Department of Information Technology
Faculty of Engineering and Technology
University of Sindh

Class: BSIT Part 1 (Morning)
Semester: First Semester
Course: Programming Fundamentals
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WEEK 1

Now perform the following changes. Is the program running as before? Write Yes or No and explain why. Finally correct the program again after performing every error than perform the next change.

1. Delete the line using namespace std from the program.

Error1:- use of undeclared identifier 'cout';
Error2:- use of undeclared identifier 'endl';

2. Write void main() instead of int main()

Error :- 'main' must return 'int'

3. Write #include<abc> instead of #include<iostream>

Fatal Error :- 'abc' file not found

4. Remove any one semi colon ';'.

Error :- Expected ';' after return statement

5. Remove any one of brace '{' or '}'.

Error 1 :- expected function body after function declarator
Error 2 :- extraneous closing brace ('}')

6. Write int main() ; instead of int main()

Error :- expected unqualified-id {

7. Write **cout >>** instead of **cout <<**

Error :- Invalid operands to binary expression

8. Remove the line **return 0;**

NO ERROR

9. Write **Main()** instead of **main()**

Error :- undefined symbol

10. Write **COUT<<** instead of **cout<<**

Error :- Use of undeclared identifier

11. Remove inverted commas " " in line 7;

Error 1 :- expected ';' after expression

Error 2 :- use of undeclared identifier

12. Remove # from **#include<iostream>**

Error 1 :- use of undeclared identifier

Error 2 :- expected unqualified-id

[NOTE:- Week 1 is performed in Mobile Phone]

WEEK 2

Solution of Exercise 1;

```
#include <iostream>

using namespace std;

main(){

        int radius;

        float volume,pi;

        pi=3.14159;

        cout<<"Enter the radius of the sphere: ";

        cin>>radius;

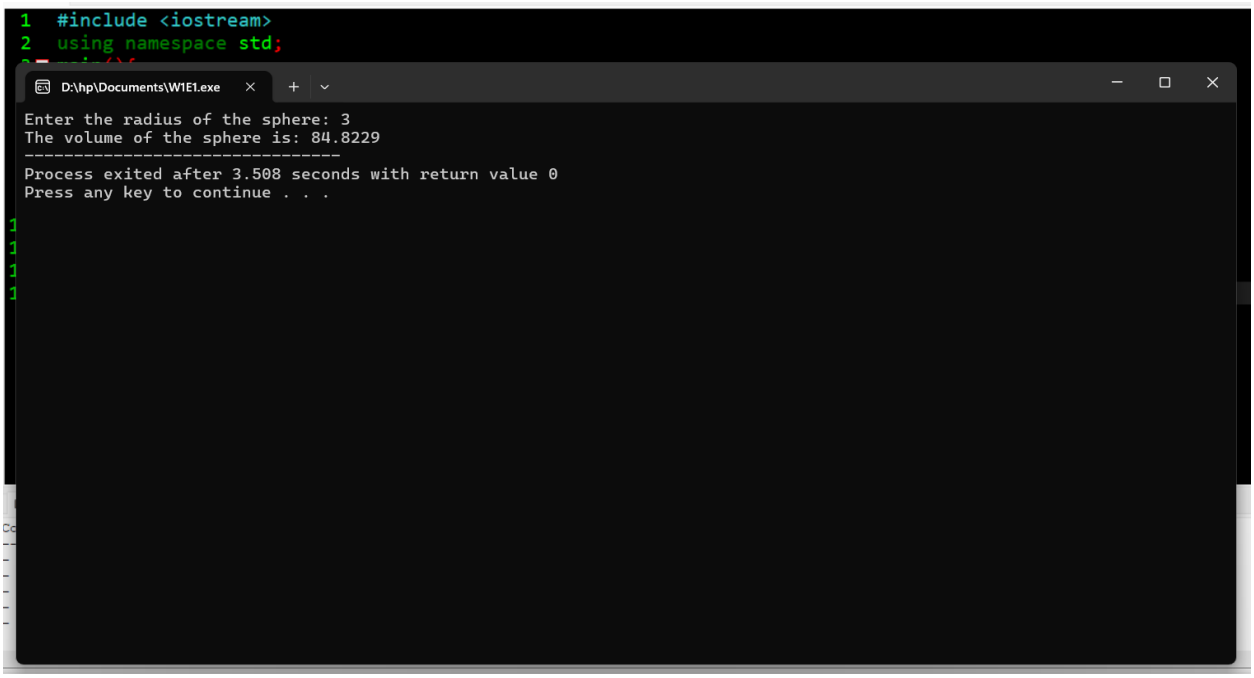
        volume=(4/3)*pi*radius*radius*radius;

        cout<<"The volume of the sphere is: "<<volume;

        return 0;

}
```

OUTPUT:



Solution of Exercise 2:

```
#include <iostream>

using namespace std;

int main(){

	int kelvin;

	float fahrenheit;

	cout<<"Enter temperature in kelvin: ";

	cin>>kelvin;

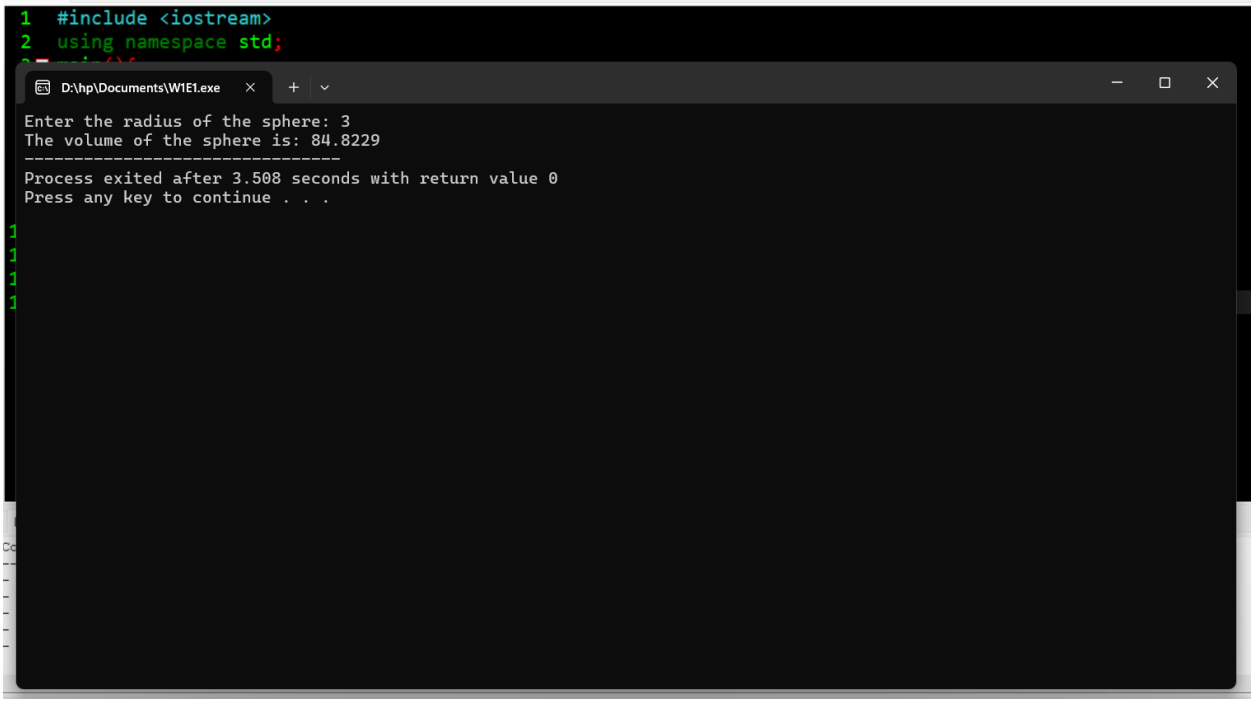
	fahrenheit=(kelvin-273.15)*9/5+32;

	cout<<"Temperature of (kelvin) "<<kelvin<<", in fahrenheit is: "<<fahrenheit;

	return 0;

}
```

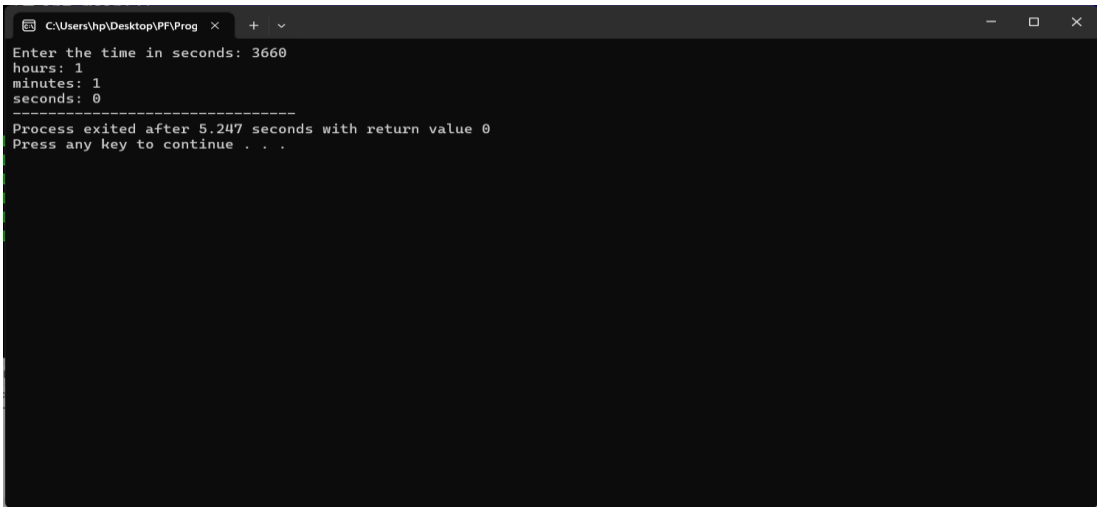
Output:



