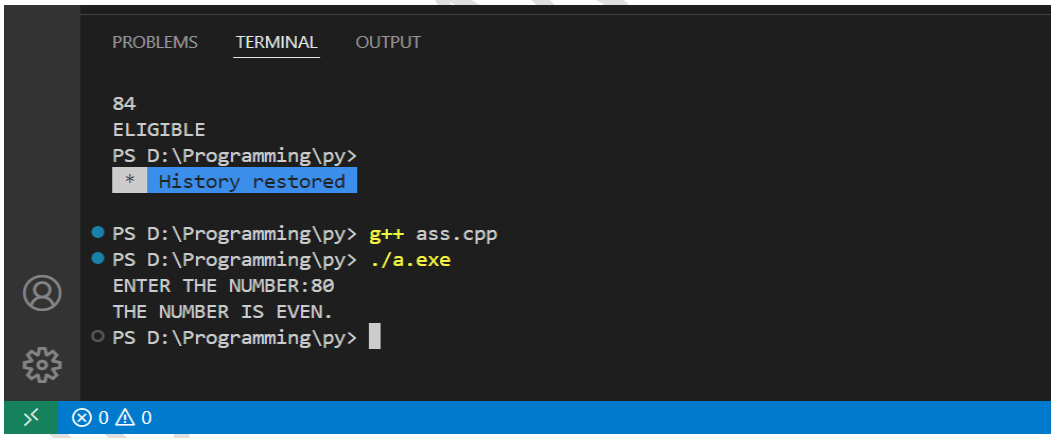
QUE 1: WAP to find given number is even or odd.

SOLUTION:

```
// to find if the number is even or odd
#include<iostream>
using namespace std;
int main ( )
{
   int n;
   cout<<" ENTER THE NUMBER: ";
   cin>n;
   if (n%2==0)
      cout<<" THE NUMBER IS EVEN.";
   else
     cout<<" THE NUMBER IS ODD.";
   return 0;
}
```

OUTPUT:



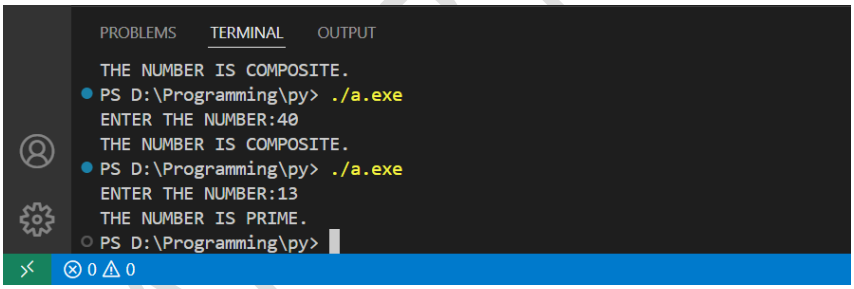
QUE 2:

SOLUTION:

```
//to find out if the given number is prime or composite.
#include <iostream>
using namespace std;
int main ( )
{
```

```
    int n;
    cout<< “ENTER THE NUMBER”: ;
    cin>>n;
    for (int i = 2; i <= n; i++)
    {
      if(n % i != 0)
        continue;
      else if ( n % i == 0 && n == i)
        cout<< “THE NUMBER IS PRIME”;
      else
        cout<< “THE NUMBER IS COMPOSITE”;
      break;
    }
    return 0;
}
```

OUTPUT:



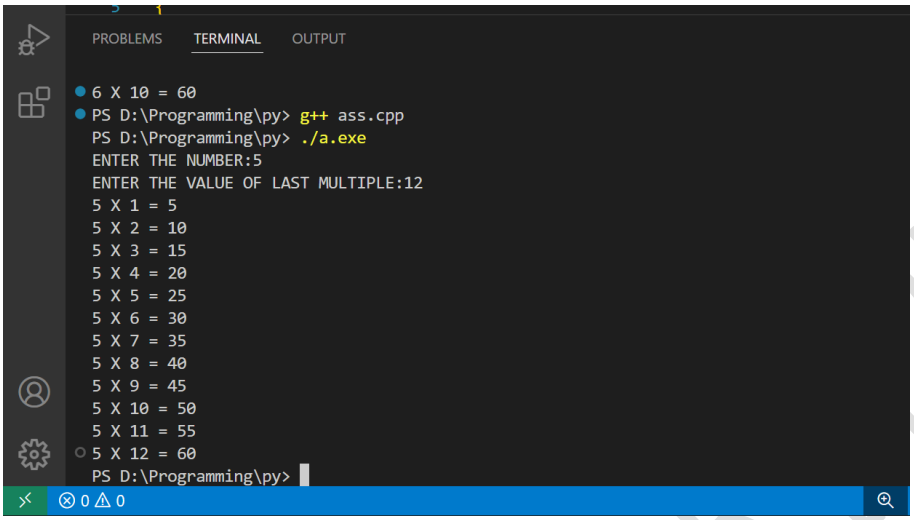
QUE 3:WAP to print the table of a given number up to ‘n’ multiples.

SOLUTION:

```
// to display the table of a given number
#include <iostream>
using namespace std;
int main ( )
{
    int n, num;
    cout << “enter the number”;
    cin >> num;
    cout << “enter the value of the last multiple: ”;
    cin >> n;
```

```
    for( int i = 1; i <= n; i++)
    {
      int a = num*1;
      cout <<num << "x" <<i<< "=" <<a<<endl;
    }
    return 0;
}
```

OUTPUT:



QUE 4: WAP to find the greater number between:

(a) two numbers

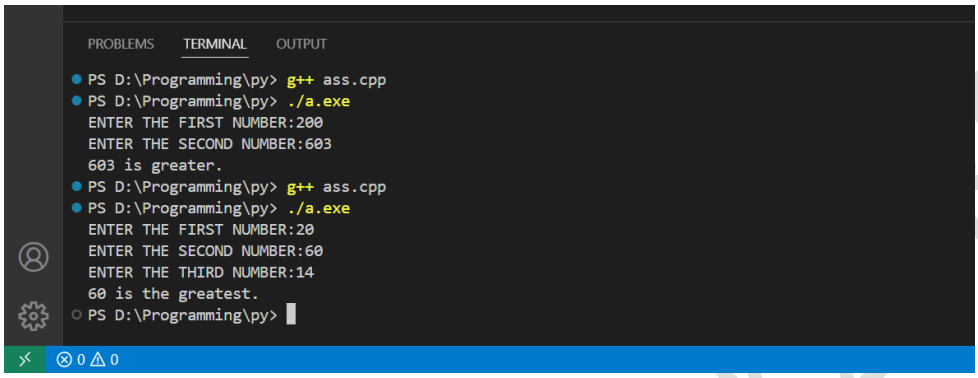
(b) three numbers

SOLUTION:

```
// to find the greater number between two numbers.
#include<iostream>
using namespace std;
int main ( )
{
    int a1, a2;
    cout << "ENTER THE FIRST NUMBER: ";
    cin <<a1;
    cout << "ENTER THE SECOND NUMBER: ";
    cin <<a2;
    if (a1>a2)
```

```
    cout <<a1<< “IS GREATER.”;
  else
    cout <<a2<< “IS GREATER.”;
  return 0;
}
```

OUTPUT:



// to find the greater number between **three** numbers.

```
#include <iostream>
using namespace std;
int main ( )
{
  int a1, a2, a3;
  cout << “enter the first number: ”;
  cin >> a1;
  cout << “enter the second number: ”;
  cin >> a2;
  cout << “enter the third number: ”;
  cin >> a3;
  (a1>a2) ? (a1>a3) ? cout <<a1<< “is greater.” : cout<<a3<< “is greater.” : (a2>a3) ?
  cout<<a2<< “is greater.” : cout<<a3<< “is greater.” ;
  return 0;
}
```

OUTPUT:

```
PROBLEMS   TERMINAL   OUTPUT
PS D:\Programming\py> g++ ass.cpp
PS D:\Programming\py> ./a.exe
ENTER THE FIRST NUMBER:200
ENTER THE SECOND NUMBER:603
603 is greater.
PS D:\Programming\py> g++ ass.cpp
PS D:\Programming\py> ./a.exe
ENTER THE FIRST NUMBER:20
ENTER THE SECOND NUMBER:60
ENTER THE THIRD NUMBER:14
60 is the greatest.
PS D:\Programming\py>
```

QUE 5: WAP to find the sum of first 'n' natural numbers.

