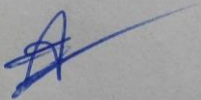


Hei Wang Andre Law

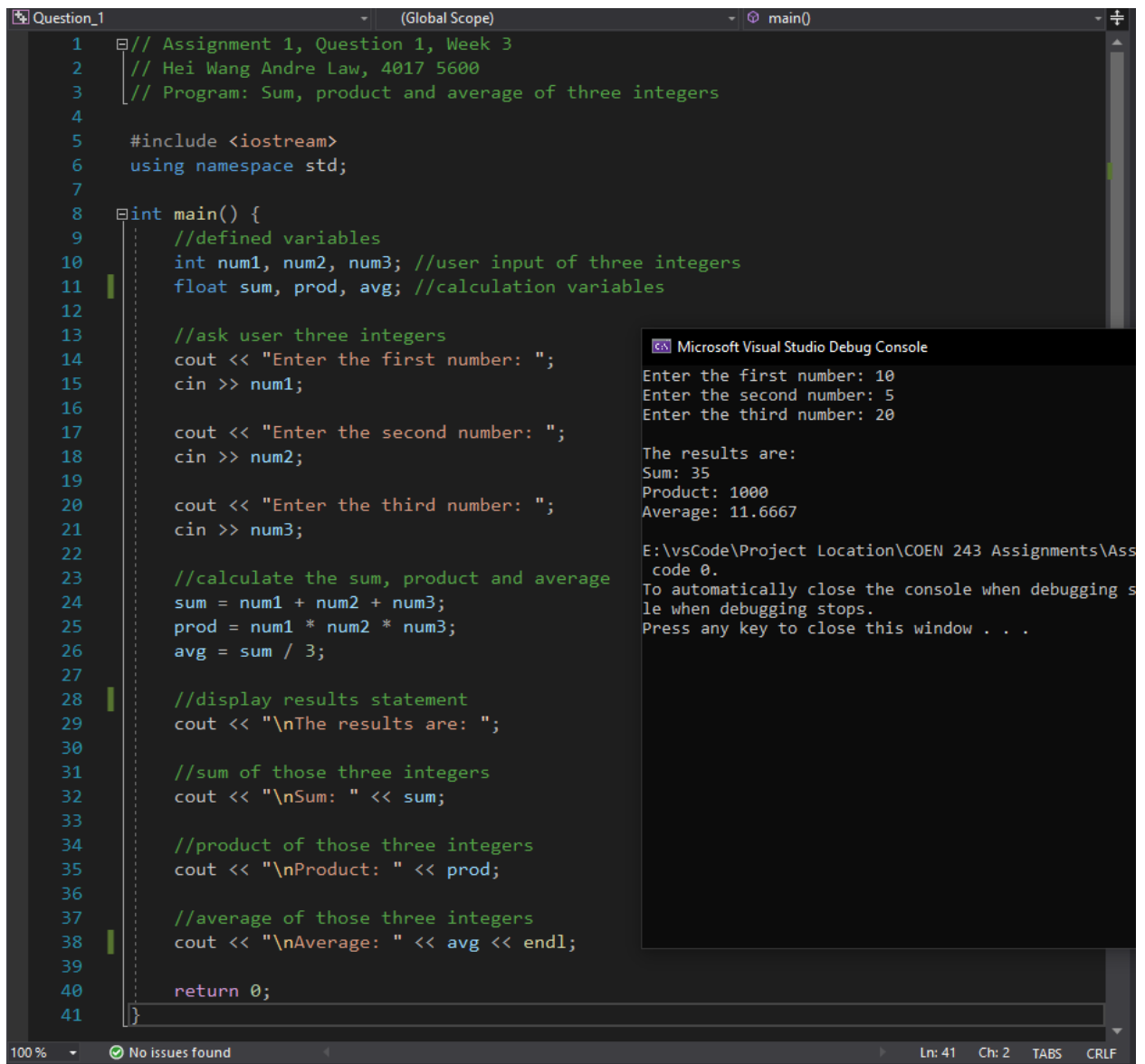
4017 5600

05/02/2021

I certify that this submission is my original work and  
meets the faculty's Expectations of Originality.

