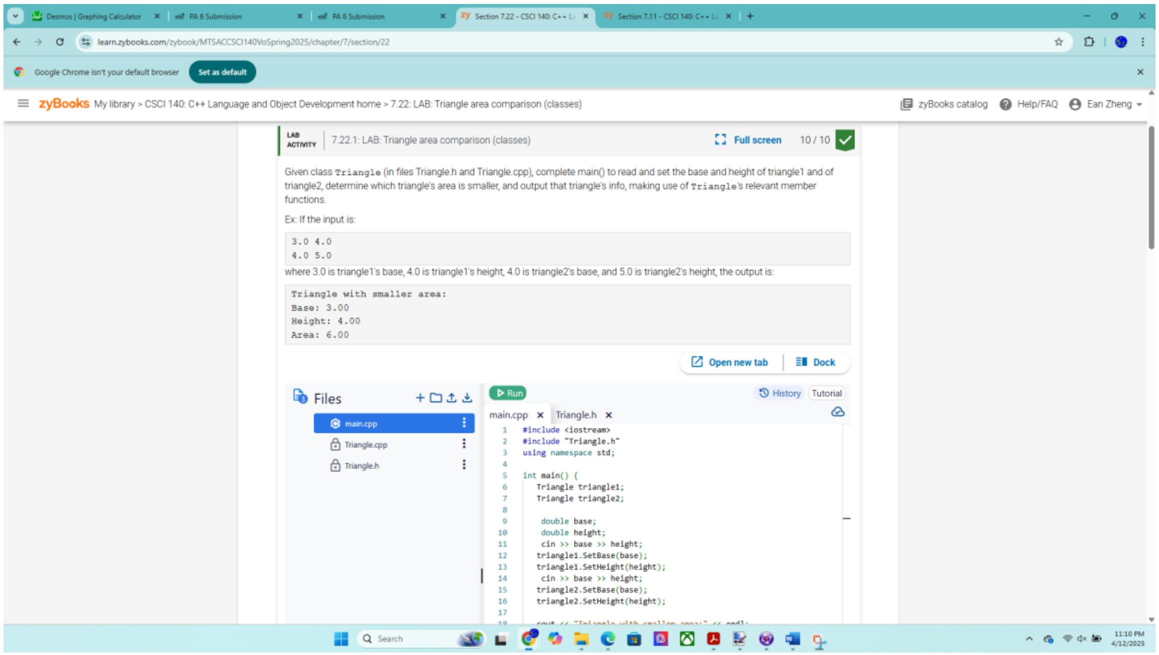
CSCI 140 PA 6 Submission
Due Date: 4/14/2025 Late (date and time):_______________
Name(s): Ean Zheng

Exercise 1 – 7.22 LAB: Triangle area comparison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main.cpp
Triangle.cpp
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4/12/2025

7.22.1: LAB: Triangle area comparison (classes)

Given class `Triangle` (in files Triangle.h and Triangle.cpp), complete main() to read and set the base and height of triangle1 and of triangle2, determine which triangle's area is smaller, and output that triangle's info, making use of `Triangle`'s relevant member functions.

Ex: If the input is:

```
3.0 4.0
4.0 5.0
```

where 3.0 is triangle1's base, 4.0 is triangle1's height, 4.0 is triangle2's base, and 5.0 is triangle2's height, the output is:

```
Triangle with smaller area:
Base: 3.00
Height: 4.00
Area: 6.00
```

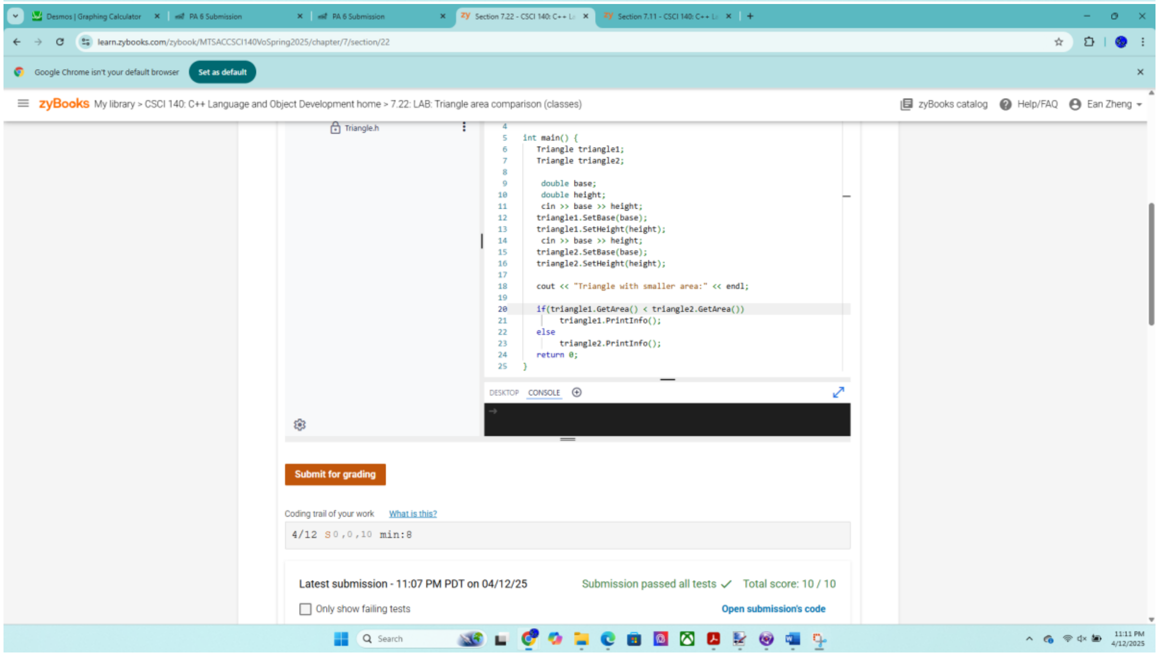
main.cpp

```cpp
#include <iostream>
#include "Triangle.h"
using namespace std;

int main() {
   Triangle triangle1;
   Triangle triangle2;

    double base;
    double height;
    cin >> base >> height;
   triangle1.SetBase(base);
   triangle1.SetHeight(height);
    cin >> base >> height;
   triangle2.SetBase(base);
   triangle2.SetHeight(height);

```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```cpp

int main() {
   Triangle triangle1;
   Triangle triangle2;

    double base;
    double height;
    cin >> base >> height;
   triangle1.SetBase(base);
   triangle1.SetHeight(height);
    cin >> base >> height;
   triangle2.SetBase(base);
   triangle2.SetHeight(height);

   cout << "Triangle with smaller area:" << endl;

   if(triangle1.GetArea() < triangle2.GetArea())
        triangle1.PrintInfo();
   else
        triangle2.PrintInfo();
   return 0;
}
```

Coding trail of your work What is this?

```
4/12 S0,0,10 min:8
```

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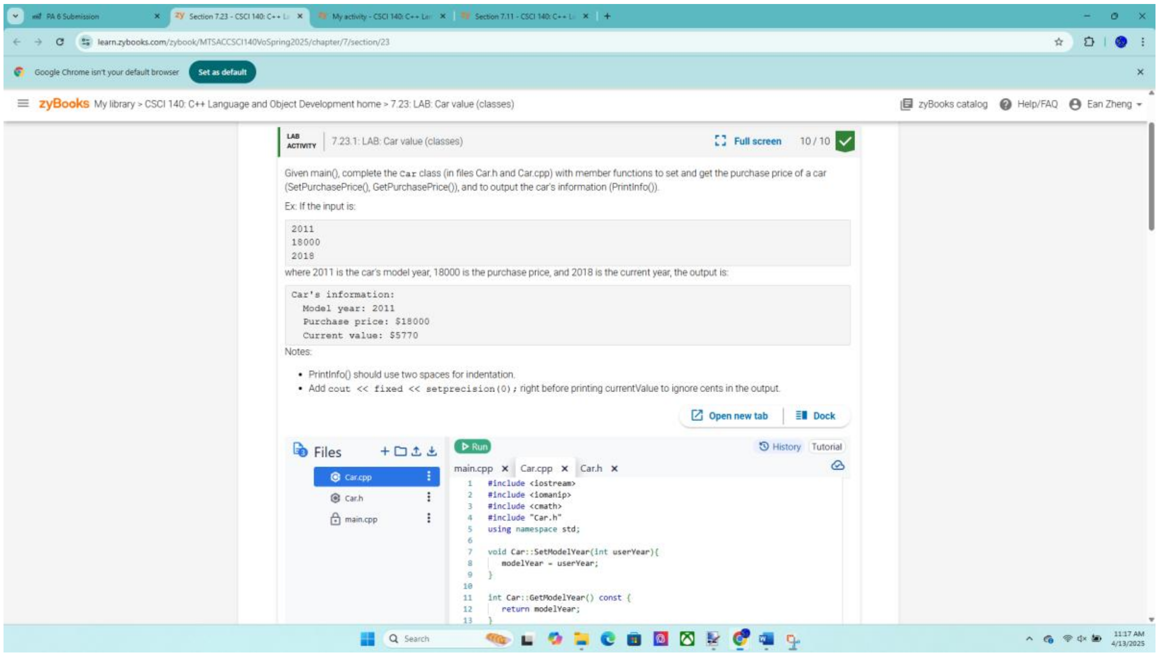
Exercise 2 – 7.23 LAB: Car value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Given main(), complete the `Car` class (in files Car.h and Car.cpp) with member functions to set and get the purchase price of a car (SetPurchasePrice(), GetPurchasePrice()), and to output the car's information (PrintInfo()).

Ex: If the input is:

```
2011
18000
2018
```

where 2011 is the car's model year, 18000 is the purchase price, and 2018 is the current year, the output is:

```
Car's information:
  Model year: 2011
  Purchase price: $18000
  Current value: $5770
```

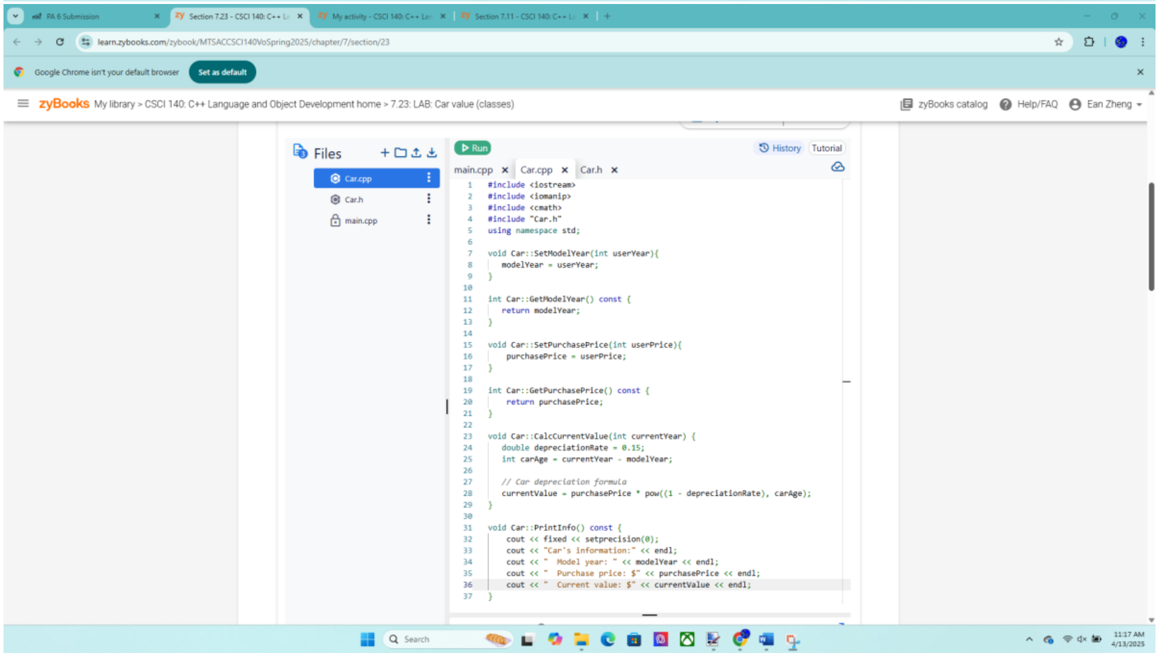
Notes:

- PrintInfo() should use two spaces for indentation.
- Add `cout << fixed << setprecision(0);` right before printing currentValue to ignore cents in the output.

```
#include <iostream>
#include <iomanip>
#include <cmath>
#include "Car.h"
using namespace std;

void Car::SetModelYear(int userYear){
   modelYear = userYear;
}

int Car::GetModelYear() const {
   return modelYear;
}
```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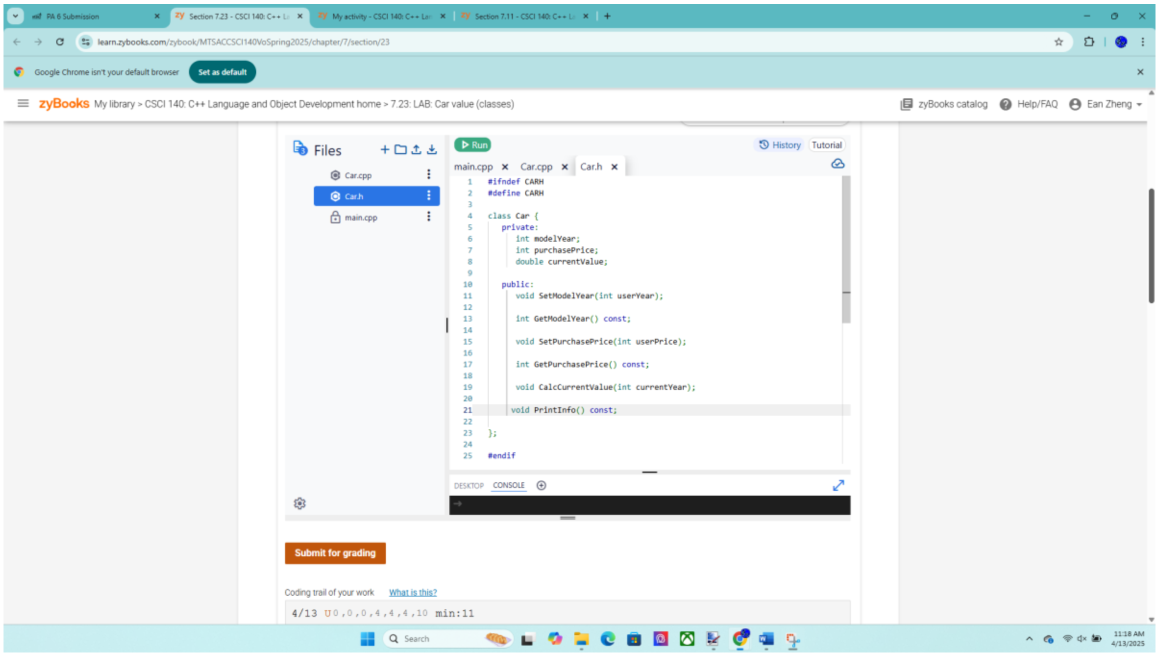
```
#include <iostream>
#include <iomanip>
#include <cmath>
#include "Car.h"
using namespace std;

void Car::SetModelYear(int userYear){
   modelYear = userYear;
}

int Car::GetModelYear() const {
   return modelYear;
}

void Car::SetPurchasePrice(int userPrice){
    purchasePrice = userPrice;
}

int Car::GetPurchasePrice() const {
    return purchasePrice;
}

void Car::CalcCurrentValue(int currentYear) {
   double depreciationRate = 0.15;
   int carAge = currentYear - modelYear;

   // Car depreciation formula
   currentValue = purchasePrice * pow((1 - depreciationRate), carAge);
}

void Car::PrintInfo() const {
    cout << fixed << setprecision(0);
    cout << "Car's information:" << endl;
    cout << "  Model year: " << modelYear << endl;
    cout << "  Purchase price: $" << purchasePrice << endl;
    cout << "  Current value: $" << currentValue << endl;
}
```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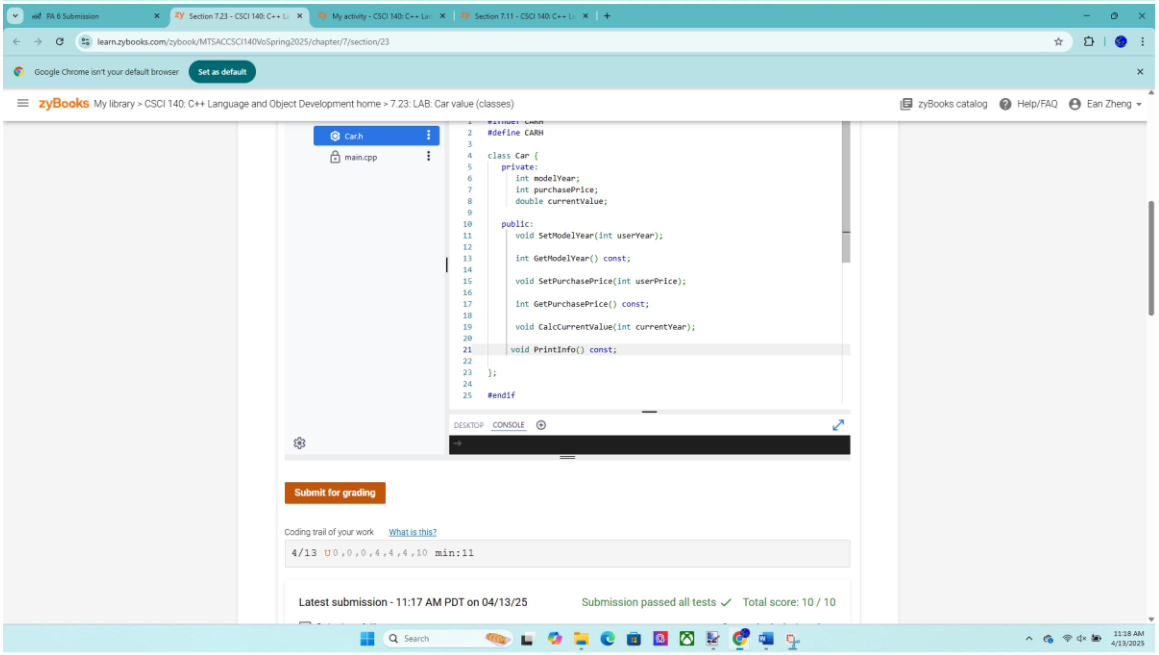
```
#ifndef CARH
#define CARH

