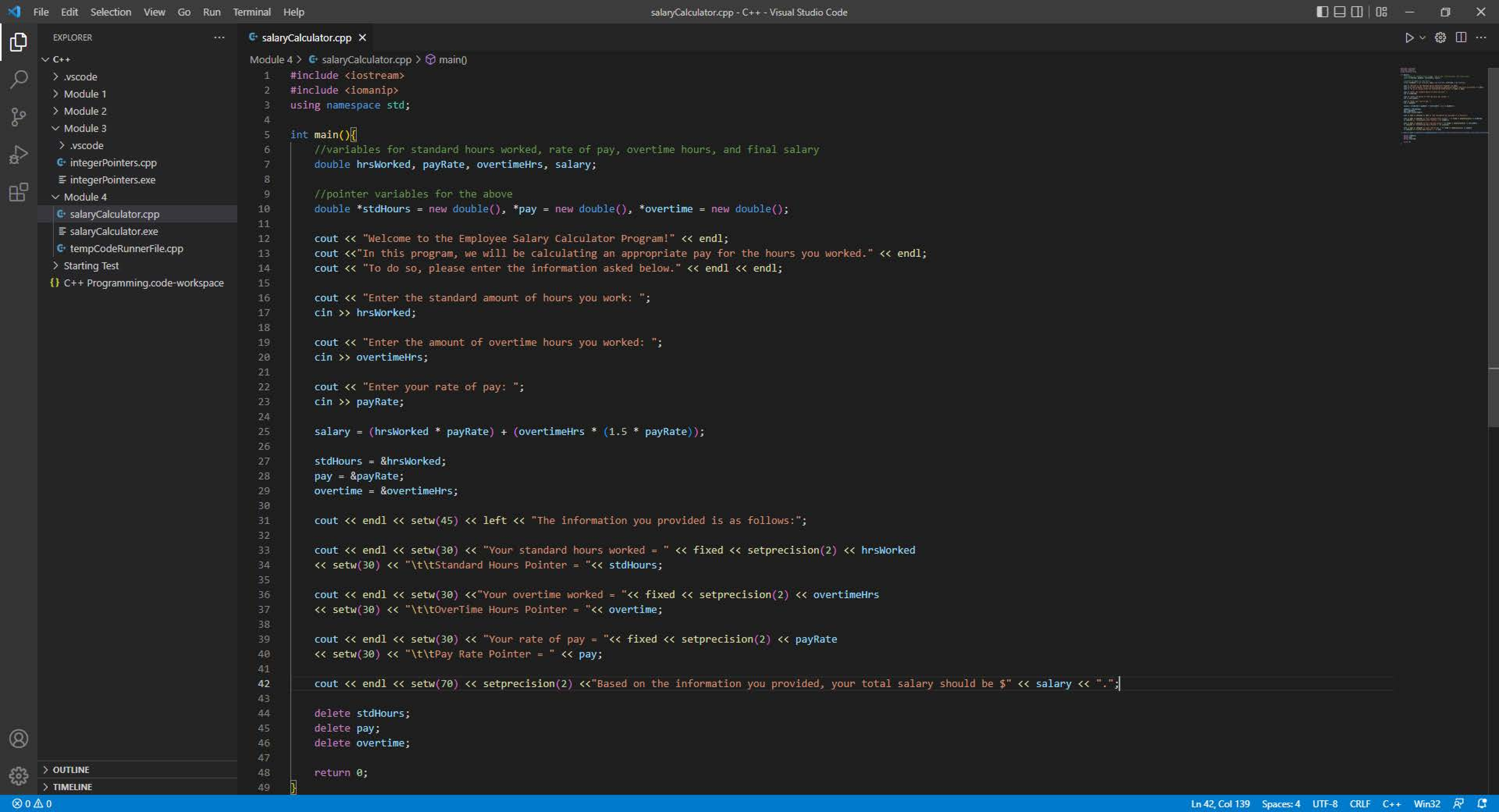
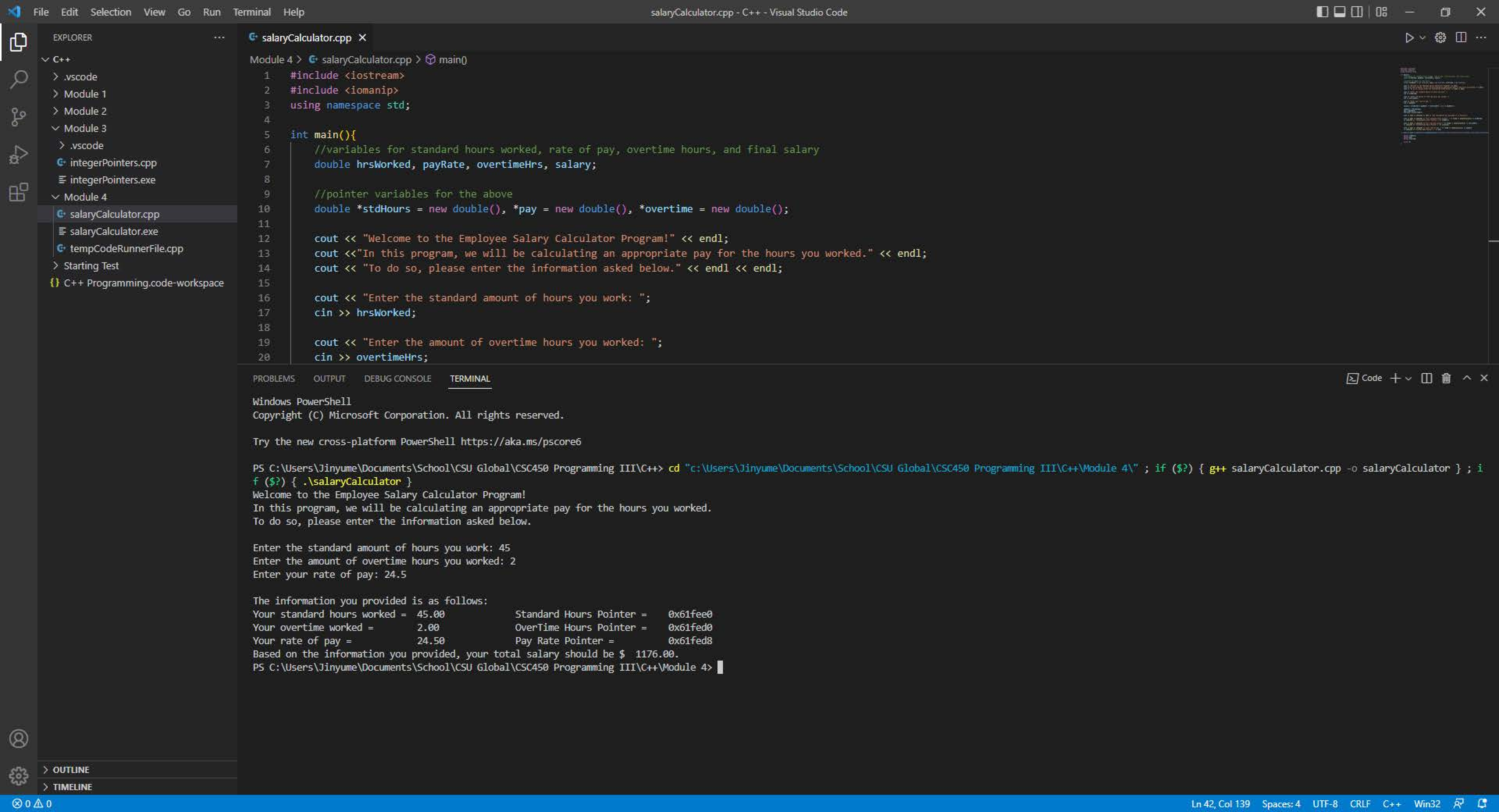


```cpp
#include <iostream>
#include <iomanip>
using namespace std;

int main(){
    //variables for standard hours worked, rate of pay, overtime hours, and final salary
    double hrsWorked, payRate, overtimeHrs, salary;

    //pointer variables for the above
    double *stdHours = new double(), *pay = new double(), *overtime = new double();

    cout << "Welcome to the Employee Salary Calculator Program!" << endl;
    cout <<"In this program, we will be calculating an appropriate pay for the hours you worked." << endl;
    cout << "To do so, please enter the information asked below." << endl << endl;

    cout << "Enter the standard amount of hours you work: ";
    cin >> hrsWorked;

    cout << "Enter the amount of overtime hours you worked: ";
    cin >> overtimeHrs;

    cout << "Enter your rate of pay: ";
    cin >> payRate;

    salary = (hrsWorked * payRate) + (overtimeHrs * (1.5 * payRate));

    stdHours = &hrsWorked;
    pay = &payRate;
    overtime = &overtimeHrs;

    cout << endl << setw(45) << left << "The information you provided is as follows:";

    cout << endl << setw(30) << "Your standard hours worked = " << fixed << setprecision(2) << hrsWorked
    << setw(30) << "\t\tStandard Hours Pointer = "<< stdHours;

    cout << endl << setw(30) <<"Your overtime worked = "<< fixed << setprecision(2) << overtimeHrs
    << setw(30) << "\t\tOverTime Hours Pointer = "<< overtime;

    cout << endl << setw(30) << "Your rate of pay = "<< fixed << setprecision(2) << payRate
    << setw(30) << "\t\tPay Rate Pointer = " << pay;

    cout << endl << setw(70) << setprecision(2) <<"Based on the information you provided, your total salary should be $" << salary << ".";

    delete stdHours;
    delete pay;
    delete overtime;

    return 0;
}
```