4017 5600 

## Question 1:



The image shows a C++ program in Visual Studio Code. The code calculates the sum, product, and average of three integers. The debug console shows the program's execution with user input and the resulting calculations.

```
1 // Assignment 1, Question 1, Week 3
2 // Hei Wang Andre Law, 4017 5600
3 // Program: Sum, product and average of three integers
4
5 #include <iostream>
6 using namespace std;
7
8 int main() {
9     //defined variables
10    int num1, num2, num3; //user input of three integers
11    float sum, prod, avg; //calculation variables
12
13    //ask user three integers
14    cout << "Enter the first number: ";
15    cin >> num1;
16
17    cout << "Enter the second number: ";
18    cin >> num2;
19
20    cout << "Enter the third number: ";
21    cin >> num3;
22
23    //calculate the sum, product and average
24    sum = num1 + num2 + num3;
25    prod = num1 * num2 * num3;
26    avg = sum / 3;
27
28    //display results statement
29    cout << "\nThe results are: ";
30
31    //sum of those three integers
32    cout << "\nSum: " << sum;
33
34    //product of those three integers
35    cout << "\nProduct: " << prod;
36
37    //average of those three integers
38    cout << "\nAverage: " << avg << endl;
39
40    return 0;
41 }
```

Microsoft Visual Studio Debug Console

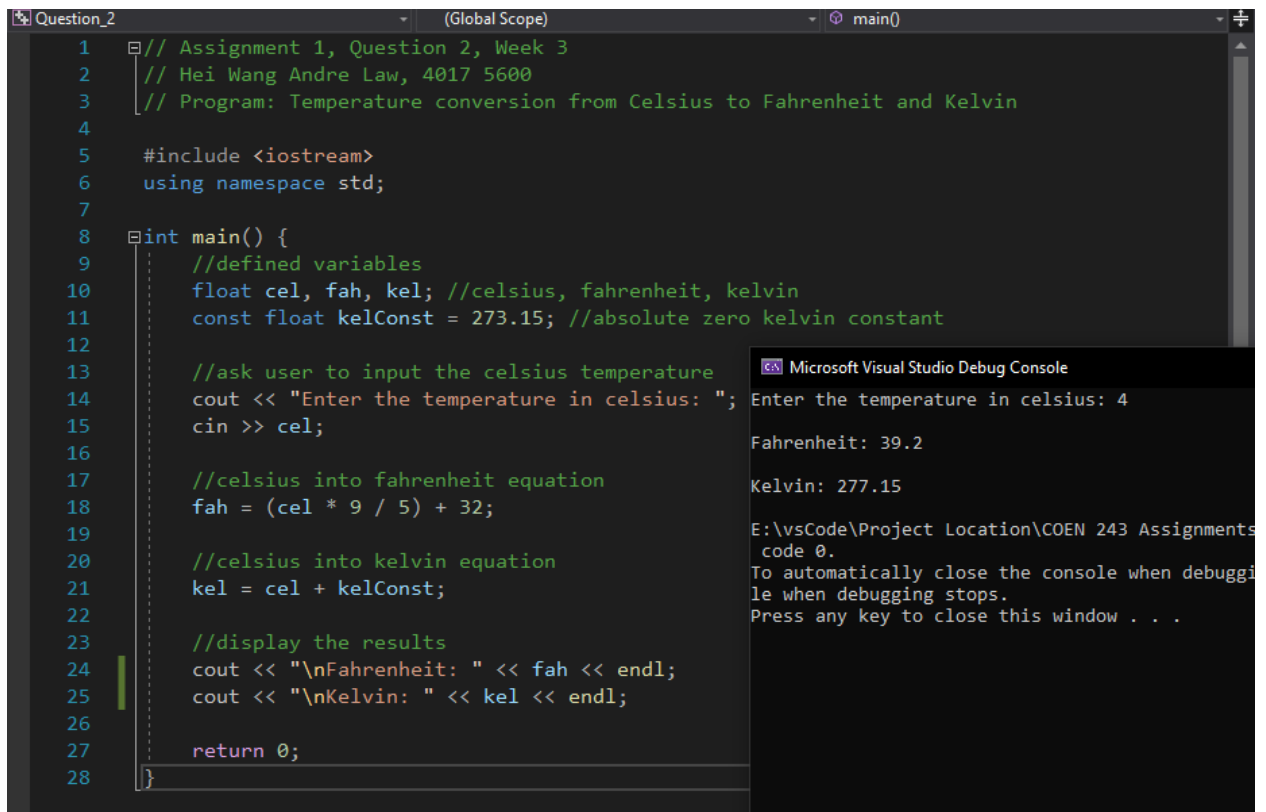
```
Enter the first number: 10
Enter the second number: 5
Enter the third number: 20

The results are:
Sum: 35
Product: 1000
Average: 11.6667

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code 0.
To automatically close the console when debugging s
le when debugging stops.
Press any key to close this window . . .
```