class Car {
   private:
      int modelYear;
      int purchasePrice;
      double currentValue;

   public:
      void SetModelYear(int userYear);

      int GetModelYear() const;

      void SetPurchasePrice(int userPrice);

      int GetPurchasePrice() const;

      void CalcCurrentValue(int currentYear);

     void PrintInfo() const;

};

#endif
```

```
4/13 U0,0,0,4,4,4,10 min:11
```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```
#define CARH

class Car {
   private:
      int modelYear;
      int purchasePrice;
      double currentValue;

   public:
      void SetModelYear(int userYear);

      int GetModelYear() const;

      void SetPurchasePrice(int userPrice);

      int GetPurchasePrice() const;

      void CalcCurrentValue(int currentYear);

     void PrintInfo() const;

};

#endif
```

```
4/13 U0,0,0,4,4,4,10 min:11
```

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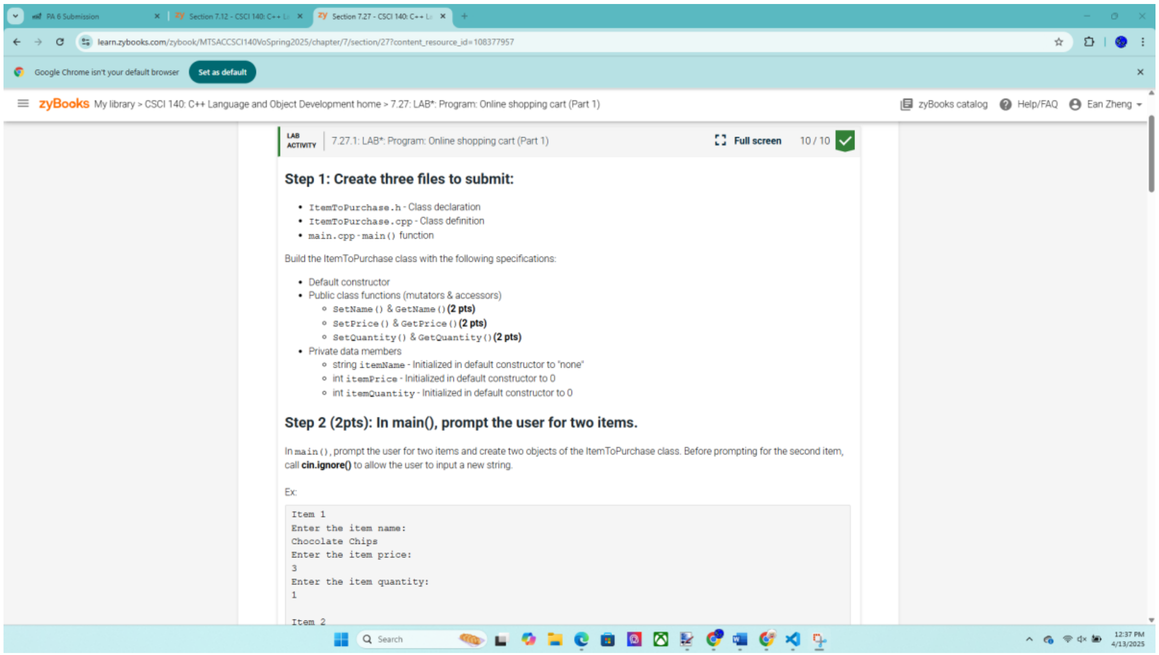
Exercise 3 – 7.27 LAB*: Warm up: Online shopping cart (Part 1)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Step 1: Create three files to submit:

- `ItemToPurchase.h` - Class declaration
- `ItemToPurchase.cpp` - Class definition
- `main.cpp` - `main()` function

Build the ItemToPurchase class with the following specifications:

- Default constructor
- Public class functions (mutators & accessors)
  - `SetName()` & `GetName()` **(2 pts)**
  - `SetPrice()` & `GetPrice()` **(2 pts)**
  - `SetQuantity()` & `GetQuantity()` **(2 pts)**
- Private data members
  - string `itemName` - Initialized in default constructor to "none"
  - int `itemPrice` - Initialized in default constructor to 0
  - int `itemQuantity` - Initialized in default constructor to 0

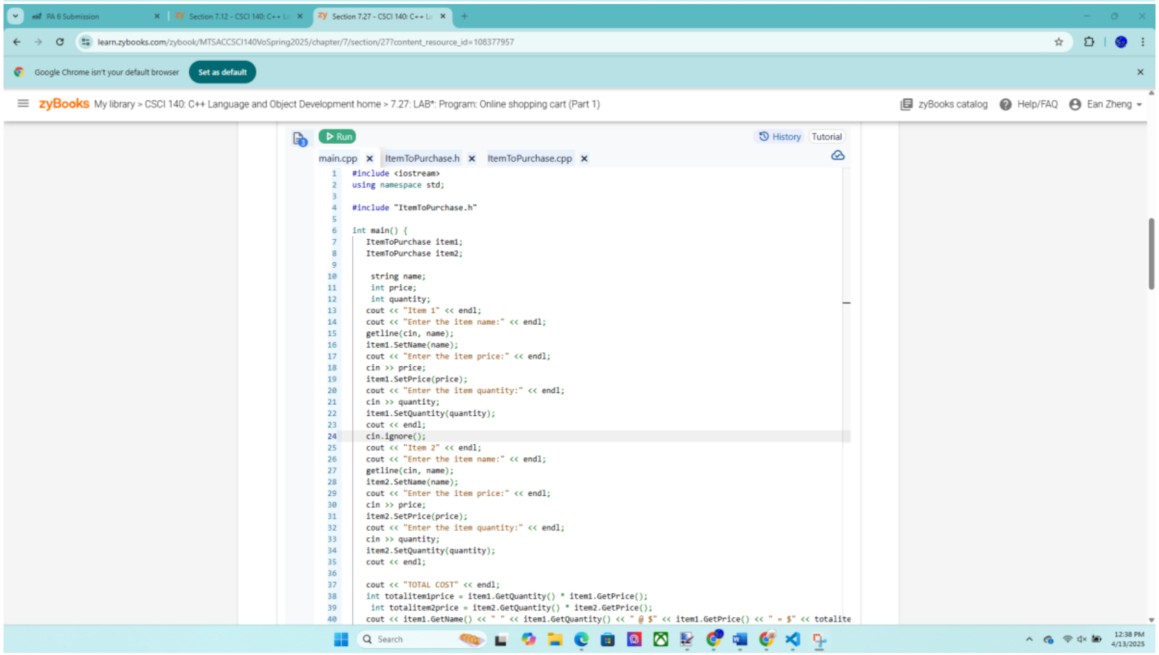
Step 2 (2pts): In main(), prompt the user for two items.

In `main()`, prompt the user for two items and create two objects of the ItemToPurchase class. Before prompting for the second item, call **cin.ignore()** to allow the user to input a new string.