Solution of Exercise 3:

```
#include <iostream>
using namespace std;
int main(){
	int timeInSeconds,hours,minutes,remainingSeconds;
	cout<<"Enter the time in seconds: ";
	cin>>timeInSeconds;
	hours=timeInSeconds/3600;
	remainingSeconds=timeInSeconds-(hours*3600);
	minutes=remainingSeconds/60;
	remainingSeconds%=60;
	cout<<"hours: "<<hours<<endl
	<<"minutes: "<<minutes<<endl
	<<"seconds: "<<remainingSeconds;
	return 0;
}
```

Output:



WEEK 3:

Solution of Exercise 1:

```
#include <iostream>

using namespace std;

int main() {

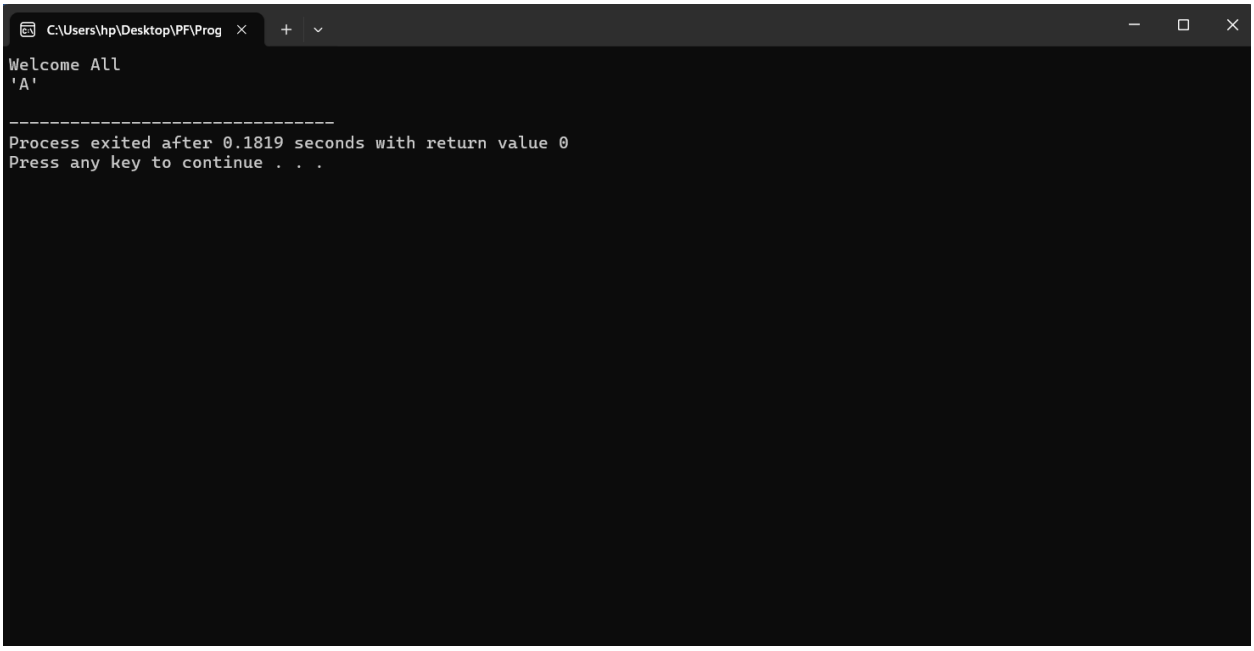
   cout << "Welcome\tAll\n";

   cout << "'A'\n";

   return 0;

}
```

Output:



Solution of Exercise 2:

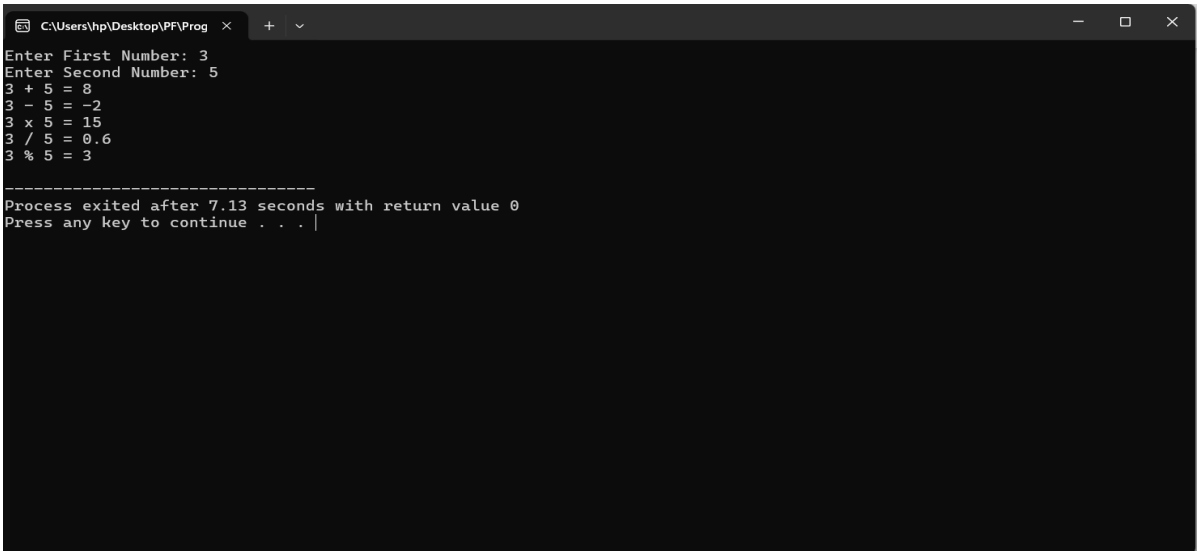
```
#include <iostream>
using namespace std;
int main() {
   int num1, num2;

   // Input two integer values from the user
   cout << "Enter First Number: ";
   cin >> num1;
   cout << "Enter Second Number: ";
   cin >> num2;

   // Perform arithmetic operations
   cout << num1 << " + " << num2 << " = " << num1 + num2 << std::endl;
   cout << num1 << " - " << num2 << " = " << num1 - num2 << std::endl;
   cout << num1 << " x " << num2 << " = " << num1 * num2 << std::endl;
   cout << num1 << " / " << num2 << " = " << static_cast<float>(num1) / num2 << std::endl;
   cout << num1 << " % " << num2 << " = " << num1 % num2 << std::endl;

   return 0;
}
```

Output:



Solution of Exercise 3:

```
#include <iostream>

using namespace std;

int main() {

   int num1, num2, num3;

   int sum;

   float average;

   cout << "Enter three numbers: ";

   cin >> num1 >> num2 >> num3;

   sum = num1 + num2 + num3;

   average = sum / 3.0;

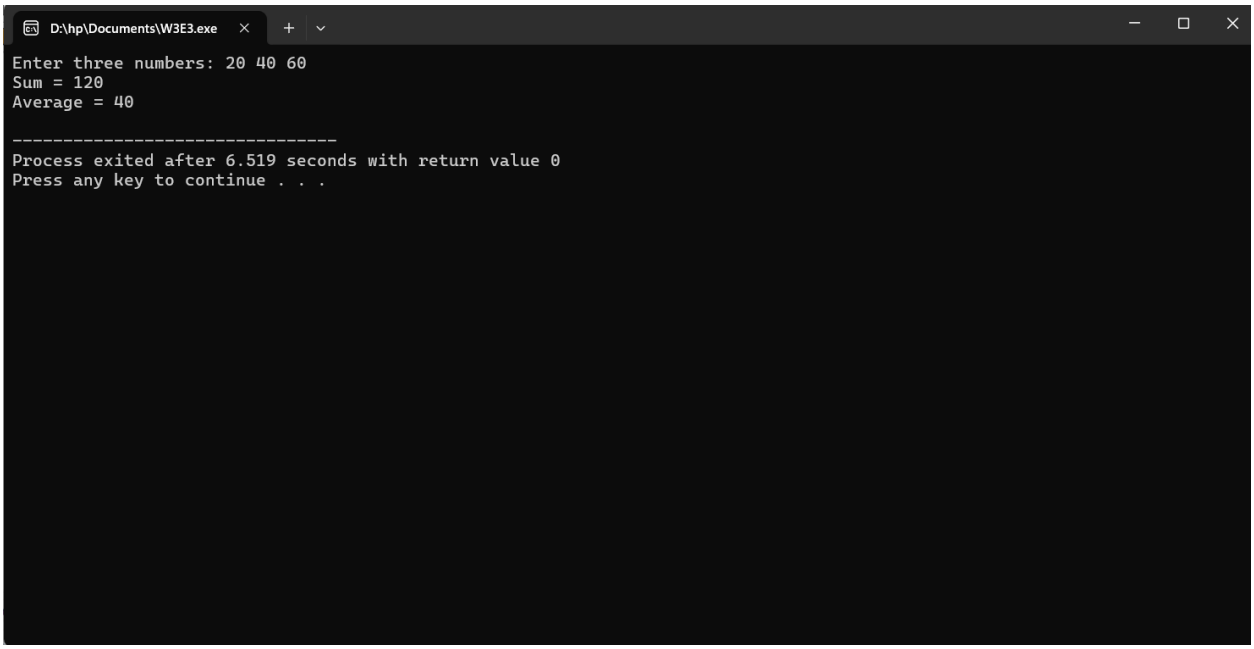
   cout << "Sum = " << sum << std::endl;

   cout << "Average = " << average << std::endl;

          return 0;

}
```