SOLUTION:

```
// to find sum of 'n ' natural numbers.
#include<iostream>
using namespace std;
int main ( )
{
    int n, i, a = 0;
    cout<< "ENTER THE NUMBER UP TO WHICH THE SUM IS TO BE FOUND: ";
    cin >> n;
    for (i = 0; i <= n; i++)
    {
      a= a + i;
    }
    cout<< "THE SUM COMES OUT TO BE: "<< a;
    return 0;
}
```

OUTPUT:

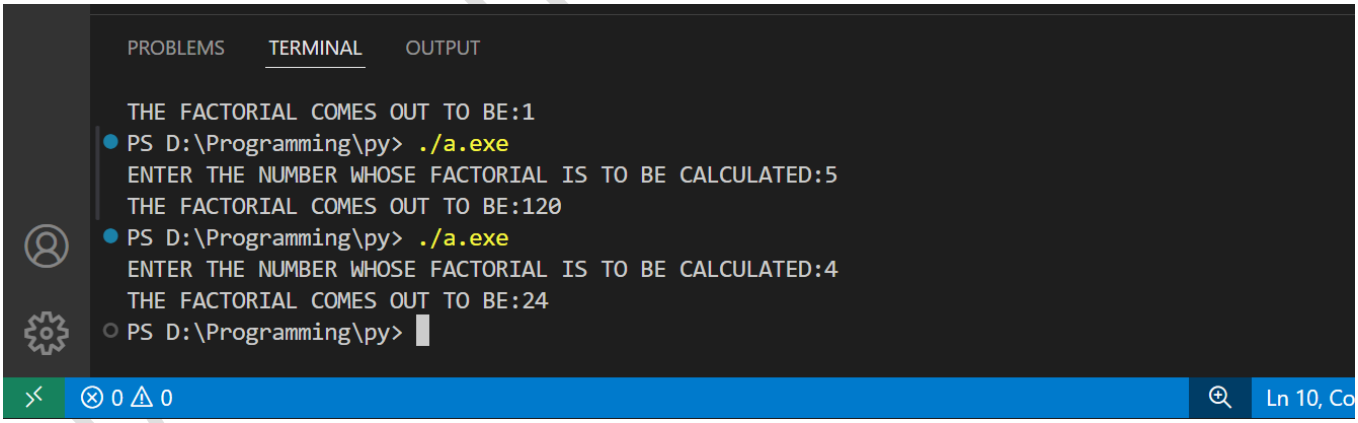
```
PROBLEMS   TERMINAL   OUTPUT                                  powershell
PS D:\Programming\py> g++ ass.cpp
PS D:\Programming\py> ./a.exe
ENTER THE NUMBER UP TO WHIC THE SUM IS TO BE CALCULATES:90
THE SUM COMES OUT TO BE:4095
PS D:\Programming\py> ./a.exe
ENTER THE NUMBER UP TO WHIC THE SUM IS TO BE CALCULATES:152
THE SUM COMES OUT TO BE:11628
PS D:\Programming\py>
```

QUE 6: WAP to find factorial of a given number.

SOLUTION:

```
// to find the factorial of a given number.
#include<iostream>
using namespace std;
int main ( )
{
    int n, i, a = 1;
    cout<< “ENTER THE NUMBER WHOSE FACTORIAL IS TO BE CALCULATED: ”;
    cin>> n;
    for (i = 1; i <= n; i++)
    {
      a = a * i;
    }
    cout<< “THE FACTORIAL COMES OUT TO BE: ”<< a;
    return 0;
}
```

OUTPUT:



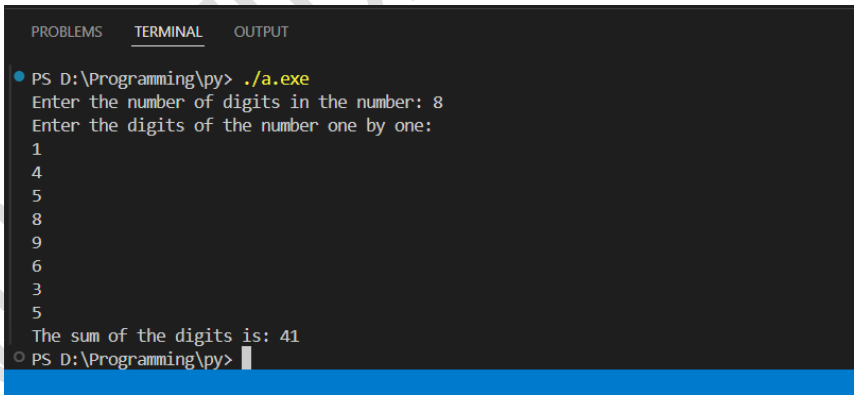
QUE 7: WAP to find sum of digits of ‘n’ digit number.

SOLUTION:

```
// to find sum of digits of an 'n' digit number.
#include <iostream>
using namespace std;
```

```
int main()
{
   int n, digits[n];
   cout << "Enter the number of digits in the number: ";
   cin >> n;
   cout << "Enter the digits of the number one by one: " << endl;
   for (int i = 0; i < n; i++)
   {
      cin >> digits[i];
   }
   int sum = 0;
   for (int i = 0; i < n; i++)
   {
      sum += digits[i];
   }
   cout << "The sum of the digits is: " << sum << endl;
   return 0;
}
```

OUTPUT:



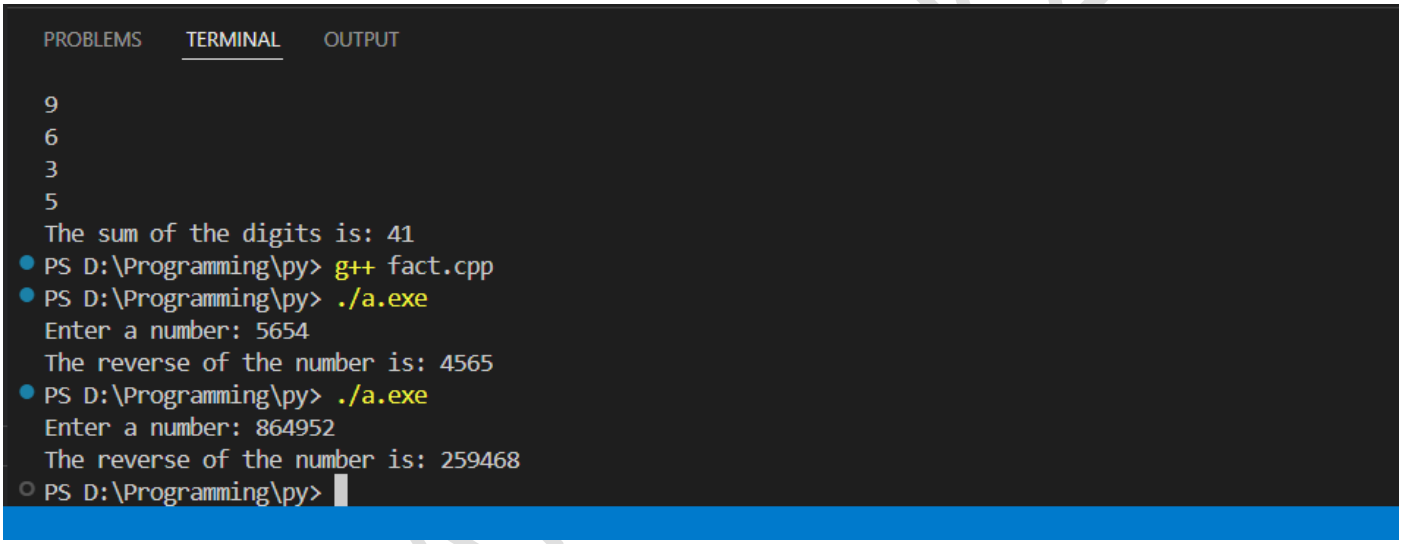
QUE 8: WAP to find the reverse of a number.

SOLUTION:

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

```
    int number, reverse = 0;
    cout << "Enter a number: ";
    cin >> number;
    while (number != 0) {
        int digit = number % 10;
        reverse = reverse * 10 + digit;
        number /= 10;
    }
    cout << "The reverse of the number is: " << reverse << endl;
    return 0;
}
```

OUTPUT:



QUE 9 : WAP to determine the given number is a palindrome or not.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
    int number, original, reverse = 0;
    cout << "Enter a number: ";
    cin >> number;
    original = number;
    for (; number != 0; number /= 10)
```

```
    {
        int digit = number % 10;
        reverse = reverse * 10 + digit;
    }
    if (original == reverse)
    {
        cout << "The number is a palindrome." << endl;
    }
    else
    {
        cout << "The number is not a palindrome." << endl;
    }
    return 0;
}
```

OUTPUT:

```
PROBLEMS   TERMINAL   OUTPUT
PS D:\Programming\py> ./a.exe
Enter a number: 12214
The number is not a palindrome.
PS D:\Programming\py> g++ fact.cpp
PS D:\Programming\py> ./a.exe
Enter a number: 51215
The number is a palindrome.
PS D:\Programming\py>
```

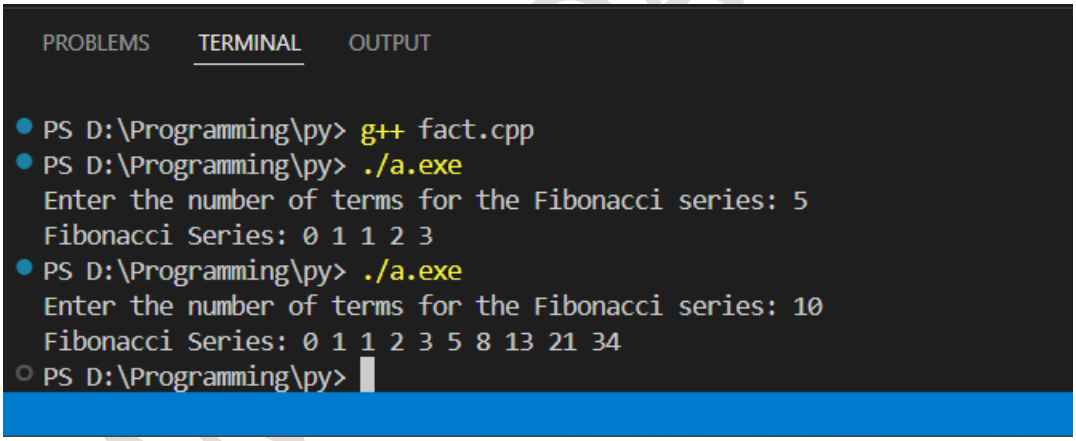
QUE 10: WAP to print Fibonacci series up to 'n' terms.

SOLUTION:

```
#include <iostream>
using namespace std;
int main() {
    int n;
    cout << "Enter the number of terms for the Fibonacci series: ";
    cin >> n;
    int n1 = 0, n2 = 1, next;
    cout << "Fibonacci Series: ";
```

```
    for (int i = 1; i <= n; i++) {
        if (i == 1) {
            cout << n1 << " ";
            continue;
        }
        if (i == 2) {
            cout << n2  << " ";
            continue;
        }
        next = n1 + n2;
        cout << next << " ";
        n1 = n2;
        n2 = next;
    }
    cout << endl;
    return 0;
}
```

OUTPUT:



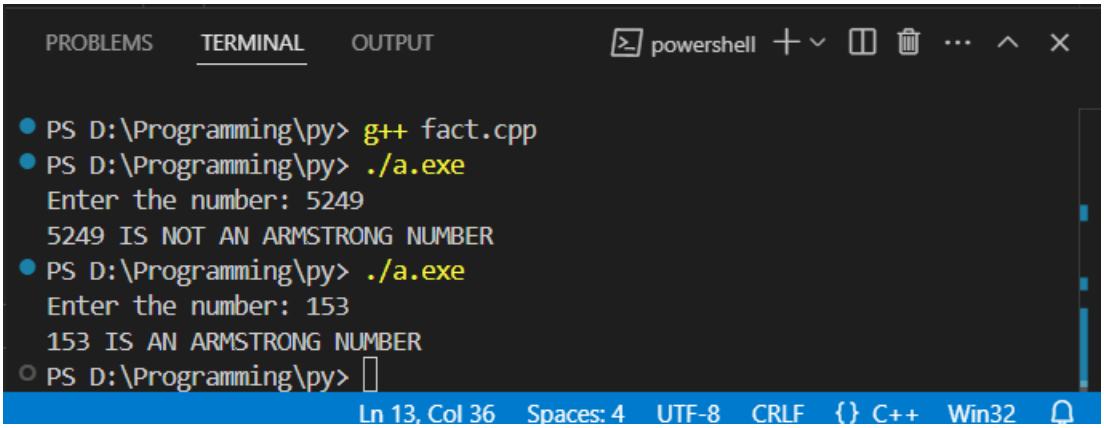
QUE 11: WAP to determine given n digit number is Armstrong number or not.

SOLUTION:

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