Ex:

```
Item 1
Enter the item name:
Chocolate Chips
Enter the item price:
3
Enter the item quantity:
1

Item 2
```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ItemToPurchase.cpp
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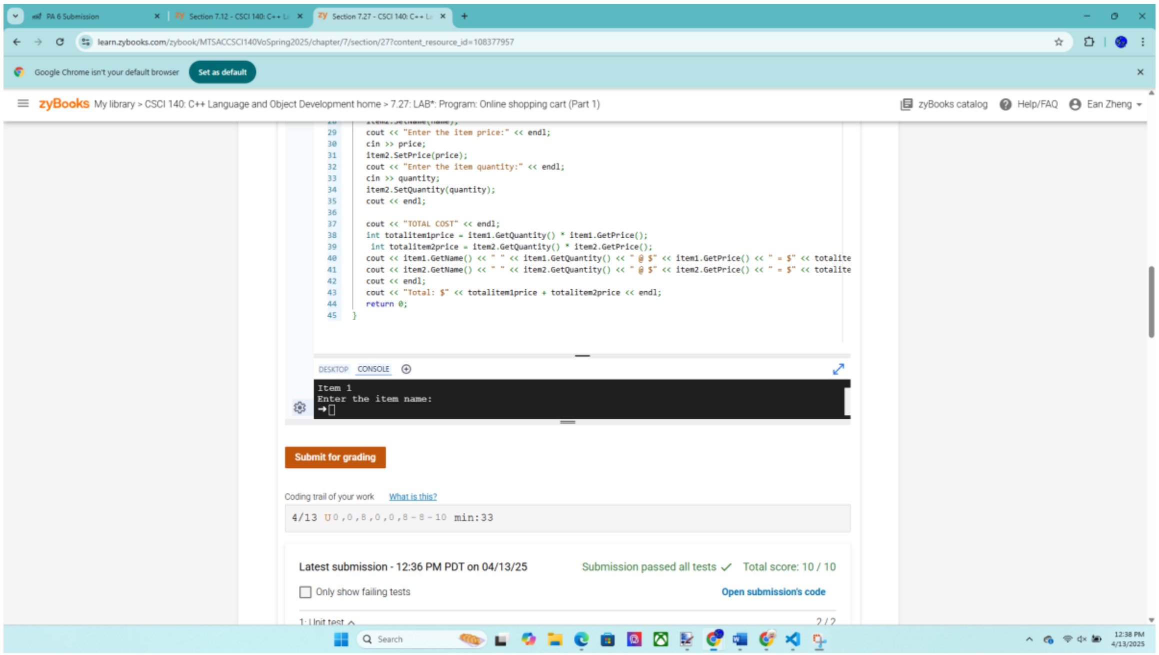
```cpp
#include <iostream>
using namespace std;

#include "ItemToPurchase.h"

int main() {
   ItemToPurchase item1;
   ItemToPurchase item2;

    string name;
    int price;
    int quantity;
   cout << "Item 1" << endl;
   cout << "Enter the item name:" << endl;
   getline(cin, name);
   item1.SetName(name);
   cout << "Enter the item price:" << endl;
   cin >> price;
   item1.SetPrice(price);
   cout << "Enter the item quantity:" << endl;
   cin >> quantity;
   item1.SetQuantity(quantity);
   cout << endl;
   cin.ignore();
   cout << "Item 2" << endl;
   cout << "Enter the item name:" << endl;
   getline(cin, name);
   item2.SetName(name);
   cout << "Enter the item price:" << endl;
   cin >> price;
   item2.SetPrice(price);
   cout << "Enter the item quantity:" << endl;
   cin >> quantity;
   item2.SetQuantity(quantity);
   cout << endl;

   cout << "TOTAL COST" << endl;
   int totalitem1price = item1.GetQuantity() * item1.GetPrice();
    int totalitem2price = item2.GetQuantity() * item2.GetPrice();
   cout << item1.GetName() << " " << item1.GetQuantity() << " @ $" << item1.GetPrice() << " = $" << totalite
```



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```
   item2.SetName(name);
   cout << "Enter the item price:" << endl;
   cin >> price;
   item2.SetPrice(price);
   cout << "Enter the item quantity:" << endl;
   cin >> quantity;
   item2.SetQuantity(quantity);
   cout << endl;

   cout << "TOTAL COST" << endl;
   int totalitem1price = item1.GetQuantity() * item1.GetPrice();
    int totalitem2price = item2.GetQuantity() * item2.GetPrice();
   cout << item1.GetName() << " " << item1.GetQuantity() << " @ $" << item1.GetPrice() << " = $" << totalite
   cout << item2.GetName() << " " << item2.GetQuantity() << " @ $" << item2.GetPrice() << " = $" << totalite
   cout << endl;
   cout << "Total: $" << totalitem1price + totalitem2price << endl;
   return 0;
}
```

```
Item 1
Enter the item name:
➜▯
```

Coding trail of your work   What is this?

4/13 U0,0,8,0,0,8-8-10 min:33

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1: Unit test ^   2 / 2

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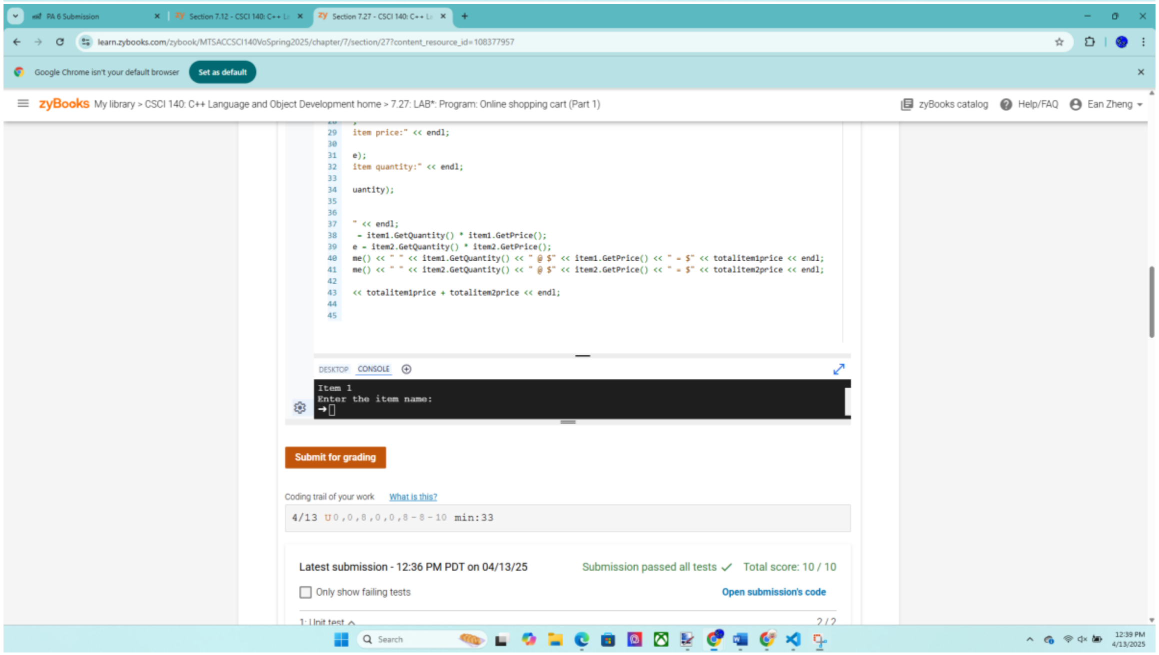

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```
item price:" << endl;

e);
item quantity:" << endl;

uantity);


" << endl;
 = item1.GetQuantity() * item1.GetPrice();
e = item2.GetQuantity() * item2.GetPrice();
me() << " " << item1.GetQuantity() << " @ $" << item1.GetPrice() << " = $" << totalitem1price << endl;
me() << " " << item2.GetQuantity() << " @ $" << item2.GetPrice() << " = $" << totalitem2price << endl;

<< totalitem1price + totalitem2price << endl;
```

```
Item 1
Enter the item name:
➜▯
```

Submit for grading

Coding trail of your work   What is this?