100 % No issues found Ln: 41 Ch: 2 TABS CRLF

## Question 2:



The image shows a Visual Studio Code editor window with a C++ file named 'Question\_2'. The code is a program for temperature conversion. It includes `<iostream>` and uses the `std` namespace. The `main` function defines three float variables: `cel`, `fah`, and `kel`. It prompts the user to enter a temperature in Celsius, which is stored in `cel`. Then, it calculates the Fahrenheit value using the formula  $F = (C \times \frac{9}{5}) + 32$  and stores it in `fah`. Next, it calculates the Kelvin value using the formula  $K = C + 273.15$  and stores it in `kel`. Finally, it prints the results for both Fahrenheit and Kelvin. The output window on the right shows the program's execution with the input '4' and the corresponding outputs 'Fahrenheit: 39.2' and 'Kelvin: 277.15'.

```
1 // Assignment 1, Question 2, Week 3
2 // Hei Wang Andre Law, 4017 5600
3 // Program: Temperature conversion from Celsius to Fahrenheit and Kelvin
4
5 #include <iostream>
6 using namespace std;
7
8 int main() {
9     //defined variables
10    float cel, fah, kel; //celsius, fahrenheit, kelvin
11    const float kelConst = 273.15; //absolute zero kelvin constant
12
13    //ask user to input the celsius temperature
14    cout << "Enter the temperature in celsius: ";
15    cin >> cel;
16
17    //celsius into fahrenheit equation
18    fah = (cel * 9 / 5) + 32;
19
20    //celsius into kelvin equation
21    kel = cel + kelConst;
22
23    //display the results
24    cout << "\nFahrenheit: " << fah << endl;
25    cout << "\nKelvin: " << kel << endl;
26
27    return 0;
28 }
```

Microsoft Visual Studio Debug Console

Enter the temperature in celsius: 4

Fahrenheit: 39.2

Kelvin: 277.15

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le when debugging stops.  
Press any key to close this window . . .

### Question 3:

```
1 // Assignment 1, Question 3, Week 3
2 // Hei Wang Andre Law, 4017 5600
3 // Program: Ascending order of three numbers
4
5 #include <iostream>
6 using namespace std;
7
8 int main() {
9     int num1, num2, num3; //user inputs variables
10
11     //ask user three integers
12     cout << "Enter the first number: ";
13     cin >> num1;
14     cout << "Enter the second number: ";
15     cin >> num2;
16     cout << "Enter the third number: ";
17     cin >> num3;
18
19     cout << "\nThe ascending order is: ";
20     if (num1 > num2 && num1 > num3) {
21         if (num2 > num3) {
22             cout << num3 << ", " << num2 << ", " << num1; //results where (num1>num2>num3)
23         }
24         else {
25             cout << num2 << ", " << num3 << ", " << num1; //results where (num1>num3>num2)
26         }
27     }
28     else if (num2 > num1 && num2 > num3) {
29         if (num1 > num3) {
30             cout << num3 << ", " << num1 << ", " << num2; //results where (num2>num1>num3)
31         }
32         else {
33             cout << num1 << ", " << num3 << ", " << num2; //results where (num2>num3>num1)
34         }
35     }
36     else if (num3 > num2 && num3 > num1) {
37         if (num2 > num1) {
38             cout << num1 << ", " << num2 << ", " << num3; //results where (num3>num2>num1)
39         }
40         else {
41             cout << num2 << ", " << num1 << ", " << num3; //results where (num3>num1>num2)
42         }
43     }
44     cout << endl;
45     return 0;
46 }
```

Microsoft Visual Studio Debug Console

Enter the first number: 45  
Enter the second number: 100  
Enter the third number: 30

The ascending order is: 30, 45, 100

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To automatically close the console when debugging stops.  
Press any key to close this window . . .

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Question 4:

```
Question_4
1  // Assignment 1, Question 4, Week3
2  // Hei Wang Andre Law, 4017 5600
3  // Program: Final grade of a student in letter form
4
5  #include <iostream>
6  using namespace std;
7
8  int main() {
9      //defined variable
10     int grade;
11
12     //ask student to input the final grade
13     cout << "Enter your final grade: ";
14     cin >> grade;
15
16     //Display results followup
17     cout << "\nYour final grade: ";
18
19     //check the range where grade belongs
20     if (90 <= grade) {
21         cout << "A+"; }
22     else if (85 <= grade) {
23         cout << "A"; }
24     else if (80 <= grade) {
25         cout << "A-"; }
26     else if (75 <= grade) {
27         cout << "B+"; }
28     else if (70 <= grade) {
29         cout << "B"; }
30     else if (65 <= grade) {
31         cout << "C+"; }
32     else if (60 <= grade) {
33         cout << "C"; }
34     else if (55 <= grade) {
35         cout << "C-"; }
36     else if (50 <= grade) {
37         cout << "D+"; }
38     else if (45 <= grade) {
39         cout << "D"; }
40     else if (40 <= grade) {
41         cout << "D-"; }
42     else if (40 > grade) {
43         cout << "F"; }
44     cout << endl;
45     return 0;
46 }
```