```
int num,n,new_no,digit,power;
cout << "Enter the number: ";
cin >> num;
n = num;
if (n==0)
{
   digit=1;
}
else {
   for(digit=0; n!=0; digit++)
    n=n/10;
}
n = num;
int ans=0;
while(n!=0) {
   new_no=n%10;
   power=1;
   for( int i=0; i<digit; i++)  {
      power=power*new_no;
   }
   ans=ans+power;
   n=n/10;
}
if (ans==num)
{ cout<<num<<" IS AN ARMSTRONG NUMBER ";}
else {
   { cout<<num<<" IS NOT AN ARMSTRONG NUMBER ";}
}
return 0;
}
```

OUTPUT:

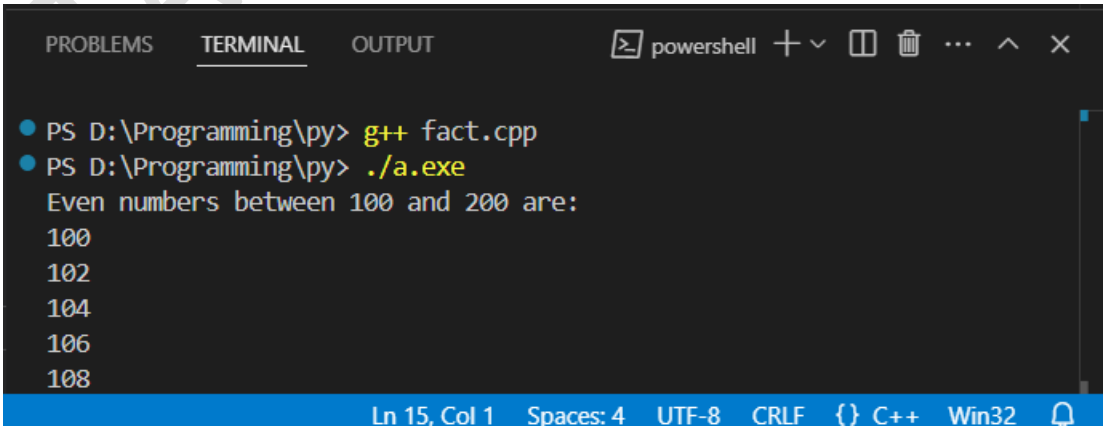


QUE 12: WAP to find all even numbers between 100 & 200.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   cout << "Even numbers between 100 and 200 are:" << endl;
   for (int i = 100; i <= 200; i++)
   {
      if (i % 2 == 0)
      {
         cout << i << endl;
      }
   }
   return 0;
}
```

OUTPUT:



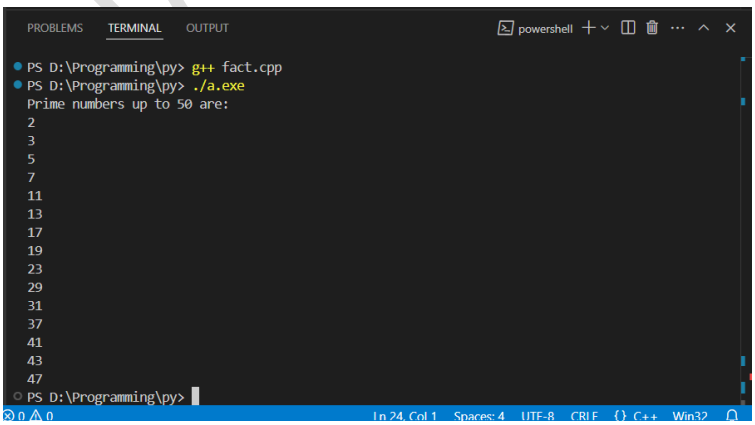
QUE 13: WAP to print first 50 prime numbers.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   cout << "Prime numbers up to 50 are: " << endl;

   for (int n = 2; n <= 50; n++)
   {
      int counter = 1;
      for (int i = 2; i < n; i++)
      {
         if (n % i == 0)
         {
            counter = 0;
            break;
         }
      }
      if (counter == 1) {
         cout << n <<endl;
      }
   }
   return 0;
}
```

OUTPUT:

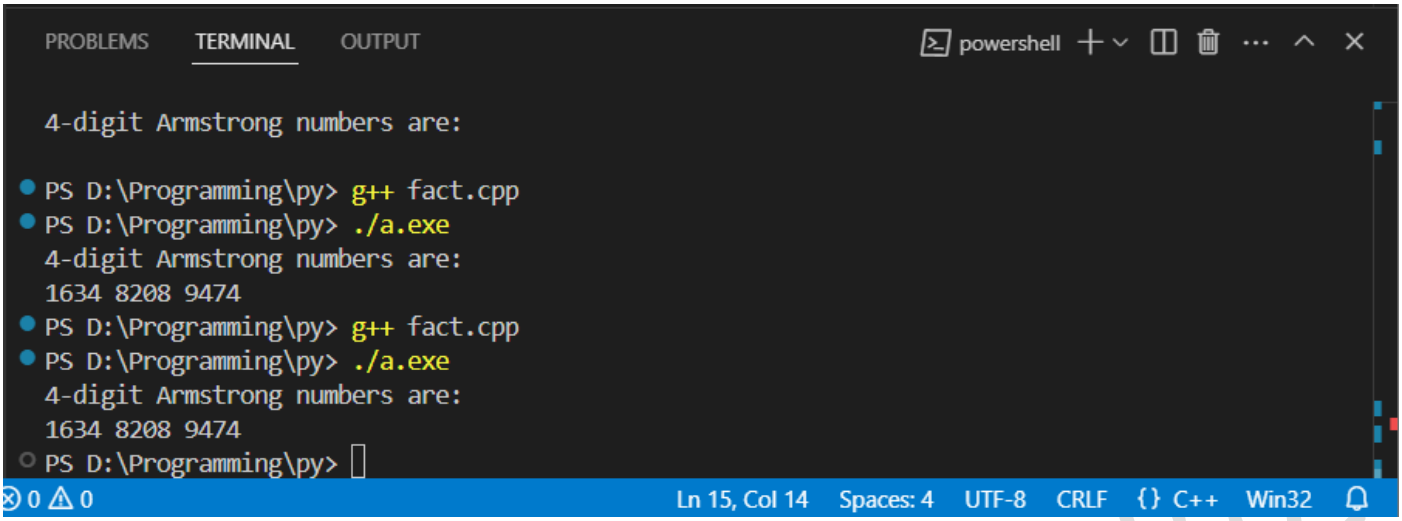


QUE 14: WAP to print all 4-digit Armstrong numbers.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int counter,sum=0;
   cout << "4-digit Armstrong numbers are:" << endl;
   for (int num = 1000; num < 10000; num++) {
      counter = num;
      sum=0;
      while (counter != 0) {
         int digit = counter % 10;
         int power = 1;
         for (int i = 0; i < 4; i++) {
            power *= digit;
         }
         sum += power;
         counter /= 10;
      }
      if (sum == num) {
         cout << num << " ";
      }
   }
   cout << endl;
   return 0;
}
```

OUTPUT:



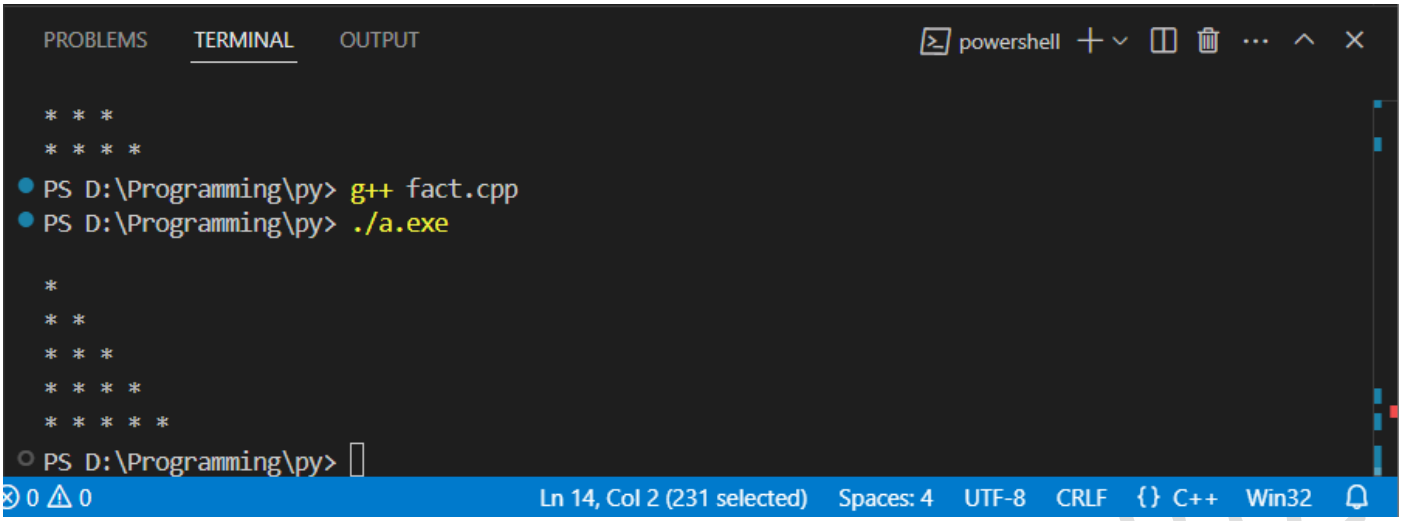
QUE 15: WAP to print patterns

(a) *
**
***
****
*****

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  for (int i = 0; i <= 5; i++)
  {
    for (int j = 0; j < i; j++)
    {
      cout << "* ";
    }
    cout << "\n";
  }
  return 0;
}
```

OUTPUT:

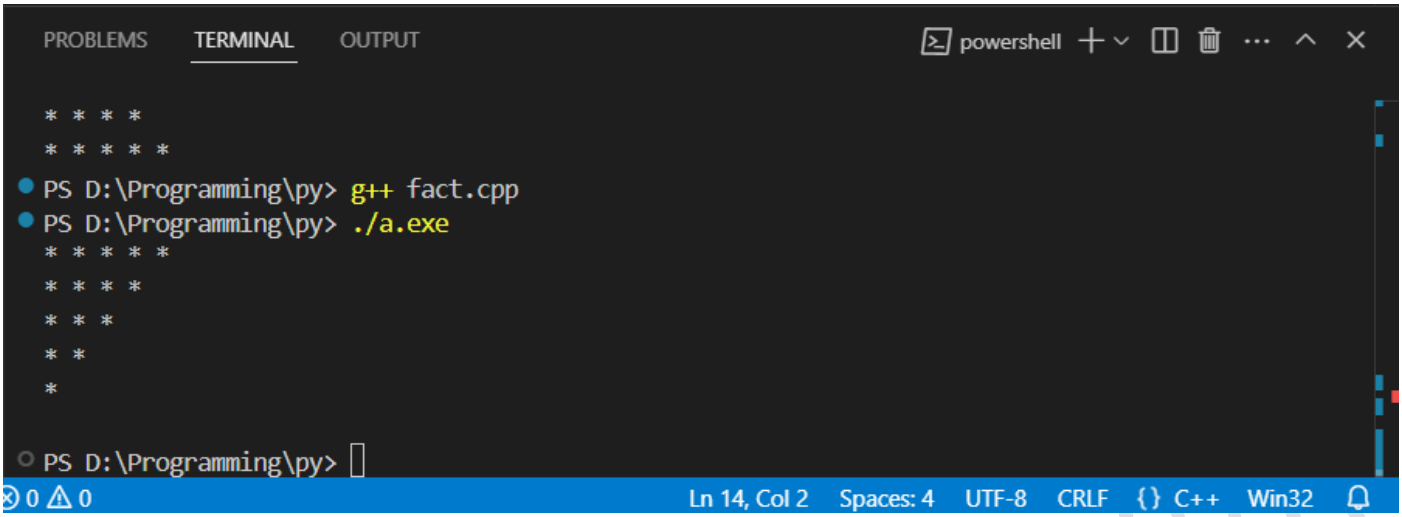


(b) *****
****
***
**
*

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  for (int i = 0; i <= 5; i++)
  {
    for (int j = 5 - i; j > 0; j--)
    {
      cout << "* ";
    }
    cout << "\n";
  }
  return 0;
}
```

OUTPUT:



(c)
```
    *
   ***
  *****
```

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  for (int i = 0; i < 3; i++)
  {
    for (int k = 0; k < 3 - i; k++)
    {
      cout << " ";
    }
    for (int j = 0; j < 2 * i + 1; j++)
    {
      cout << "* ";
    }
    cout << endl;
  }
  return 0;
}
```

OUTPUT:

(d) 1
22
333
4444

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  int count = 0;
  for (int i = 0; i < 4; i++)
  {
    count++;
    for (int j = 0; j <= i; j++)
    {
      cout << count << " ";
    }
    cout << endl;
  }
  return 0;
}
```

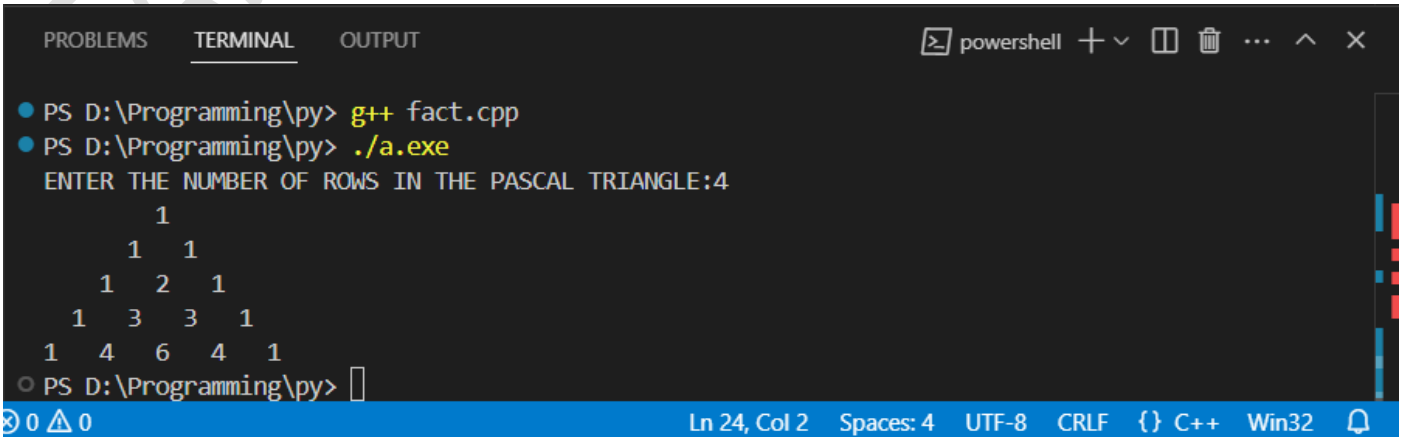
OUTPUT:

(e) Pascal's triangle:

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int i, j, n,coef;
   cout << "ENTER THE NUMBER OF ROWS IN THE PASCAL TRIANGLE:";
   cin >> n;
   for (int i = 0; i <= n; i++)
   {
      for (int space = i; space < n; ++space)
      {
         cout << "  ";
      }
      coef = 1;
      for (int j = 0; j <= i; j++)
      {
         cout << coef<<"   ";
         coef = coef * (i - j) / (j + 1);
      }
      cout<< endl;
   }
   return 0;
}
```

OUTPUT:



(f) FLOYD'S TRIANGLE.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  int n, count = 0;
  cout << "Enter a number: ";
  cin >> n;
  for (int i = 0; i <= n; i++)
  {
    for (int j = 0; j < i; j++)
    {
      count++;
      cout << count << " ";
    }
    cout << endl;
  }
  return 0;
}
```

OUTPUT:

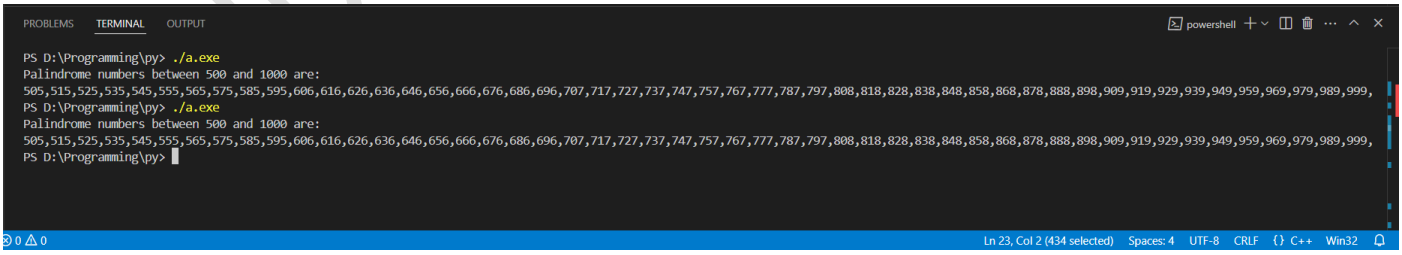
QUE 16: using functions, write following c++ program.

(a) To print all the palindrome for range 500-1000.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
 int num, orig, rev = 0;
   cout << "Palindrome numbers between 500 and 1000 are:" << endl;
   for (int num = 500; num <= 1000; num++)
   {
      orig = num;
      rev = 0;
      while (orig != 0)
      {
         int digit = orig % 10;
         rev = rev * 10 + digit;
         orig /= 10;
      }
      if (rev == num)
      {
         cout << num<<",";
      }
   }
   return 0;
}
```

OUTPUT:



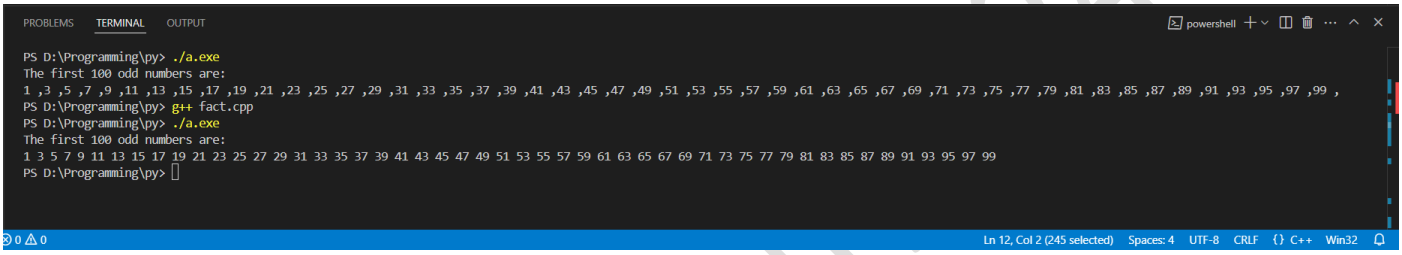
(b) To print first 100 odd numbers.

SOLUTION:

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

```
int main()
{
   cout << "The first 100 odd numbers are:" << endl;
   for (int num = 1; num <= 100; num++)
   {
      if (num % 2 != 0)
         cout << num << " ";
   }
   return 0;
}
```

OUTPUT:



(c) To find binary, octal & hexadecimal equivalents of a number.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int number;
   cout << "Enter a number: ";
   cin >> number;
   cout << "Binary equivalent: ";
   for (int i = 15; i >= 0; i--)
   {
      cout << ((number >> i) & 1);
   }
   cout << endl;
   cout << "Octal equivalent: " << oct << number << endl;
   cout << "Hexadecimal equivalent: " << hex << number << endl;
```

```
    return 0;
}
```

OUTPUT:

(d) To find decimal equivalents for binary, octal & hexadecimal numbers.

SOLUTION:

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
  string input;
  int decimalValue = 0;
  cout << "Enter a number (binary, octal, or hexadecimal): ";
  cin >> input;
  if (input.find("0x") == 0 || input.find("0X") == 0)
  {
    for (size_t i = 2; i < input.length(); i++)
    {
      char c = input[i];
      if (c >= '0' && c <= '9')
      {
        decimalValue = decimalValue * 16 + (c - '0');
      }
      else if (c >= 'A' && c <= 'F')
      {
```

```
            decimalValue = decimalValue * 16 + (c - 'A' + 10);
        }
        else if (c >= 'a' && c <= 'f')
        {
            decimalValue = decimalValue * 16 + (c - 'a' + 10);
        }
    }
    cout << "Detected Hexadecimal number: " << input << endl;
  }
  else if (input[0] == '0')
  {
    for (size_t i = 1; i < input.length(); i++)
    {
      char c = input[i];
      decimalValue = decimalValue * 8 + (c - '0');
    }
    cout << "Detected Octal number: " << input << endl;
  }
  else
  {
    for (char c : input)
    {
      decimalValue = decimalValue * 2 + (c - '0');
    }
    cout << "Detected Binary number: " << input << endl;
  }
  cout << "Decimal equivalent: " << decimalValue << endl;