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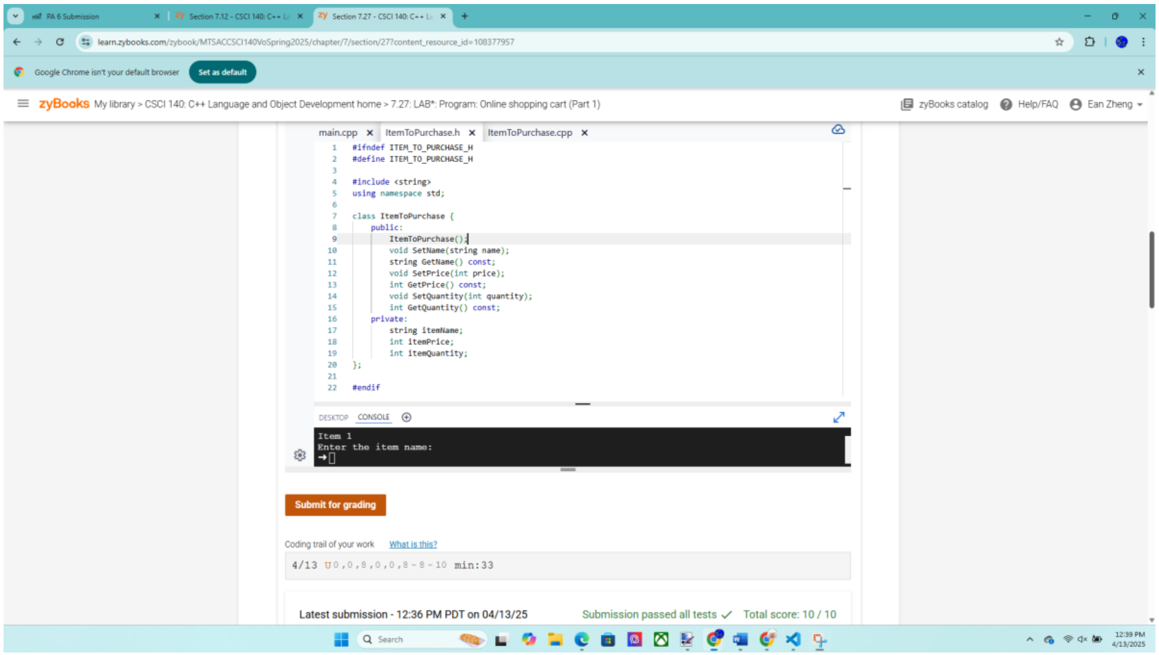
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main.cpp
ItemToPurchase.h
ItemToPurchase.cpp

```
#ifndef ITEM_TO_PURCHASE_H
#define ITEM_TO_PURCHASE_H

#include <string>
using namespace std;

class ItemToPurchase {
    public:
        ItemToPurchase();
        void SetName(string name);
        string GetName() const;
        void SetPrice(int price);
        int GetPrice() const;
        void SetQuantity(int quantity);
        int GetQuantity() const;
    private:
        string itemName;
        int itemPrice;
        int itemQuantity;
};

#endif
```

```
Item 1
Enter the item name:
→
```

Coding trail of your work What is this?

```
4/13 U0,0,8,0,0,8-8-10 min:33
```

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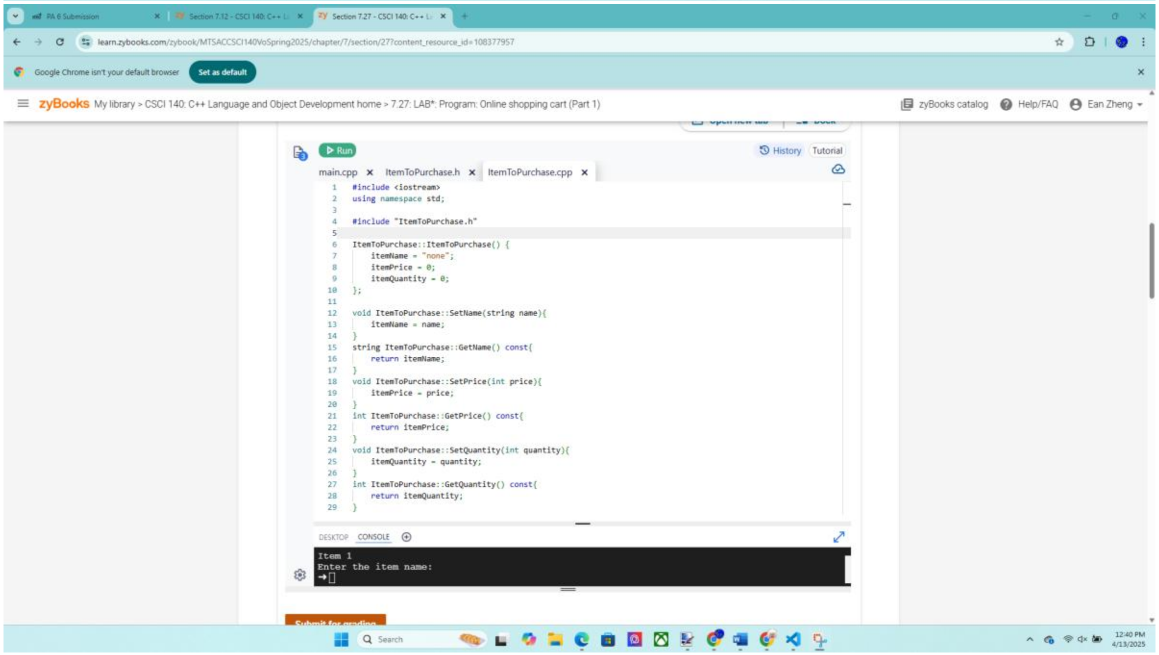
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ItemToPurchase.cpp

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

#include "ItemToPurchase.h"

ItemToPurchase::ItemToPurchase() {
    itemName = "none";
    itemPrice = 0;
    itemQuantity = 0;
};

void ItemToPurchase::SetName(string name){
    itemName = name;
}
string ItemToPurchase::GetName() const{
    return itemName;
}
void ItemToPurchase::SetPrice(int price){
    itemPrice = price;
}
int ItemToPurchase::GetPrice() const{
    return itemPrice;
}
void ItemToPurchase::SetQuantity(int quantity){
    itemQuantity = quantity;
}
int ItemToPurchase::GetQuantity() const{
    return itemQuantity;
}
```

```
Item 1
Enter the item name:
→
```

Exercise 4 – Height class version 1 – more points for this exercise

Create a class called Height and then write a driver program to test your class by creating some objects and performing various operations. You will continue with this class in future PAs so try to complete it and ask for help if needed! Your program must have at least three files: a Height header file (Height.h), a Height implementation file (Height.cpp), and an application file (HeightApp.cpp). The class has only two int data members feet and inches. The feet must be greater or equal to 0 (non-negative value) and the inches must be between 0 and 11 so validation is needed for applicable operations. Provide the following public member functions:

- Constructor; must verify that feet is greater than or equal to 0 and default to 0 if needed; must verify that inches are between 0 and 11 and default to 0 if needed.

o Height(int f, int i);

- Set the feet (must verify that the value is greater than or equal to 0 and keep current feet and ignore bad data if applicable).

o void setFeet(int f);

- Set the inches (must verify that the value is between 0 and 11 and keep current inches and ignore bad data if applicable).

o void setInches(int i);

- Return the feet.

o int getFeet() const;

- Return the inches.

o int getInches() const;

- Print the height in the following format (like 5’ 6”).

o void print() const;

- Increment the inches by one inch more (don't forget to adjust the inches and feet if needed).

o void increment();

You must try at least the following in your driver and add code to label height and new line for formatting as needed:

```
// Create some Height objects
Height h3(5, 8); // feet: 5, inches: 8
Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
// Print height h3
cout << “h3: “;
h3.print(); // h3: 5’ 8”
cout << endl;
// Add more code below to print h4 and h5 like h3 above
// Perform various operations
h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
h3.setInches(10); // feet: 5, inches: 10
cout << “feet: “ << h3.getFeet() << “, inches: “ << h3.getInches() << endl; // 5 10
h4.setFeet(6); // feet: 6, inches: 5
```

```
h4.setInches(12); // feet: 6, inches: 5, inches stay the same
cout << “feet: “ << h4.getFeet() << “, inches: “ << h4.getInches() << endl; // 6 5
h5.setInches(10); // feet: 6, inches: 10
h5.increment(); // feet: 6, inches: 11
h5.increment(); // feet: 7, inches: 0
cout << “h3: “;
h3.print(); // h3: 7’ 0”
cout << endl;
// Add more test cases if needed
```

Source code below:

HeightApp.cpp:

```
/*  Program: Height Class
Author: Ean Zheng
Class : CSCI 140
Date : 4 / 13 / 2025
Description :
   I certify that the code below is my own work.
   Exception(s) : N / A
   */
#include <iostream>
   using namespace std;