Output;



Solution of Exercise 4:

```
#include <iostream>

#include <cmath>

using namespace std;

int main() {

   double initialSpeed, acceleration, time, distance;

   cout << "Enter the initial speed of the car (m/s): ";

   cin >> initialSpeed;

   cout << "Enter the acceleration of the car (m/s\xFD): ";

   cin >> acceleration;

   cout << "Enter the time traveled (s): ";

   cin >> time;

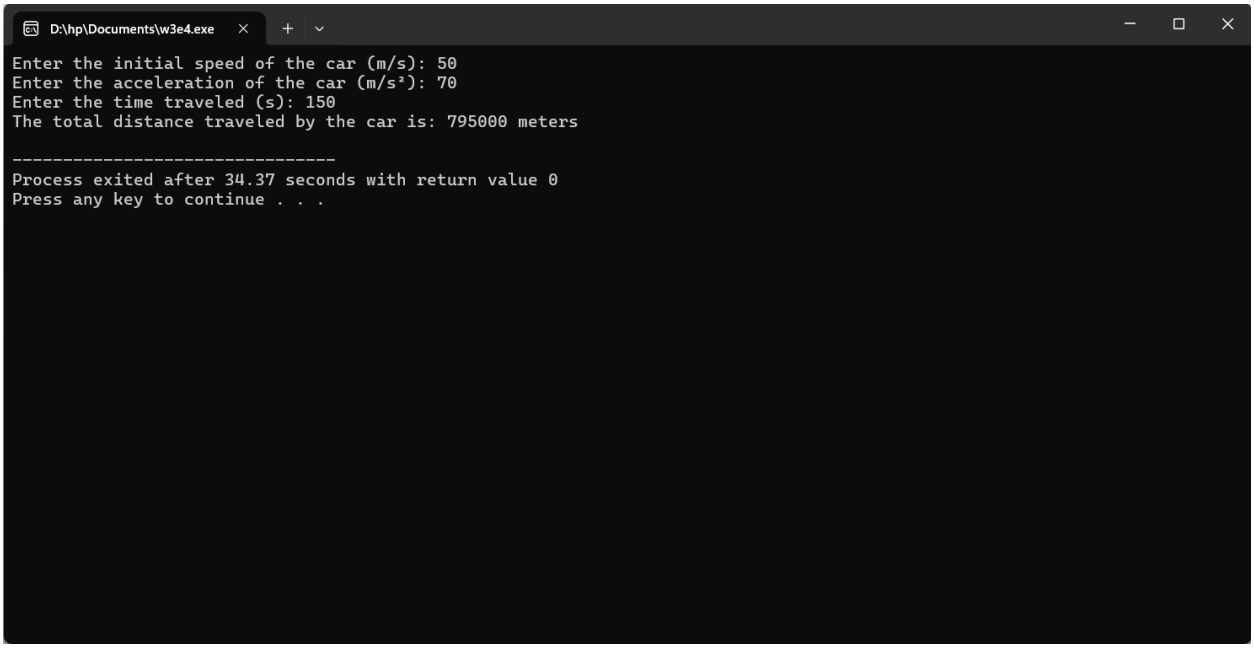
   distance = initialSpeed * time + 0.5 * acceleration * pow(time, 2);

   cout << "The total distance traveled by the car is: " << distance << " meters" << std::endl;

          return 0;
```

}

Output:



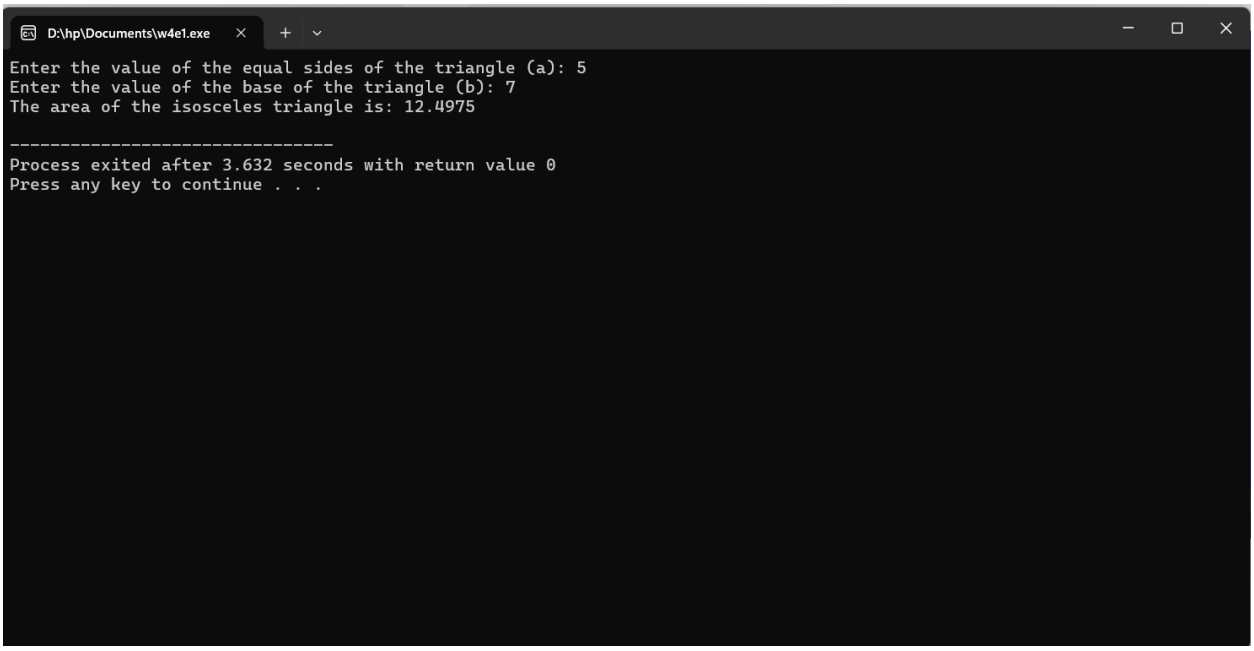
WEEK 4:

Solution of Exercise 1:

```
#include <iostream>
#include <cmath>
using namespace std;
int main() {
   float a, b;
   double area;
   cout << "Enter the value of the equal sides of the triangle (a): ";
   cin >> a;
   if (a <= 0) {
      cout << "Value of 'a' should be a positive number and not zero." << std::endl;
```

```
    return 1;
  }
  cout << "Enter the value of the base of the triangle (b): ";
  cin >> b;
  if (b <= 0) {
    cout << "Value of 'b' should be a positive number and not zero." << std::endl;
    return 1;
  }
  area = 0.25 * b * sqrt(4 * pow(a, 2) - pow(b, 2));
  cout << "The area of the isosceles triangle is: " << area << std::endl;
        return 0;
}
```

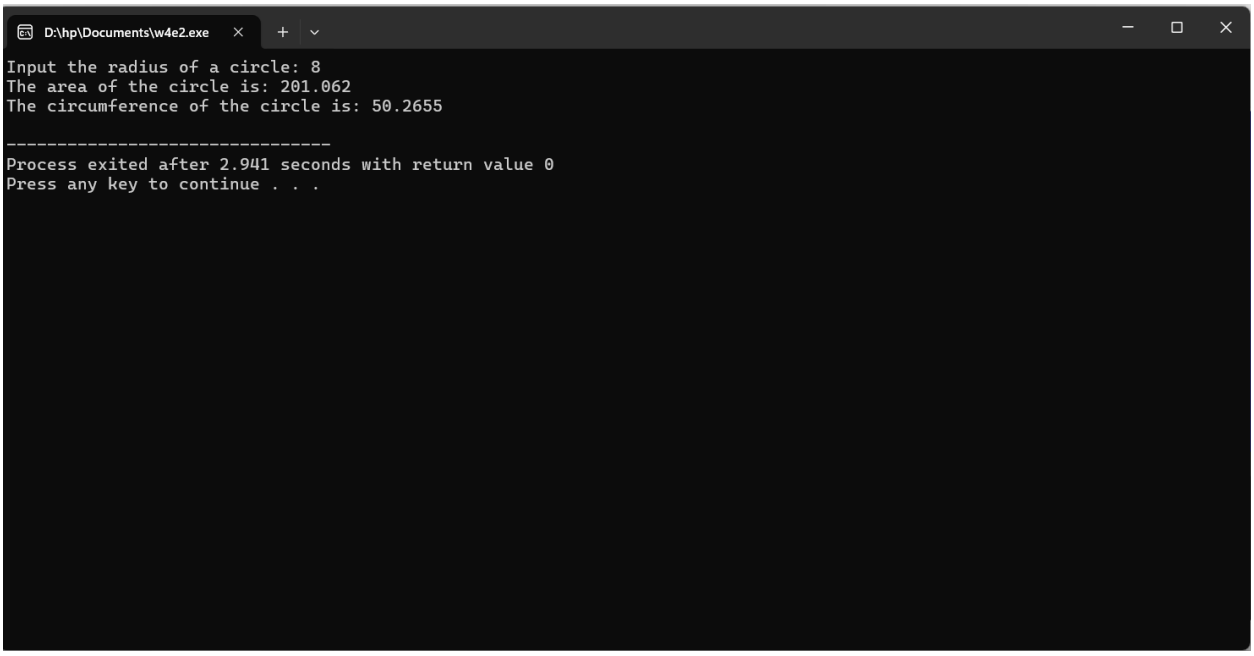
Output:



Solution of Exercise 2:

```
#include <iostream>
#include <cmath>
using namespace std;
int main() {
   double radius, area, circumference;
   const double PI = std::acos(-1);
   cout << "Input the radius of a circle: ";
   cin >> radius;
   area = PI * pow(radius, 2);
   circumference = 2 * PI * radius;
   cout << "The area of the circle is: " << area << std::endl;
   cout << "The circumference of the circle is: " << circumference << std::endl;
        return 0;
}
```

Output:



WEEK 5:

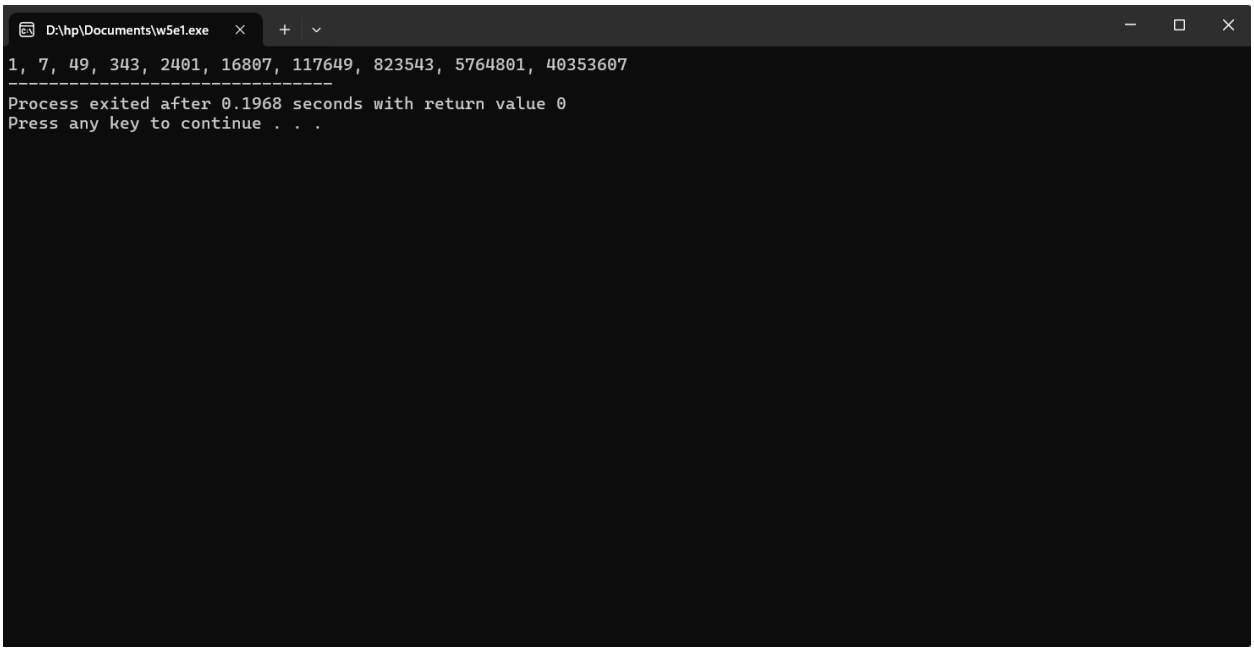
Solution of Exercise 1:

```
#include <iostream>

using namespace std;

int main() {
   int value = 1;
   for (int i = 0; i < 10; ++i) {
      cout << value;
      if (i < 9) {
         cout << ", ";
      }
      value *= 7;
   }
   return 0;
}
```

Output;



Solution of Exercise 2:

```
#include <iostream>

using namespace std;

int main() {

   int number, sum = 0;

   cout << "Enter a number: ";

   cin >> number;

   int originalNumber = number;

   while (number != 0) {

      int digit = number % 10;

      sum += digit;

      number /= 10;

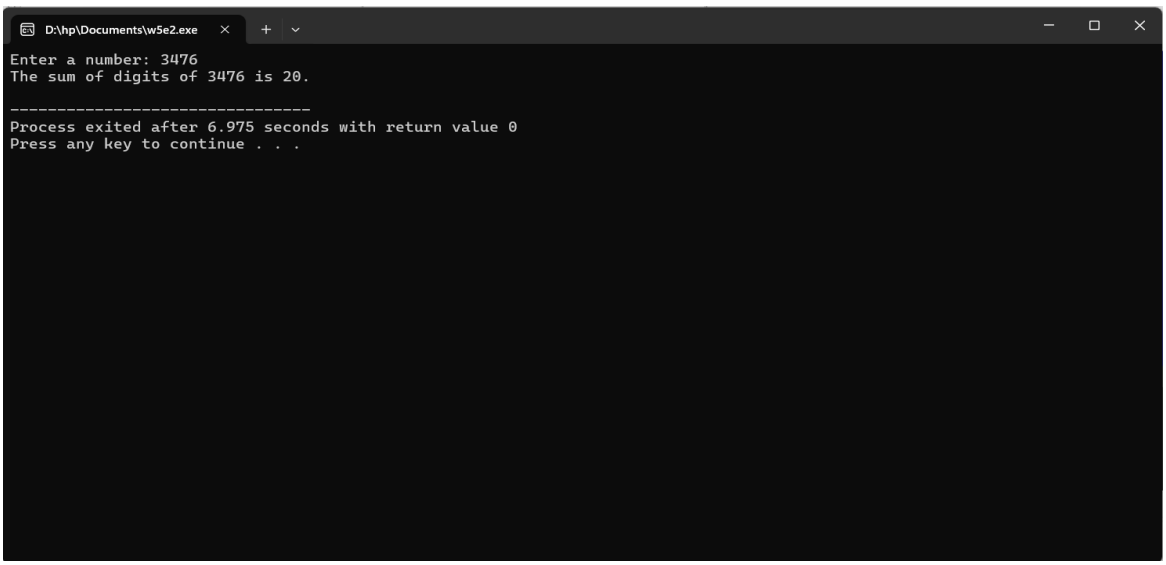
   }

   cout << "The sum of digits of " << originalNumber << " is " << sum << "." <<endl;

            return 0;

}
```

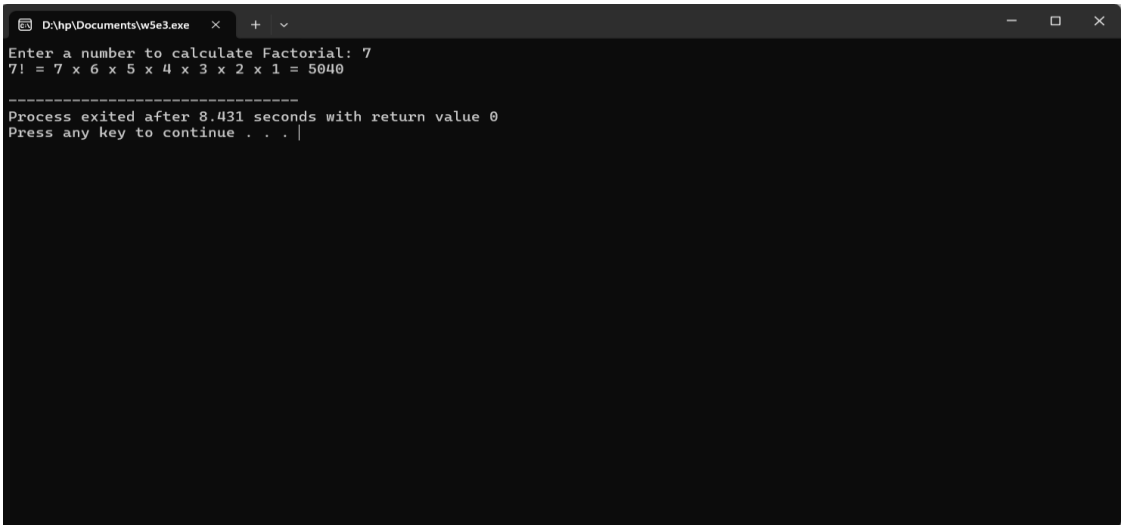
Output:



Solution of Exercise 3:

```
#include <iostream>
using namespace std;
int main() {
   int number;
   long long factorial = 1;
   cout << "Enter a number to calculate Factorial: ";
   cin >> number;
   for (int i = number; i >= 1; --i) {
      factorial *= i;
   }
   cout << number << "! = ";
   for (int i = number; i >= 1; --i) {
      cout << i;
      if (i > 1) {
         cout << " x ";
      }
   }
   cout << " = " << factorial << std::endl;
            return 0;
}
```

Output:



Solution of Exercise 4:

```
#include <iostream>

using namespace std;

int main() {

   int tableNumber, startingValue, endingValue;

   cout << "Enter Table Number: ";

   cin >> tableNumber;

         cout << "Enter Starting Value: ";

   cin >> startingValue;

         cout << "Enter Ending Value: ";

   cin >> endingValue;

   for (int i = startingValue; i <= endingValue; ++i) {

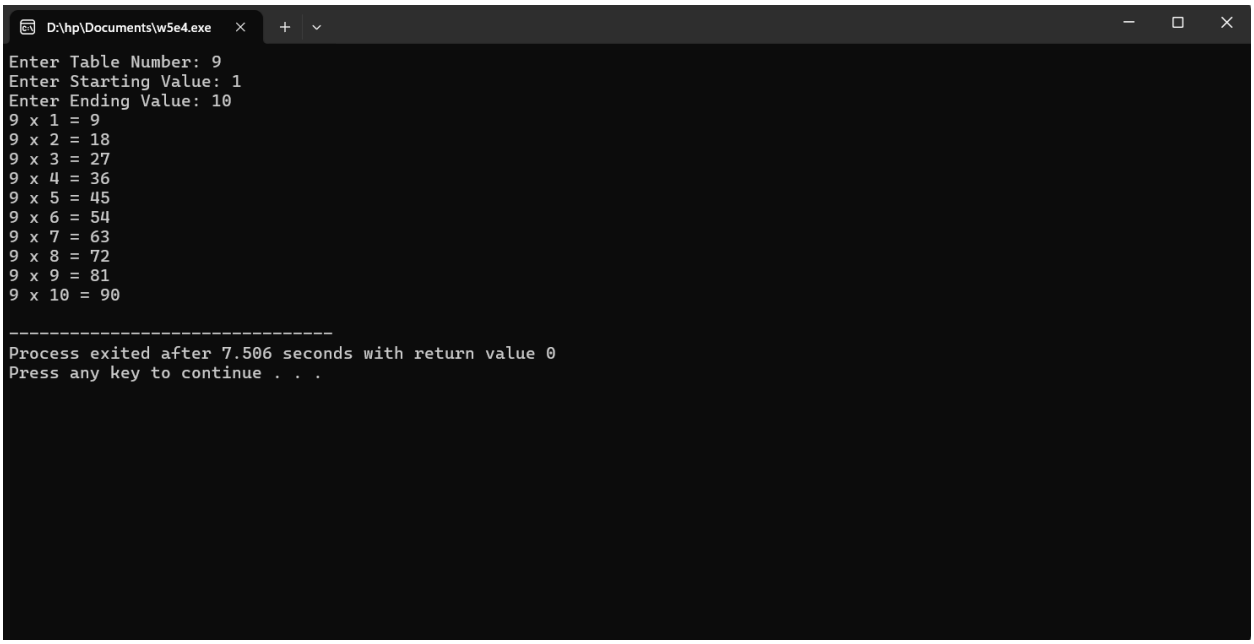
      cout << tableNumber << " x " << i << " = " << (tableNumber * i) <<endl;

   }

         return 0;

}
```

Output:



WEEK 6:

Solution of Exercise 1:

```
#include <iostream>

using namespace std;

int main() {

  int dayNumber;

  cout << "Input day number (1-7): ";

  cin >> dayNumber;

  switch (dayNumber) {

    case 1:

      cout << "The day is Sunday" << endl;

      break;

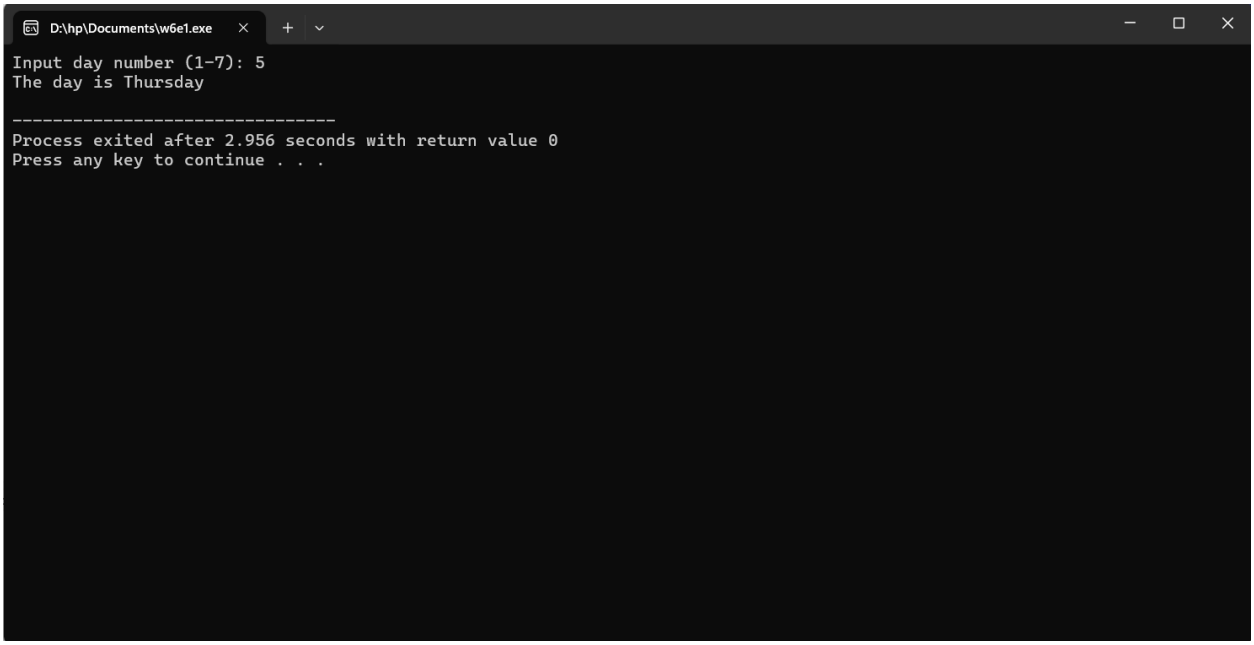
    case 2:

      cout << "The day is Monday" << endl;

      break;
```

```
        case 3:
            cout << "The day is Tuesday" << endl;
            break;
        case 4:
            cout << "The day is Wednesday" << endl;
            break;
        case 5:
            cout << "The day is Thursday" << endl;
            break;
        case 6:
            cout << "The day is Friday" << endl;
            break;
        case 7:
            cout << "The day is Saturday" << endl;
            break;
        default:
            cout << "Invalid input! Please enter a number between 1 and 7." << endl;
            break;
    }
    return 0;
}
```

Output:



Solution of Exercise 2:

```
#include <iostream>

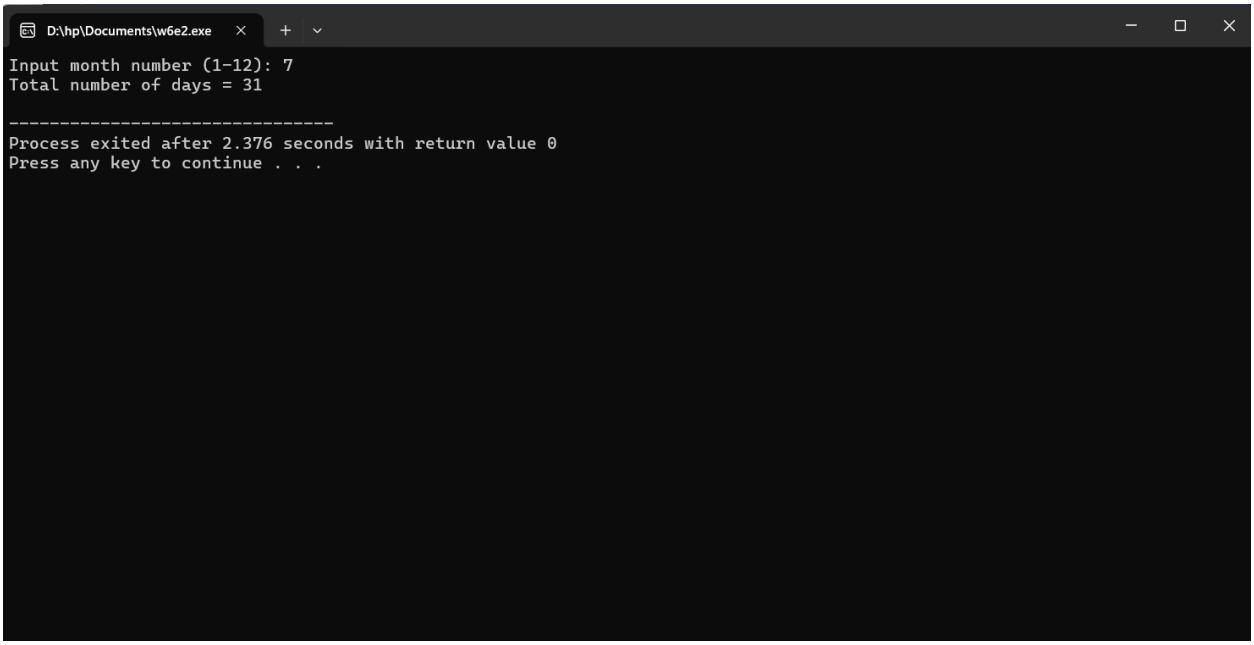
using namespace std;

int main() {
   int monthNumber;
   cout << "Input month number (1-12): ";
   cin >> monthNumber;
   switch (monthNumber) {
      case 1:
         cout << "Total number of days = 31" << endl;
         break;
      case 2:
         cout << "Total number of days = 28 (or 29 in a leap year)" << endl;
         break;
      case 3:
         cout << "Total number of days = 31" << endl;
```

```
    break;
case 4:
    cout << "Total number of days = 30" << endl;
    break;
case 5:
    cout << "Total number of days = 31" << endl;
    break;
case 6:
    cout << "Total number of days = 30" << endl;
    break;
case 7:
    cout << "Total number of days = 31" << endl;
    break;
case 8:
    cout << "Total number of days = 31" << endl;
    break;
case 9:
    cout << "Total number of days = 30" << endl;
    break;
case 10:
    cout << "Total number of days = 31" << endl;
    break;
case 11:
    cout << "Total number of days = 30" << endl;
    break;
case 12:
```

```
        cout << "Total number of days = 31" << endl;
        break;
    default:
        cout << "Invalid input! Please enter a number between 1 and 12." << endl;
        break;
  }
  return 0;
}
```