File Edit Selection View Go Run Terminal Help
salaryCalculator.cpp - C++ - Visual Studio Code
EXPLORER
C++
.vscode
Module 1
Module 2
Module 3
.vscode
integerPointers.cpp
integerPointers.exe
Module 4
salaryCalculator.cpp
salaryCalculator.exe
tempCodeRunnerFile.cpp
Starting Test
C++ Programming.code-workspace
OUTLINE
TIMELINE
salaryCalculator.cpp
Module 4 > salaryCalculator.cpp > main()
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Code
Ln 42, Col 139 Spaces: 4 UTF-8 CRLF C++ Win32

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    cout << "To do so, please enter the information asked below." << endl << endl;

    cout << "Enter the standard amount of hours you work: ";
    cin >> hrsWorked;

    cout << "Enter the amount of overtime hours you worked: ";
    cin >> overtimeHrs;
```

```
Windows PowerShell
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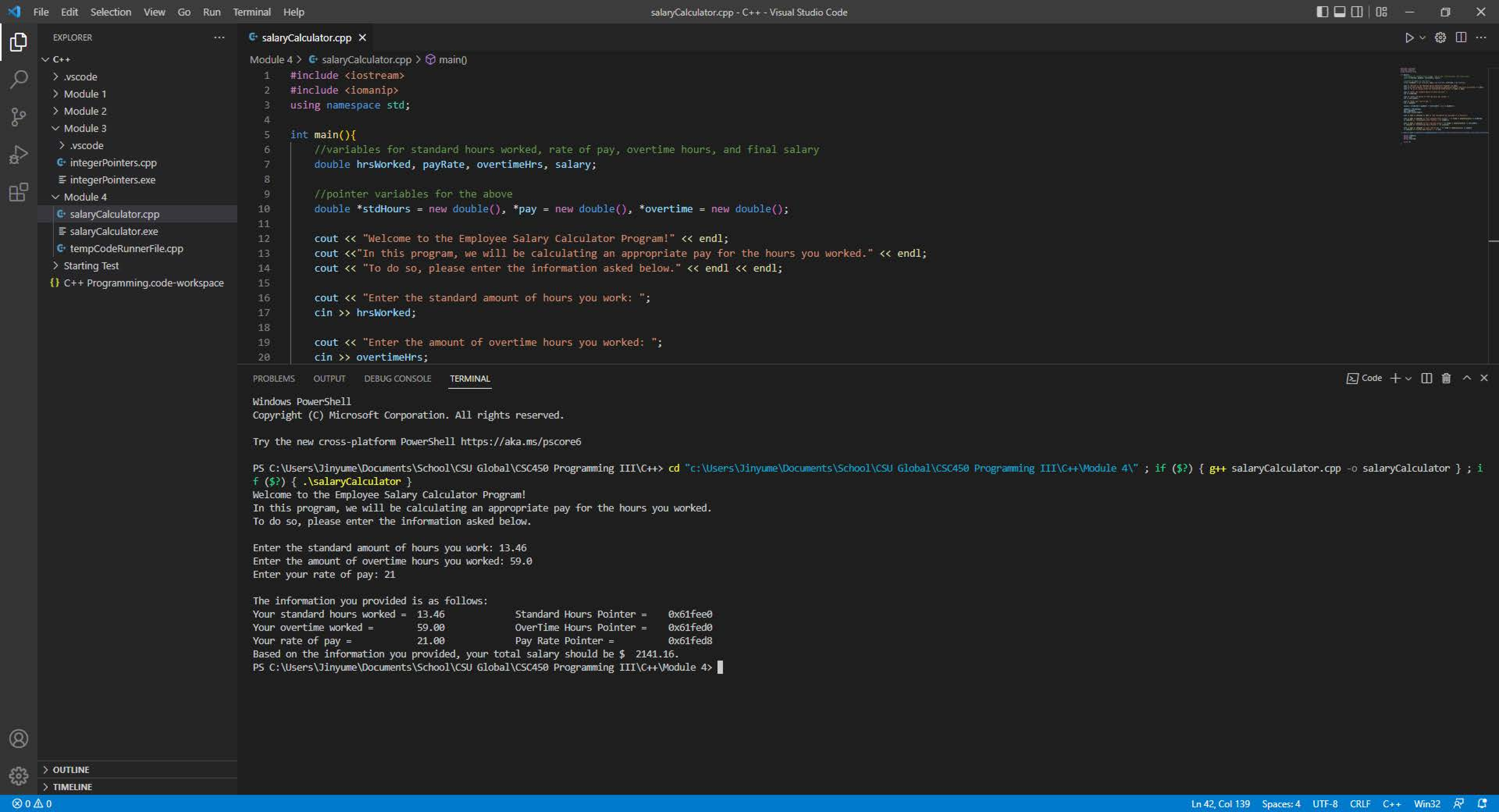
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++> cd "c:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++\Module 4\" ; if ($?) { g++ salaryCalculator.cpp -o salaryCalculator } ; i
f ($?) { .\salaryCalculator }
Welcome to the Employee Salary Calculator Program!
In this program, we will be calculating an appropriate pay for the hours you worked.
To do so, please enter the information asked below.