#include "Height.h"

int main() {
    // Create some Height objects
    Height h3(5, 8); // feet: 5, inches: 8
    Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
    Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
    // Print height h3
    cout << "h3: ";
    h3.print(); // h3: 5’ 8”
    cout << endl;
    // Add more code below to print h4 and h5 like h3 above
    // Perform various operations
    h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
    h3.setInches(10); // feet: 5, inches: 10
    cout << "feet: " << h3.getFeet() << ", inches: " << h3.getInches() << endl; // 5 10
    h4.setFeet(6); // feet: 6, inches: 5
    h4.setInches(12); // feet: 6, inches: 5, inches stay the same
    cout << "feet: " << h4.getFeet() << ", inches: " << h4.getInches() << endl; // 6 5
    h5.setInches(10); // feet: 6, inches: 10
    h5.increment(); // feet: 6, inches: 11
    h5.increment(); // feet: 7, inches: 0
    cout << "h5: ";
    h5.print(); // h3: 7’ 0”
   cout << endl;
    //Add more test cases if needed
}
```

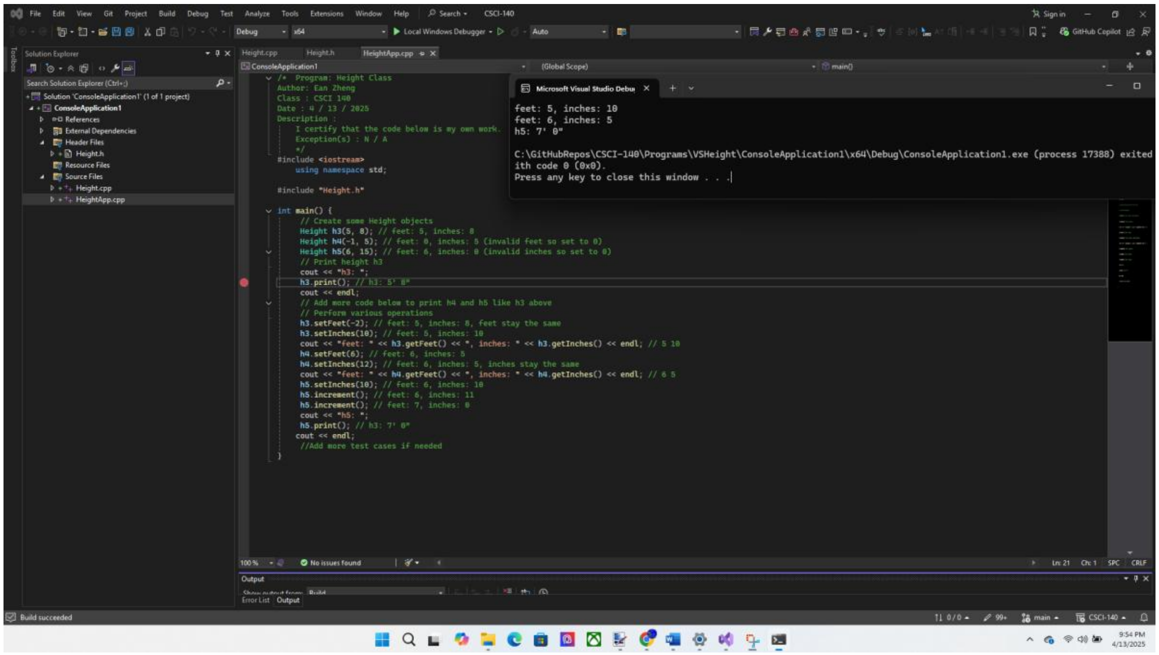
Height.cpp:

```
#include "Height.h"
/*  Program: Height Class
   Author: Ean Zheng
   Class: CSCI 140
   Date: 4/13/2025
   Description:
   I certify that the code below is my own work.
   Exception(s): N/A
*/
#include <iostream>
using namespace std;

#include "Height.h"

Height::Height(int f, int i) : feet(f), inches(i) {
   if (feet < 0)feet = 0;
   if (inches < 0 || inches > 11) inches = 0;
}
void Height::setFeet(int f) {
   if (f >= 0)feet = f;
}

void Height::setInches(int i) {
   if (i >= 0 && i <= 11) inches = i;
}

int Height::getFeet() const {
   return feet;
}

int Height::getInches() const {
   return inches;
}
```

```
void Height::print() const {
   cout << feet << "' " << inches << "\"";
}

void Height::increment() {
   ++inches;
   if (inches == 12) {
      inches = 0;
      ++feet;
   }
}
```

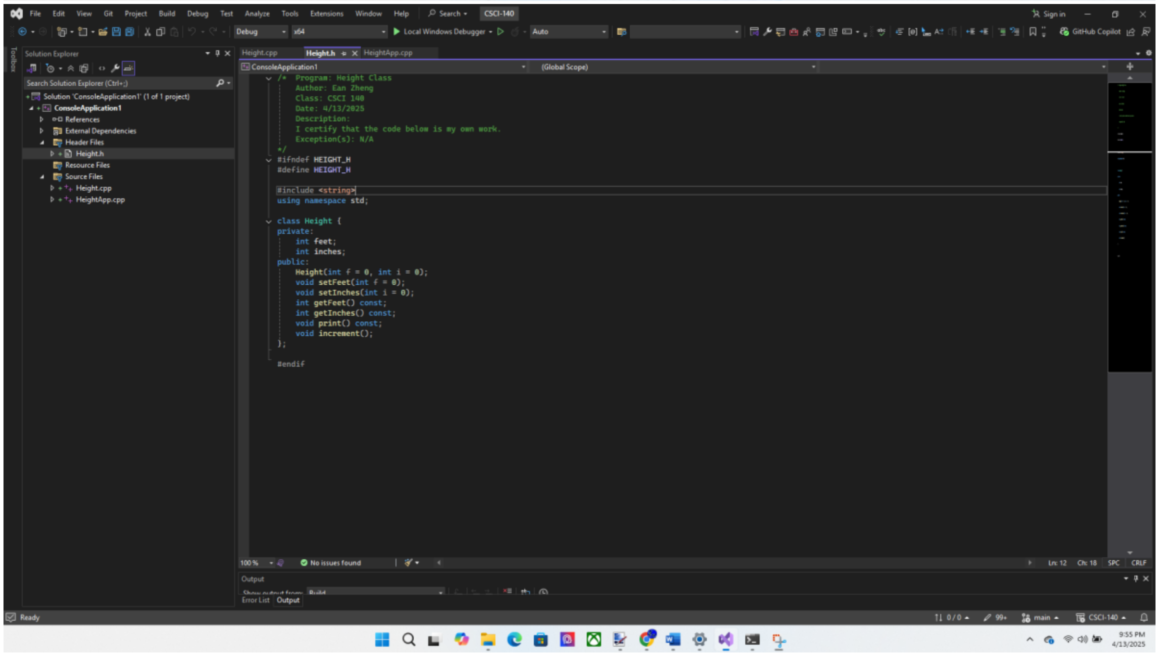
Height.h:

```
/*  Program: Height Class
   Author: Ean Zheng
   Class: CSCI 140
   Date: 4/13/2025
   Description:
   I certify that the code below is my own work.
   Exception(s): N/A
*/
#ifndef HEIGHT_H
#define HEIGHT_H

#include <string>
using namespace std;

class Height {
private:
   int feet;
   int inches;
public:
   Height(int f = 0, int i = 0);
   void setFeet(int f = 0);
   void setInches(int i = 0);
   int getFeet() const;
   int getInches() const;
   void print() const;
   void increment();
};

#endif
```

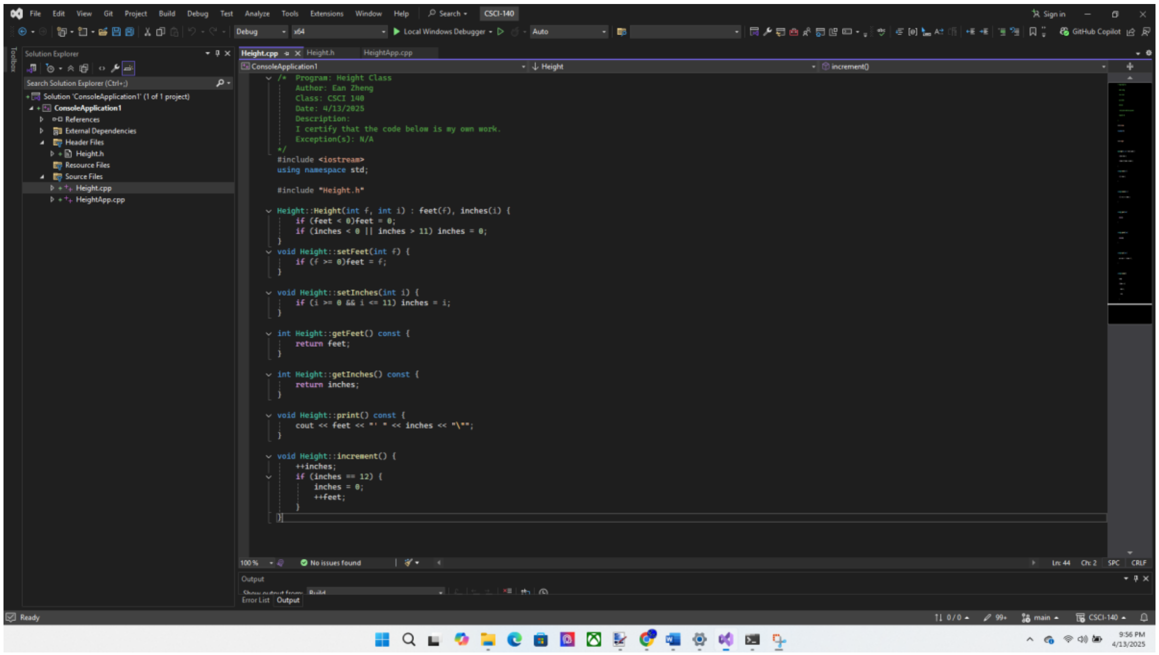


```cpp
/*  Program: Height Class
Author: Ean Zheng
Class : CSCI 140
Date : 4 / 13 / 2025
Description :
    I certify that the code below is my own work.
    Exception(s) : N / A
    */
#include <iostream>
    using namespace std;