Output:



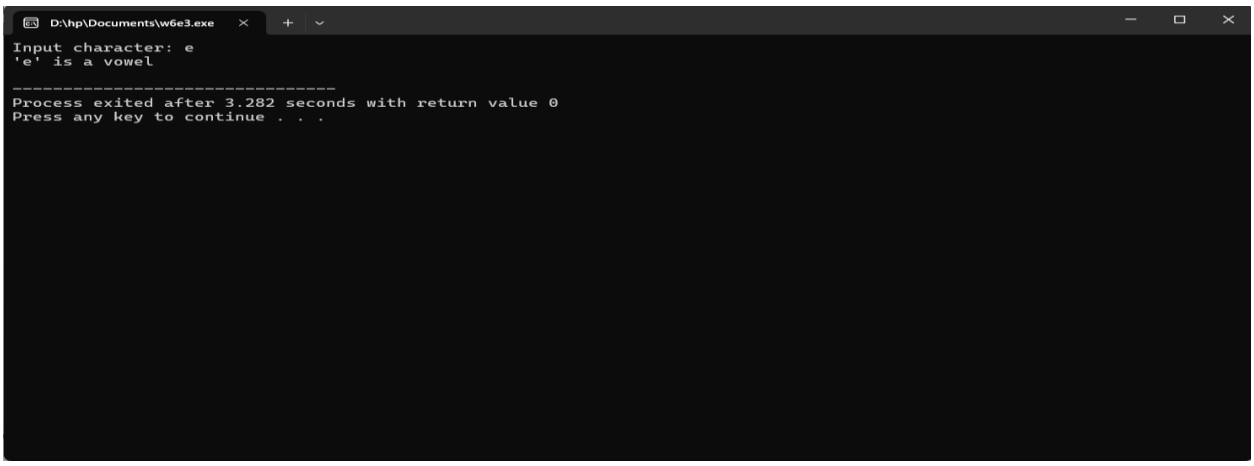
Solution of Exercise 3:

Using Switch statement:

```
#include <iostream>
using namespace std;
int main() {
  char ch;
  cout << "Input character: ";
```

```
    cin >> ch;
    ch = tolower(ch);
    switch (ch) {
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
            cout << "'" << ch << "' is a vowel" << endl;
            break;
        default:
            cout << "'" << ch << "' is a consonant" << endl;
            break;
    }
    return 0;
}
```

Output:



Using IF Else

```
#include <iostream>

using namespace std;

int main() {
   char ch;
   cout << "Input character: ";
   cin >> ch;
   ch = tolower(ch);
   if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
      cout << "'" << ch << "' is a vowel" << endl;
   } else {
      cout << "'" << ch << "' is a consonant" << endl;
   }
   return 0;
}
```

Output:



Solution of Exercise 4:

```
#include <iostream>

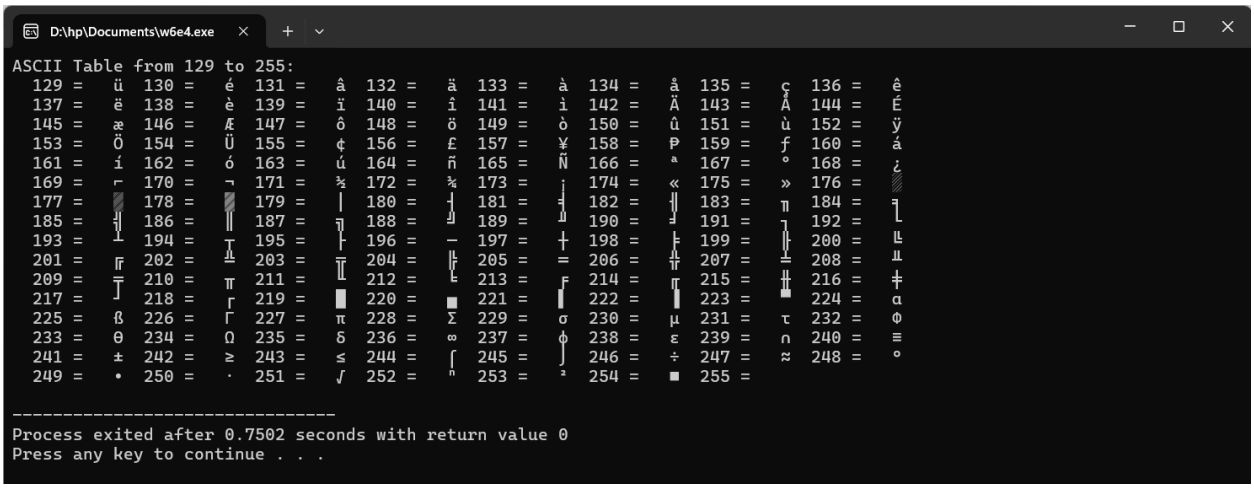
#include <iomanip>

using namespace std;

int main() {
```

```
    const int start = 129;
    const int end = 255;
    const int itemsPerLine = 8;
    cout << "ASCII Table from 129 to 255:" << endl;
    for (int i = start; i <= end; i++) {
        cout << setw(5) << i << " = " << setw(3) << char(i);
        if ((i - start + 1) % itemsPerLine == 0) {
            cout << endl;
        }
    }
    if ((end - start + 1) % itemsPerLine != 0) {
        cout << endl;
    }
    return 0;
}
```

Output:

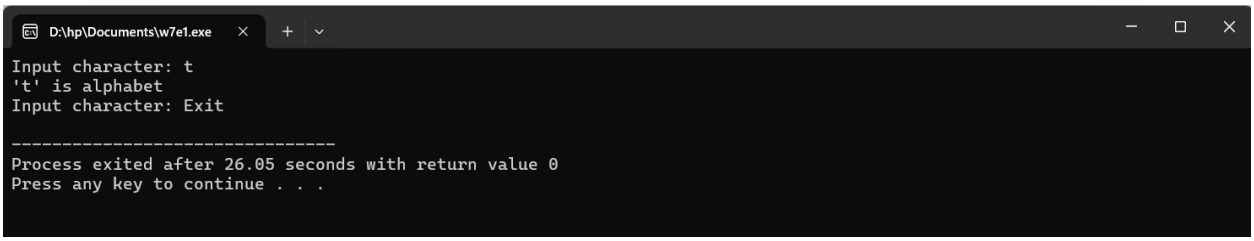


Week 7:

Solution of Exercise 1:

```
#include <iostream>
using namespace std;
int main() {
   char ch;
   while (true) {
      cout << "Input character: ";
      ch = cin.get();
      if (ch == '\n') {
         cout << "Exit" << endl;
         break;
      }
      if ((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z')) {
         cout << "'" << ch << "' is alphabet" << endl;
      } else if (ch >= '0' && ch <= '9') {
         cout << "'" << ch << "' is a number" << endl;
      } else {
         cout << "'" << ch << "' is a special character" << endl;
      }
   }
   return 0;
}
```

Output:



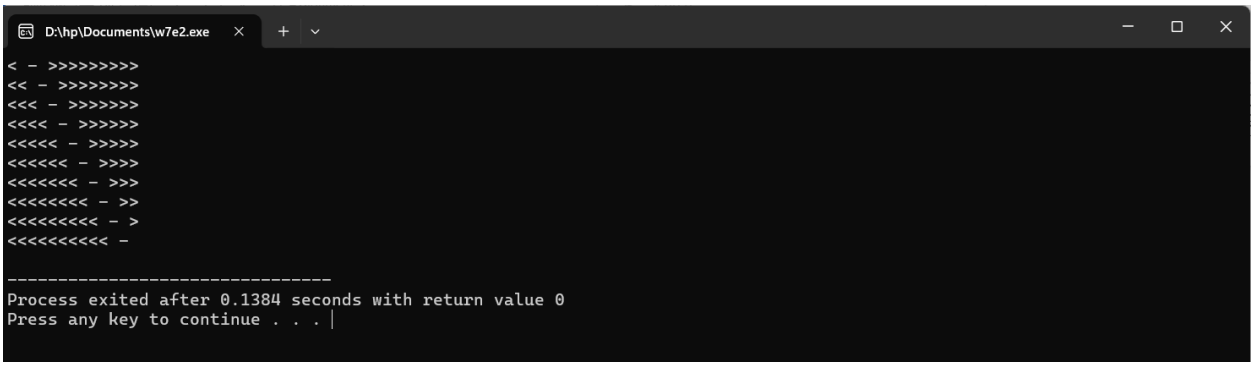
Solution of Exercise 2:

```
#include <iostream>

using namespace std;

int main() {
   const int rows = 10;
   for (int i = 1; i <= rows; i++) {
      for (int j = 1; j <= i; j++) {
         cout << '<';
      }
      cout << " - ";
      for (int j = i; j < rows; j++) {
         cout << '>';
      }
      cout << endl;
   }
   return 0;
}
```

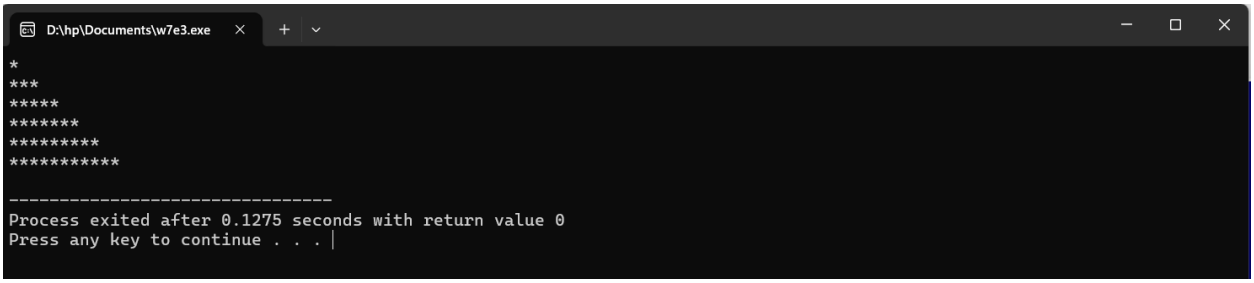
Output:



Solution of Exercise 3:

```
#include <iostream>
using namespace std;
int main() {
   const int rows = 6;
   for (int i = 1; i <= rows; i++) {
      for (int j = 1; j <= (2 * i - 1); j++) {
         cout << '*';
      }
      cout << endl;
   }
   return 0;
}
```

Output:



Solution of Exercise 4:

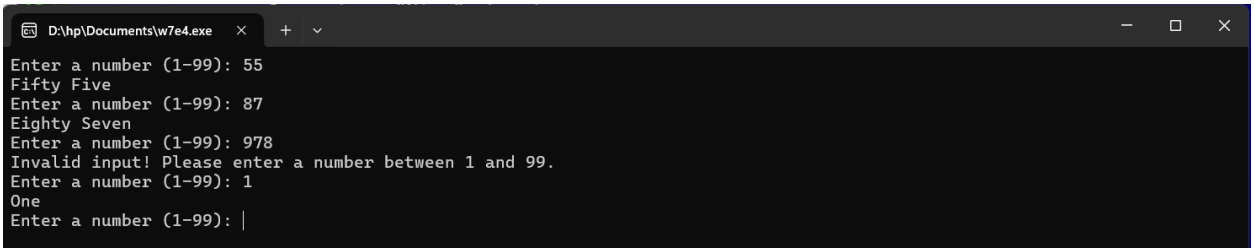
```
#include <iostream>
using namespace std;
void printNumberInWords(int number) {
   if (number < 1 || number > 99) {
      cout << "Invalid input! Please enter a number between 1 and 99." << endl;
      return;
   }
```

```
switch (number / 10) {
   case 1:
      switch (number) {
         case 10: cout << "Ten"; break;
         case 11: cout << "Eleven"; break;
         case 12: cout << "Twelve"; break;
         case 13: cout << "Thirteen"; break;
         case 14: cout << "Fourteen"; break;
         case 15: cout << "Fifteen"; break;
         case 16: cout << "Sixteen"; break;
         case 17: cout << "Seventeen"; break;
         case 18: cout << "Eighteen"; break;
         case 19: cout << "Nineteen"; break;
      }
      break;
   case 2: cout << "Twenty"; break;
   case 3: cout << "Thirty"; break;
   case 4: cout << "Forty"; break;
   case 5: cout << "Fifty"; break;
   case 6: cout << "Sixty"; break;
   case 7: cout << "Seventy"; break;
   case 8: cout << "Eighty"; break;
   case 9: cout << "Ninety"; break;
}
if (number / 10 != 1 && number % 10 != 0) {
   if (number / 10 != 0) cout << " ";
```

```
        switch (number % 10) {
            case 1: cout << "One"; break;
            case 2: cout << "Two"; break;
            case 3: cout << "Three"; break;
            case 4: cout << "Four"; break;
            case 5: cout << "Five"; break;
            case 6: cout << "Six"; break;
            case 7: cout << "Seven"; break;
            case 8: cout << "Eight"; break;
            case 9: cout << "Nine"; break;
        }
    }
    cout << endl;
}
int main() {
    int number;
    while (true) {
        cout << "Enter a number (1-99): ";
        cin >> number;
        if (number == 0) {
            cout << "Exit" << endl;
            break;
        }
        printNumberInWords(number);
    }
    return 0;
```

}

Output:

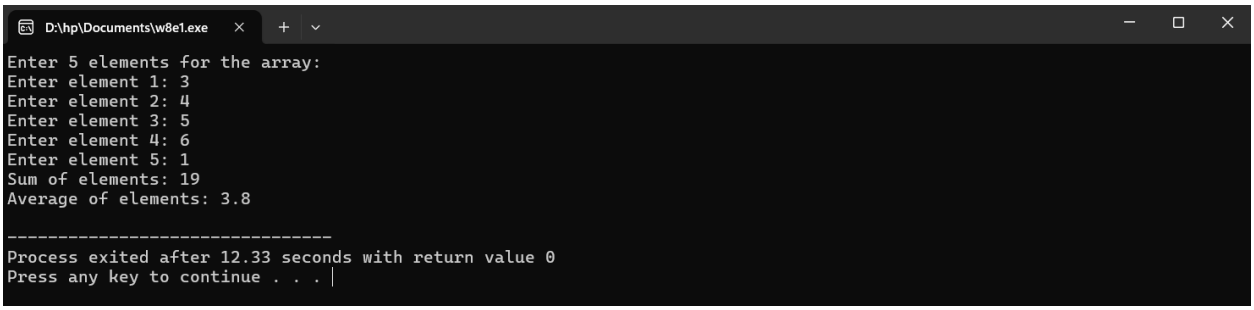


Week 8:

Solution of Exercise 1:

```
#include <iostream>
using namespace std;
int main() {
   const int size = 5;
   int a[size];
   int sum = 0;
   cout << "Enter " << size << " elements for the array:" << endl;
   for (int i = 0; i < size; ++i) {
      cout << "Enter element " << i + 1 << ": ";
      cin >> a[i];
      sum += a[i];
   }
   double average = static_cast<double>(sum) / size;
   cout << "Sum of elements: " << sum << endl;
   cout << "Average of elements: " << average << endl;
   return 0;
}
```

Output:



Solution of Exercise 2:

```
#include <iostream>

using namespace std;

int main() {
   const int size = 5;
   int arr[size];
   cout << "Enter " << size << " elements for the array:" << endl;
   for (int i = 0; i < size; ++i) {
      cout << "Enter element " << i + 1 << ": ";
      cin >> arr[i];
   }
   int smallest = arr[0];
   for (int i = 1; i < size; ++i) {
      if (arr[i] < smallest) {
         smallest = arr[i];
      }
   }
   cout << "The smallest element in the array is: " << smallest << endl;
   return 0;
}
```

Output:



Solution of Exercise 3:

```
#include <iostream>

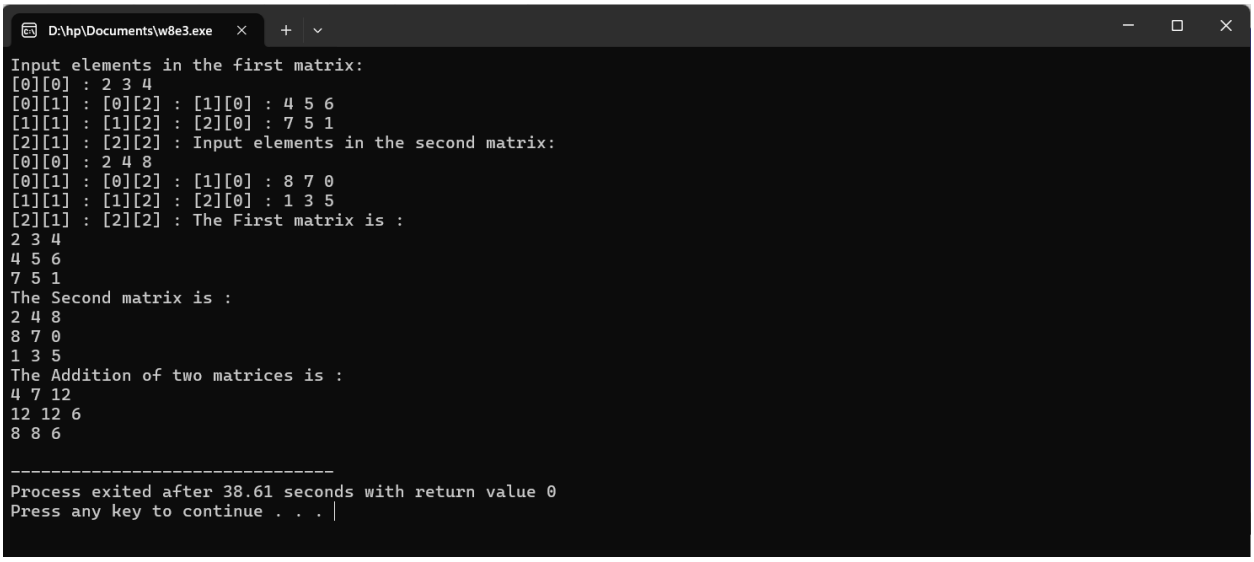
using namespace std;

int main() {
   int matrix1[3][3], matrix2[3][3], sum[3][3];
   cout << "Input elements in the first matrix:\n";
   for(int i = 0; i < 3; ++i) {
      for(int j = 0; j < 3; ++j) {
         cout << "[" << i << "][" << j << "] : ";
         cin >> matrix1[i][j];
      }
   }
   cout << "Input elements in the second matrix:\n";
   for(int i = 0; i < 3; ++i) {
      for(int j = 0; j < 3; ++j) {
         cout << "[" << i << "][" << j << "] : ";
         cin >> matrix2[i][j];
      }
   }
   cout << "The First matrix is :\n";
```

```
for(int i = 0; i < 3; ++i) {
   for(int j = 0; j < 3; ++j) {
      cout << matrix1[i][j] << " ";
   }
   cout << endl;
}
cout << "The Second matrix is :\n";
for(int i = 0; i < 3; ++i) {
   for(int j = 0; j < 3; ++j) {
      cout << matrix2[i][j] << " ";
   }
   cout << endl;
}
for(int i = 0; i < 3; ++i) {
   for(int j = 0; j < 3; ++j) {
      sum[i][j] = matrix1[i][j] + matrix2[i][j];
   }
}
cout << "The Addition of two matrices is :\n";
for(int i = 0; i < 3; ++i) {
   for(int j = 0; j < 3; ++j) {
      cout << sum[i][j] << " ";
   }
   cout << endl;
}
return 0;
```

}

Output:



Week 9:

Solution of Exercise 1:

```
#include <iostream>

#include <cctype>

#include <string>

using namespace std;

int main() {

  string regNumber;


  while (true) {

    cout << "Enter car registration number: ";

    getline(cin, regNumber);

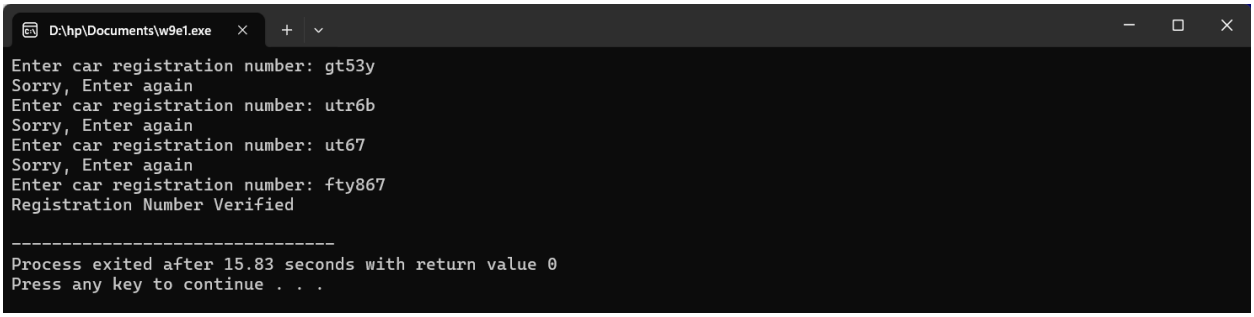
    if (regNumber.length() != 6) {

      cout << "Sorry, Enter again" << endl;

      continue;
```

```
    }
    bool isValid = true;
    for (int i = 0; i < 3; ++i) {
      if (!isalpha(regNumber[i])) {
        isValid = false;
        break;
      }
    }
    for (int i = 3; i < 6; ++i) {
      if (!isdigit(regNumber[i])) {
        isValid = false;
        break;
      }
    }
    if (isValid) {
      cout << "Registration Number Verified" << endl;
      break;
    } else {
      cout << "Sorry, Enter again" << endl;
    }
  }
  return 0;
}
```

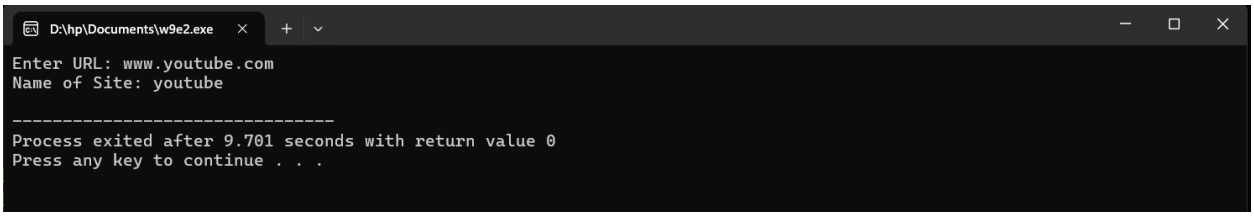
Output:



Solution of Exercise 2:

```
#include <iostream>
#include <string>
using namespace std;
int main() {
   string url;
   const string prefix = "www.";
   const string suffix = ".com";
   cout << "Enter URL: ";
   getline(cin, url);
   if (url.substr(0, prefix.size()) == prefix && url.substr(url.size() - suffix.size()) == suffix) {
      string siteName = url.substr(prefix.size(), url.size() - prefix.size() - suffix.size());
      cout << "Name of Site: " << siteName << endl;
   } else {
      cout << "Invalid URL format. It should start with 'www.' And end with '.com'." << endl;
   }
   return 0;
}
```

Output:



Week 10:

Solution of Exercise 1:

```
#include <iostream>

using namespace std;

double fahrenheitToCelsius(double fahrenheit) {

   return (fahrenheit - 32) * 5.0 / 9.0;

}

int main() {

   double fahrenheit, celsius;

   cout << "Enter Temperature in Fahrenheit: ";

   cin >> fahrenheit;

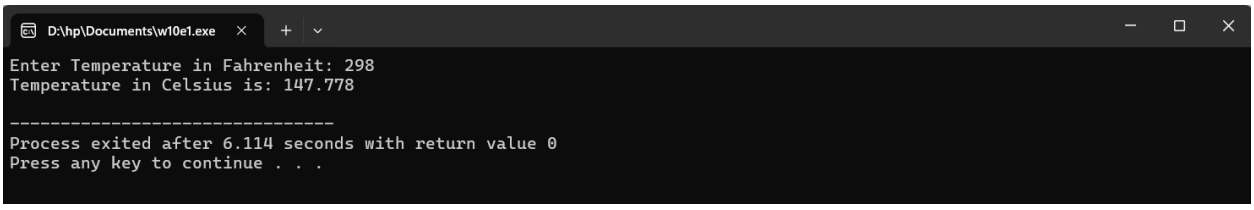
   celsius = fahrenheitToCelsius(fahrenheit);

   cout << "Temperature in Celsius is: " << celsius << endl;

   return 0;

}
```

Output:



Solution of Exercise 2:

```
#include <iostream>
using namespace std;
long hms_to_secs(int hours, int minutes, int seconds) {
   return static_cast<long>(hours * 3600 + minutes * 60 + seconds);
}
int main() {
   int hours, minutes, seconds;
   while (true) {
      cout << "Enter Hours: ";
      cin >> hours;
      cout << "Enter Min: ";
      cin >> minutes;
      cout << "Enter Sec: ";
      cin >> seconds;
      if (hours > 24 || minutes >= 60 || seconds >= 60) {
         cout << "Wrong Value. Re-enter." << endl;
         continue;
      }
      long total_seconds = hms_to_secs(hours, minutes, seconds);
      cout << "The Value in Seconds is: " << total_seconds << endl;
      cout << "Exiting Program" << endl;
      break;
   }
   return 0;
}
```

Output:



Solution of Exercise 3:

```
#include <iostream>
#include <cstring>
using namespace std;
void reversit(char str[]) {
   int length = strlen(str);
   for (int i = 0; i < length / 2; ++i) {
      char temp = str[i];
      str[i] = str[length - 1 - i];
      str[length - 1 - i] = temp;
   }
}
int main() {
   const int MAX_SIZE = 100;
   char str[MAX_SIZE];
   cout << "Enter a String: ";
   cin.getline(str, MAX_SIZE);
   reversit(str);
   cout << "Reversed: " << str << endl;
   return 0;
}
```

Output:



THE END