Microsoft Visual Studio Debug Console

Enter your final grade: 72

Your final grade: B

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code 0.

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le when debugging stops.

Press any key to close this window . . .

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## Question 5: (132 000\$)

```
Question_5 (Global Scope)
1 // Assignment 1, Question 5, Week 3
2 // Hei Wang Andre Law, 4017 5600
3 // Program: Canada's income tax calculator
4
5 #include <iostream>
6 using namespace std;
7
8 int main() {
9     //defined variable
10    double income, tax, net; //shown values
11    double bracket1, bracket2, bracket3, bracket4; //calculations variables for each tax bracket
12
13    //ask user the income
14    cout << "Enter your income: ";
15    cin >> income;
16
17    //logic -> calculate the tax of each bracket in advance
18    bracket1 = 0.15 * 48535; //income below 48535$
19    bracket2 = 0.205 * 48534; //income between 48535$ - 97069$
20    bracket3 = 0.26 * 53404; //income between 97069$ - 150473$
21    bracket4 = 0.29 * 63895; //income between 150473$ - 214368$
22
23    //filter income to know which bracket it belongs to
24    if (income > 214368) {
25        tax = bracket1 + bracket2 + bracket3 + bracket4 + 0.33 * (income - 214368);
26    }
27    else if (income > 150473) {
28        tax = bracket1 + bracket2 + bracket3 + 0.29 * (income - 150473);
29    }
30    else if (income > 97069) {
31        tax = bracket1 + bracket2 + 0.26 * (income - 97069);
32    }
33    else if (income > 48535) {
34        tax = bracket1 + 0.205 * (income - 48535);
35    }
36    else if (income <= 48535) {
37        tax = 0.15 * income;
38    }
39    net = income - tax;
40    cout << "\nTax income: " << tax << "$";
41    cout << "\nNet income: " << net << "$\n";
42    return 0;
43 }
```

Microsoft Visual Studio Debug Console

Enter your income: 132000

Tax income: 26311.8\$  
Net income: 105688\$

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code 0.  
To automatically close the console when  
le when debugging stops.  
Press any key to close this window . .

### Question 5: (255 000\$)

```
1 // Assignment 1, Question 5, Week 3
2 // Hei Wang Andre Law, 4017 5600
3 // Program: Canada's income tax calculator
4
5 #include <iostream>
6 using namespace std;
7
8 int main() {
9     //defined variable
10    double income, tax, net; //shown values
11    double bracket1, bracket2, bracket3, bracket4; //calculations variables for each tax bracket
12
13    //ask user the income
14    cout << "Enter your income: ";
15    cin >> income;
16
17    //logic -> calculate the tax of each bracket in advance
18    bracket1 = 0.15 * 48535; //income below 48535$
19    bracket2 = 0.205 * 48534; //income between 48535$ - 97069$
20    bracket3 = 0.26 * 53404; //income between 97069$ - 150473$
21    bracket4 = 0.29 * 63895; //income between 150473$ - 214368$
22
23    //filter income to know which bracket it belongs to
24    if (income > 214368) {
25        tax = bracket1 + bracket2 + bracket3 + bracket4 + 0.33 * (income - 214368);
26    }
27    else if (income > 150473) {
28        tax = bracket1 + bracket2 + bracket3 + 0.29 * (income - 150473);
29    }
30    else if (income > 97069) {
31        tax = bracket1 + bracket2 + 0.26 * (income - 97069);
32    }
33    else if (income > 48535) {
34        tax = bracket1 + 0.205 * (income - 48535);
35    }
36    else if (income <= 48535) {
37        tax = 0.15 * income;
38    }
39    net = income - tax;
40    cout << "\nTax income: " << tax << "$";
41    cout << "\nNet income: " << net << "$\n";
42    return 0;
43 }
```

Microsoft Visual Studio Debug Console

Enter your income: 255000

Tax income: 63052.9\$  
Net income: 191947\$

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code 0.  
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le when debugging stops.  
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