#include "Height.h"

int main() {
    // Create some Height objects
    Height h3(5, 8); // feet: 5, inches: 8
    Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
    Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
    // Print height h3
    cout << "h3: ";
    h3.print(); // h3: 5' 8"
    cout << endl;
    // Add more code below to print h4 and h5 like h3 above
    // Perform various operations
    h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
    h3.setInches(10); // feet: 5, inches: 10
    cout << "feet: " << h3.getFeet() << ", inches: " << h3.getInches() << endl; // 5 10
    h4.setFeet(6); // feet: 6, inches: 5
    h4.setInches(12); // feet: 6, inches: 5, inches stay the same
    cout << "feet: " << h4.getFeet() << ", inches: " << h4.getInches() << endl; // 6 5
    h5.setInches(10); // feet: 6, inches: 10
    h5.increment(); // feet: 6, inches: 11
    h5.increment(); // feet: 7, inches: 0
    cout << "h5: ";
    h5.print(); // h3: 7' 0"
   cout << endl;
    //Add more test cases if needed
}
```

```
feet: 5, inches: 10
feet: 6, inches: 5
h5: 7' 0"

C:\GitHubRepos\CSCI-140\Programs\VSHeight\ConsoleApplication1\x64\Debug\ConsoleApplication1.exe (process 17388) exited
ith code 0 (0x0).
Press any key to close this window . . .
```



```cpp
/*  Program: Height Class
    Author: Ean Zheng
    Class: CSCI 140
    Date: 4/13/2025
    Description:
    I certify that the code below is my own work.
    Exception(s): N/A
*/
#ifndef HEIGHT_H
#define HEIGHT_H

#include <string>
using namespace std;

class Height {
private:
    int feet;
    int inches;
public:
    Height(int f = 0, int i = 0);
    void setFeet(int f = 0);
    void setInches(int i = 0);
    int getFeet() const;
    int getInches() const;
    void print() const;
    void increment();
};

#endif
```

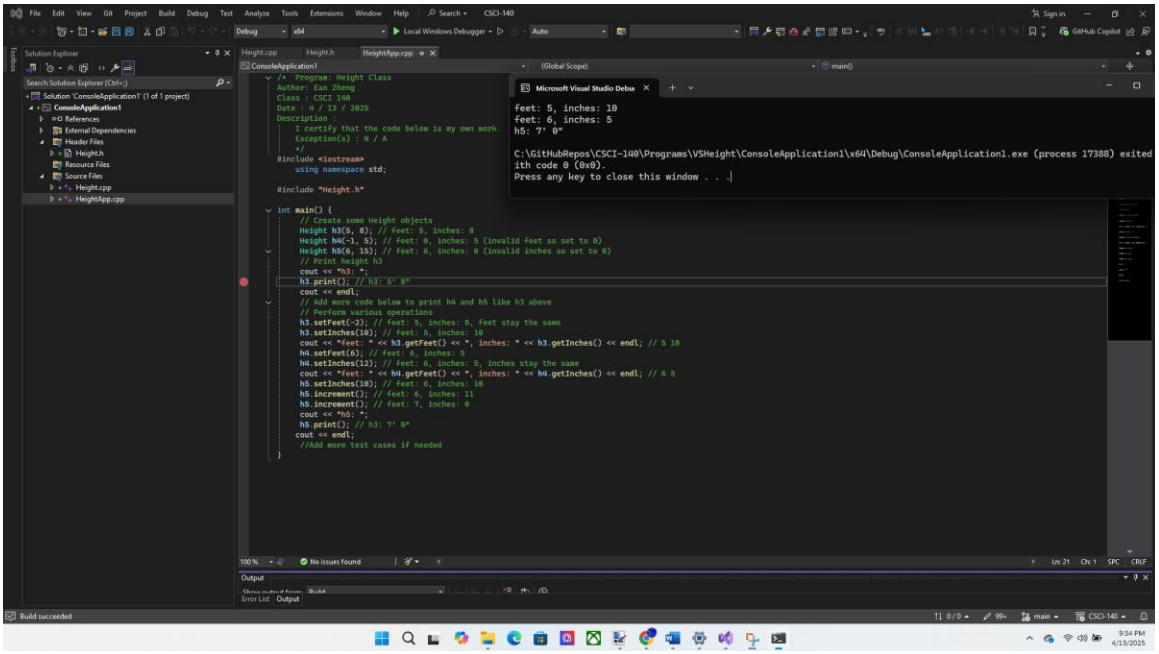


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help Search CSCI-140
Debug x64 Local Windows Debugger Auto
Solution Explorer
Solution 'ConsoleApplication1' (1 of 1 project)
ConsoleApplication1
References
External Dependencies
Header Files
Height.h
Resource Files
Source Files
Height.cpp
HeightApp.cpp
Height.cpp Height.h HeightApp.cpp
ConsoleApplication1 Height increment()
100 % No issues found Ln: 44 Ch: 2 SPC CRLF
Output Error List Output
Ready

```
/*  Program: Height Class
    Author: Ean Zheng
    Class: CSCI 140
    Date: 4/13/2025
    Description:
    I certify that the code below is my own work.
    Exception(s): N/A
*/
#include <iostream>
using namespace std;

#include "Height.h"

Height::Height(int f, int i) : feet(f), inches(i) {
    if (feet < 0)feet = 0;
    if (inches < 0 || inches > 11) inches = 0;
}
void Height::setFeet(int f) {
    if (f >= 0)feet = f;
}

void Height::setInches(int i) {
    if (i >= 0 && i <= 11) inches = i;
}

int Height::getFeet() const {
    return feet;
}

int Height::getInches() const {
    return inches;
}

void Height::print() const {
    cout << feet << "' " << inches << "\"";
}

void Height::increment() {
    ++inches;
    if (inches == 12) {
        inches = 0;
        ++feet;
    }
}
```

Input/output below:

h3: 5' 8"
feet: 5, inches: 10
feet: 6, inches: 5
h5: 7' 0"



File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help Search CSCI-140
Debug x64 Local Windows Debugger Auto
Solution Explorer
Solution 'ConsoleApplication1' (1 of 1 project)
ConsoleApplication1
References
External Dependencies
Header Files
Height.h
Resource Files
Source Files
Height.cpp
HeightApp.cpp
Height.cpp Height.h HeightApp.cpp
ConsoleApplication1 (Global Scope) main()
Microsoft Visual Studio Debu
100 % No issues found Ln: 21 Ch: 1 SPC CRLF
Output Error List Output
Build succeeded

```
/*  Program: Height Class
Author: Ean Zheng
Class : CSCI 140
Date : 4 / 13 / 2025
Description :
    I certify that the code below is my own work.
    Exception(s) : N / A
    */
#include <iostream>
    using namespace std;

#include "Height.h"

int main() {
     // Create some Height objects
     Height h3(5, 8); // feet: 5, inches: 8
     Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
     Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
     // Print height h3
     cout << "h3: ";
     h3.print(); // h3: 5' 8"
     cout << endl;
     // Add more code below to print h4 and h5 like h3 above
     // Perform various operations
     h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
     h3.setInches(10); // feet: 5, inches: 10
     cout << "feet: " << h3.getFeet() << ", inches: " << h3.getInches() << endl; // 5 10
     h4.setFeet(6); // feet: 6, inches: 5
     h4.setInches(12); // feet: 6, inches: 5, inches stay the same
     cout << "feet: " << h4.getFeet() << ", inches: " << h4.getInches() << endl; // 6 5
     h5.setInches(10); // feet: 6, inches: 10
     h5.increment(); // feet: 6, inches: 11
     h5.increment(); // feet: 7, inches: 0
     cout << "h5: ";
     h5.print(); // h3: 7' 0"
    cout << endl;
     //Add more test cases if needed
}
```

```
feet: 5, inches: 10
feet: 6, inches: 5
h5: 7' 0"

C:\GitHubRepos\CSCI-140\Programs\VSHeight\ConsoleApplication1\x64\Debug\ConsoleApplication1.exe (process 17388) exited
ith code 0 (0x0).
Press any key to close this window . . .
```

Question 1: Struct originates from C language. What are some good reasons for grouping related data with a struct? What is the main difference between a struct in C++ (a bit different than a struct in C) and a class?

To reduce lines of code, better organization, and reusability. A struct can only hold data values while a class can have functions and operations and also have both public and private values/functions.

Question 2: What is a default constructor? Why would you want to overload constructors for a class?

A special class function that initializes data members with default values upon declaration of a class object, and in the case of no arguments being given to the call. Overloading constructors allows class initialization to tolerate multiple input field cases and prevent error.

Extra Credit (2 points): Modify Height class to set up constructor(s) so the following Height objects can be created in the driver. Set up a Height array as specified below and print the heights in the driver as well (can modify regular version and submit one version).