Enter the standard amount of hours you work: 45
Enter the amount of overtime hours you worked: 2
Enter your rate of pay: 24.5

The information you provided is as follows:
Your standard hours worked =  45.00            Standard Hours Pointer =    0x61fee0
Your overtime worked =        2.00             OverTime Hours Pointer =    0x61fed0
Your rate of pay =            24.50            Pay Rate Pointer =          0x61fed8
Based on the information you provided, your total salary should be $  1176.00.
PS C:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++\Module 4>
```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0 0
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    cout << "Welcome to the Employee Salary Calculator Program!" << endl;
    cout <<"In this program, we will be calculating an appropriate pay for the hours you worked." << endl;
    cout << "To do so, please enter the information asked below." << endl << endl;

    cout << "Enter the standard amount of hours you work: ";
    cin >> hrsWorked;

    cout << "Enter the amount of overtime hours you worked: ";
    cin >> overtimeHrs;
```

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++> cd "c:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++\Module 4\" ; if ($?) { g++ salaryCalculator.cpp -o salaryCalculator } ; i
f ($?) { .\salaryCalculator }
Welcome to the Employee Salary Calculator Program!
In this program, we will be calculating an appropriate pay for the hours you worked.
To do so, please enter the information asked below.

Enter the standard amount of hours you work: 13.46
Enter the amount of overtime hours you worked: 59.0
Enter your rate of pay: 21

The information you provided is as follows:
Your standard hours worked =  13.46            Standard Hours Pointer =    0x61fee0
Your overtime worked =        59.00            OverTime Hours Pointer =    0x61fed0
Your rate of pay =            21.00            Pay Rate Pointer =          0x61fed8
Based on the information you provided, your total salary should be $  2141.16.
PS C:\Users\Jinyume\Documents\School\CSU Global\CSC450 Programming III\C++\Module 4> 
```

Clarissa Kuter

CSC450 Programming III

Reginald Haseltine

10 July 2022

Employee Salary Calculator Analysis

For the critical thinking assignment due this week, I was tasked with writing a C++ program that would function as an employee salary calculator. I needed to create three double variables for the standard hours worked, the rate of pay, and the overtime hours; afterwards, I needed to make pointers for those same three variables. When run, the application would ask users to input values for the above variables, and once the values were received, the program would calculate the appropriate salary the user should receive. Finally, using the setw() and setprecision() formatting output methods, the application was to print the contents of the variables, salary, and pointer variables to the screen.

Like my program from week three, the main errors that could occur with this program relate to the pointer variables. If I did not initialize the pointers properly, I suffer the risk of them containing garbage; if I did not allocate enough memory for the pointers, the pointer could end up reading or writing the value to an invalid memory location. Both mistakes could lead to security vulnerabilities, so in order to avoid them, I declared the variables and first initialized them to a new double(). After they were declared and space was assigned to them, I finally assigned the memory locations of the standard hours worked, rate of pay, and overtime hour variables to them. From my test runs, they worked without any issues occurring.

At the end of my program, I employed setw() and setprecision() formatting methods with my cout statement to output the final salary and variable values. While the two formatting methods I used do not pose too much of a security issue, other formatting methods can result in vulnerabilities if not used properly. One such vulnerability is a format string vulnerability which can occur when an attacker-controller buffer is passed as an argument to a format function such as printf(). If such an event occurs, the attacker will be able to write to arbitrary memory addresses and can fool the function into printing addresses from the stack that it was never meant to print. One way to prevent format string vulnerabilities, programmers should make sure format strings are specified as part of the program and not as an input.