```
// Create 2 Height objects
Height h1; // feet: 0, inches: 0
Height h2(5); // feet: 5, inches: 0
// Create some Height objects (same as original version)
Height h3(5, 8); // feet: 5, inches: 8
Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
// Set up an array to hold 5 different heights above and use a loop to print the heights
// Same code as exercise 4 below
```

Source code below:

HeightEC.cpp:

```
/*  Program: Height Class
Author: Ean Zheng
Class : CSCI 140
Date : 4 / 13 / 2025
Description :
   I certify that the code below is my own work.
   Exception(s) : N / A
  */
#include <iostream>
using namespace std;

#include "Height.h"

int main() {
   // Create 2 Height objects
   Height h1; // feet: 0, inches: 0
   Height h2(5); // feet: 5, inches: 0
   // Create some Height objects (same as original version)
   Height h3(5, 8); // feet: 5, inches: 8
   Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
   Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
   // Print height h3
   Height array[] {h1, h2, h3, h4, h5};
   for (int i = 0; i < 5; ++i) {
      array[i].print();
      cout << endl;
   }
   cout << "h3: ";
   h3.print(); // h3: 5’ 8”
   cout << endl;
   // Add more code below to print h4 and h5 like h3 above
   // Perform various operations
   h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
   h3.setInches(10); // feet: 5, inches: 10
   cout << "feet: " << h3.getFeet() << ", inches: " << h3.getInches() << endl; // 5 10
   h4.setFeet(6); // feet: 6, inches: 5
   h4.setInches(12); // feet: 6, inches: 5, inches stay the same
   cout << "feet: " << h4.getFeet() << ", inches: " << h4.getInches() << endl; // 6 5
   h5.setInches(10); // feet: 6, inches: 10
   h5.increment(); // feet: 6, inches: 11
   h5.increment(); // feet: 7, inches: 0
   cout << "h5: ";
   h5.print(); // h3: 7’ 0”
   cout << endl;
   //Add more test cases if needed
}
```

Height.cpp:

```
/*  Program: Height Class
   Author: Ean Zheng
   Class: CSCI 140
   Date: 4/13/2025
   Description:
   I certify that the code below is my own work.
   Exception(s): N/A
*/
#include <iostream>
using namespace std;

#include "Height.h"

Height::Height(int f, int i) : feet(f), inches(i) {
   if (feet < 0)feet = 0;
   if (inches < 0 || inches > 11) inches = 0;
}
void Height::setFeet(int f) {
   if (f >= 0)feet = f;
}

void Height::setInches(int i) {
   if (i >= 0 && i <= 11) inches = i;
}

int Height::getFeet() const {
   return feet;
}

int Height::getInches() const {
   return inches;
}

void Height::print() const {
   cout << feet << "' " << inches << "\"";
}

void Height::increment() {
   ++inches;
   if (inches == 12) {
      inches = 0;
      ++feet;
   }
}
```

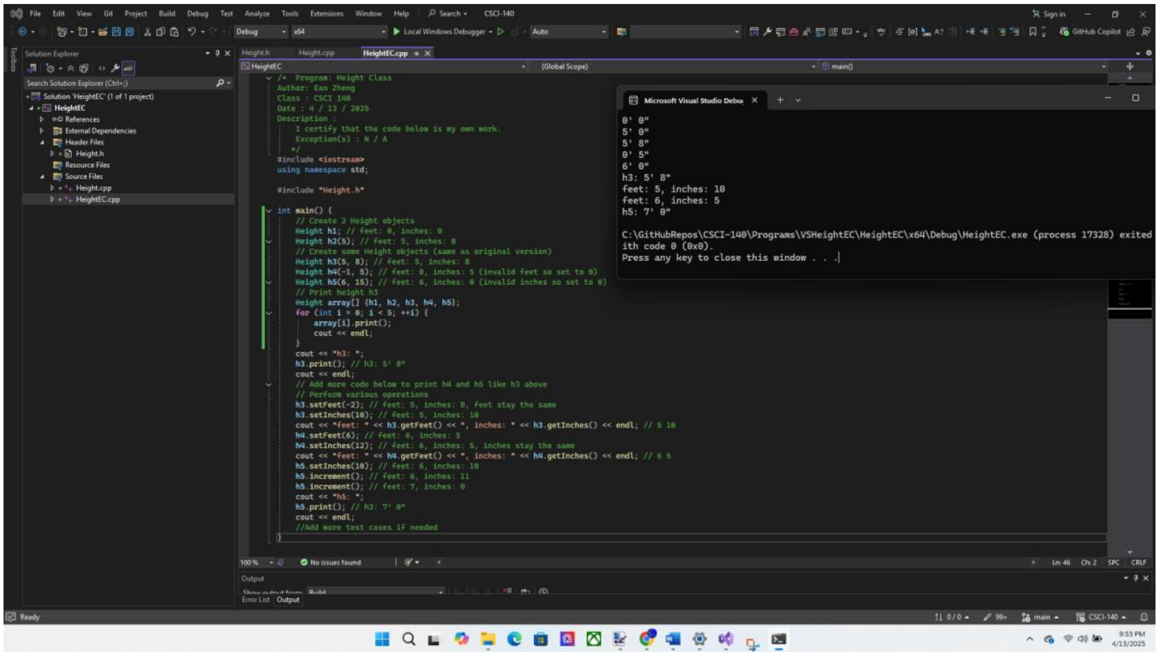
Height.h:

```
/*  Program: Height Class
   Author: Ean Zheng
   Class: CSCI 140
   Date: 4/13/2025
   Description:
   I certify that the code below is my own work.
   Exception(s): N/A
*/
#ifndef HEIGHT_H
#define HEIGHT_H

#include <string>
using namespace std;

class Height {
private:
   int feet;
   int inches;
public:
   Height(int f = 0, int i = 0);
   void setFeet(int f = 0);
```

```
    void setInches(int i = 0);
    int getFeet() const;
    int getInches() const;
    void print() const;
    void increment();
};

#endif
```

Input/output below:

```
0' 0"
5' 0"
5' 8"
0' 5"
6' 0"
h3: 5' 8"
feet: 5, inches: 10
feet: 6, inches: 5
h5: 7' 0"
```



```
/*  Program: Height Class
Author: Ean Zheng
Class : CSCI 140
Date : 4 / 13 / 2025
Description :
    I certify that the code below is my own work.
    Exception(s) : N / A
  */
#include <iostream>
using namespace std;

#include "Height.h"

int main() {
    // Create 2 Height objects
    Height h1; // feet: 0, inches: 0
    Height h2(5); // feet: 5, inches: 0
    // Create some Height objects (same as original version)
    Height h3(5, 8); // feet: 5, inches: 8
    Height h4(-1, 5); // feet: 0, inches: 5 (invalid feet so set to 0)
    Height h5(6, 15); // feet: 6, inches: 0 (invalid inches so set to 0)
    // Print height h3
    Height array[] {h1, h2, h3, h4, h5};
    for (int i = 0; i < 5; ++i) {
        array[i].print();
        cout << endl;
    }
    cout << "h3: ";
    h3.print(); // h3: 5' 8"
    cout << endl;
    // Add more code below to print h4 and h5 like h3 above
    // Perform various operations
    h3.setFeet(-2); // feet: 5, inches: 8, feet stay the same
    h3.setInches(10); // feet: 5, inches: 10
    cout << "feet: " << h3.getFeet() << ", inches: " << h3.getInches() << endl; // 5 10
    h4.setFeet(6); // feet: 6, inches: 5
    h4.setInches(12); // feet: 6, inches: 5, inches stay the same
    cout << "feet: " << h4.getFeet() << ", inches: " << h4.getInches() << endl; // 6 5
    h5.setInches(10); // feet: 6, inches: 10
    h5.increment(); // feet: 6, inches: 11
    h5.increment(); // feet: 7, inches: 0
    cout << "h5: ";
    h5.print(); // h3: 7' 0"
    cout << endl;
    //Add more test cases if needed
}
```

```
0' 0"
5' 0"
5' 8"
0' 5"
6' 0"
h3: 5' 8"
feet: 5, inches: 10
feet: 6, inches: 5
h5: 7' 0"

C:\GitHubRepos\CSCI-140\Programs\VSHeightEC\HeightEC\x64\Debug\HeightEC.exe (process 17328) exited
ith code 0 (0x0).
Press any key to close this window . . .
```