  return 0;
}
```

OUTPUT:

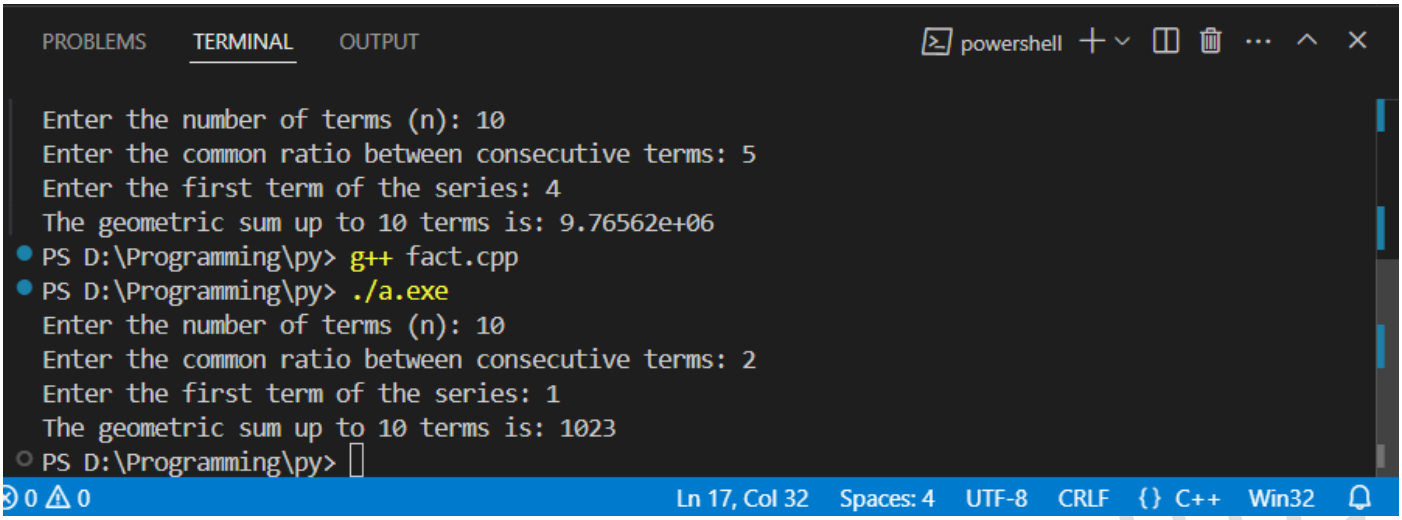
```
PS D:\Programming\py> g++ n.cpp
PS D:\Programming\py> ./a.exe
Enter a number (binary, octal, or hexadecimal): 10
Detected Binary number: 10
Decimal equivalent: 2
PS D:\Programming\py>
```

(e) to calculate geometric sum up to 'n' terms.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int n, r, result = 1;
   double sum = 0.0, a;
   cout << "Enter the number of terms (n): ";
   cin >> n;
   cout << "Enter the common ratio between consecutive terms: ";
   cin >> r;
   cout << "Enter the first term of the series: ";
   cin >> a;
   for (int i = 0; i < n; i++)
   {
      result = result * r;
   }
   for (int i = 0; i < n; i++)
   {
      sum = a * ((1 - result) / (1 - r));
   }
   cout << "The geometric sum up to " << n << " terms is: " << sum << endl;
   return 0;
}
```

OUTPUT:

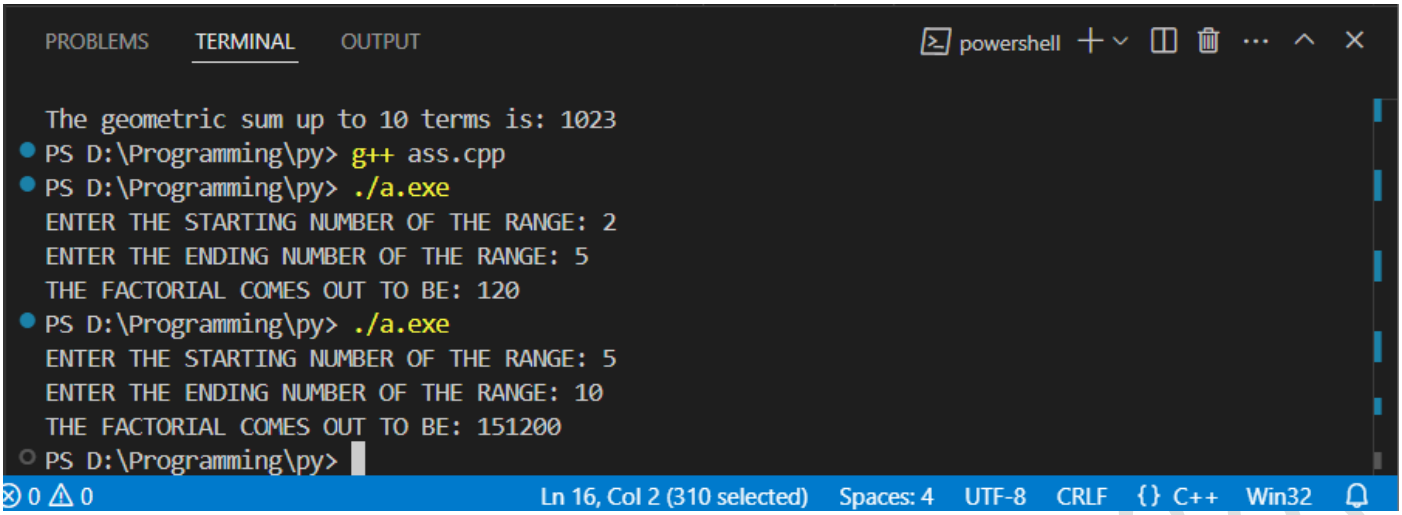


QUE 17: using recursion write c++ program to print factorials for a given range.

SOLUTION :

```
#include<iostream>
using namespace std;
int main ( )
{
int n1,n2, i, a = 1;
cout<< "ENTER THE STARTING NUMBER OF THE RANGE: ";
cin>> n1;
cout<< "ENTER THE ENDING NUMBER OF THE RANGE: ";
cin>> n2;
for (i = n1; i <= n2; i++)
{
a = a * i;
}
cout<< "THE FACTORIAL COMES OUT TO BE: "<< a;
return 0;
}
```

OUTPUT:

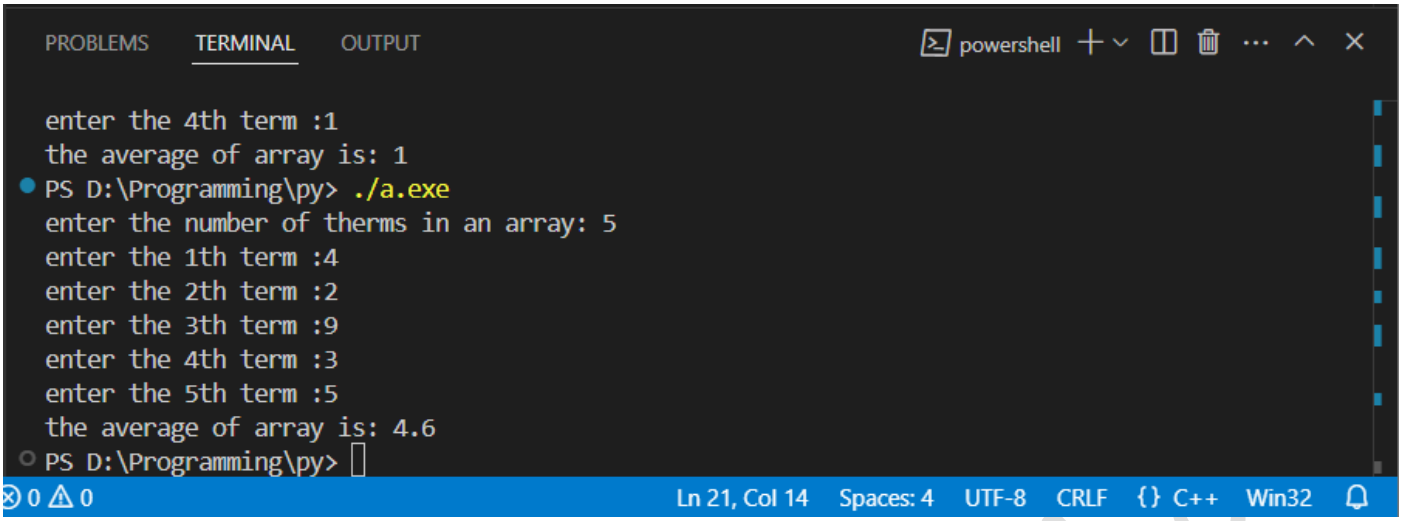


QUE 18: WAP to find the average of all the elements of a 1D array.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int n;
   cout << "enter the number of therms in an array: ";
   cin >> n;
   int arr[n];
   for (int i = 0; i < n; i++)
   {
      cout << "enter the " << i + 1 << "(th) term :";
      cin >> arr[i];
   }
   float ar = 0.0;
   for (int i = 0; i < n; i++)
   {
      ar += arr[i];
   }
   double avg = ar / n;
   cout << "the average of array is: " << avg;
   return 0;
}
```

OUTPUT:



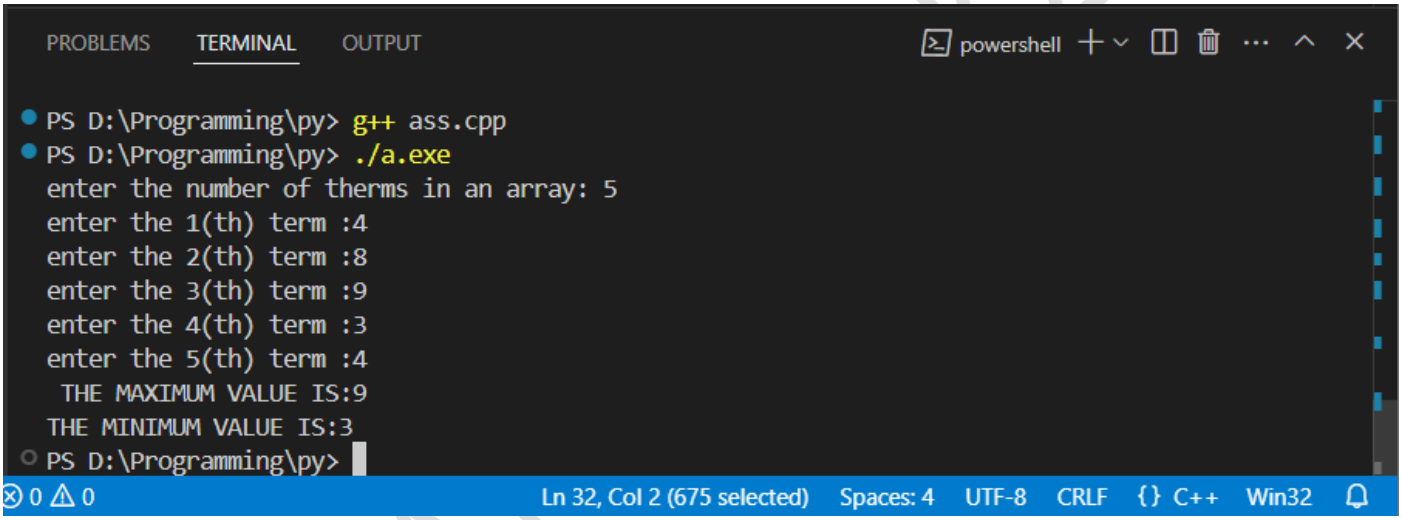
QUE 19: WAP to find the maximum and minimum elements of an array.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int n;
   cout << "enter the number of therms in an array: ";
   cin >> n;
   int arr[n];
   for (int i = 0; i < n; i++)
   {
      cout << "enter the " << i + 1 << "(th) term :";
      cin >> arr[i];
   }
   int max=0;
   for (int i = 0; i < n; i++)
   {
      if(arr[i]>max)
      {max=arr[i];}
      else
      {continue;}
   }
```

```
    int min=max;
    for (int i = 0; i < n; i++)
    {
      if(arr[i]<min)
      {min=arr[i];}
      else
      {continue;}
    }
    cout << " THE MAXIMUM VALUE IS:"<<max<<endl<<"THE MINIMUM VALUE IS:"<<min;
    return 0;
}
```

OUTPUT:



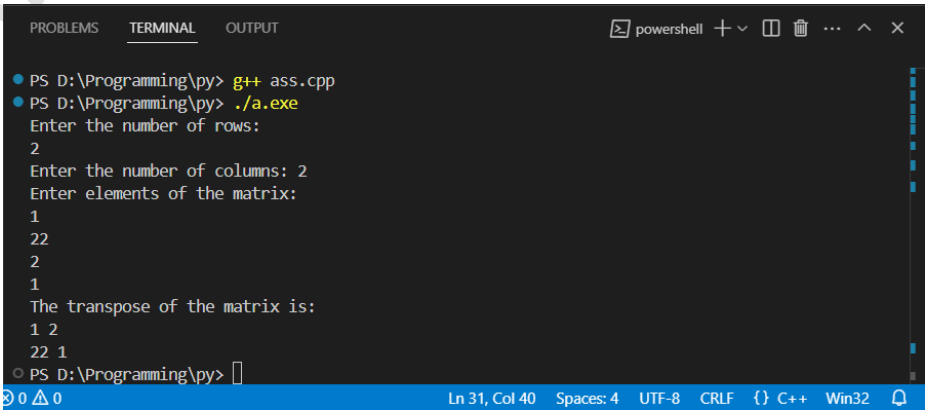
QUE 20: WAP to find the transpose of a matrix.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
  int rows, cols;
  cout << "Enter the number of rows: ";
  cin >> rows;
  cout << "Enter the number of columns: ";
  cin >> cols;
  int mat[rows][cols], trans[cols][rows];
```

```
    cout << "Enter elements of the matrix:" << endl;
    for (int i = 0; i < rows; i++)
    {
       for (int j = 0; j < cols; j++)
       {
          cin >> mat[i][j];
       }
    }
    for (int i = 0; i < rows; i++)
    {
       for (int j = 0; j < cols; j++)
       {
          trans[j][i] = mat[i][j];
       }
    }
    cout << "The transpose of the matrix is:" << endl;
    for (int i = 0; i < cols; i++)
    {
       for (int j = 0; j < rows; j++)
       {
          cout << trans[i][j] << " ";
       }
       cout << endl;
    }
    return 0;
}
```

OUTPUT:



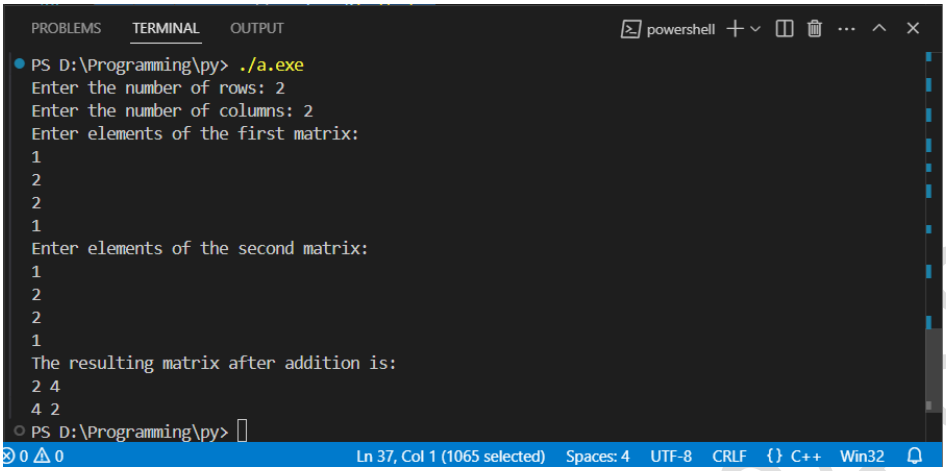
QUE 21: WAP to add 2D matrix.

SOLUTION:

```
#include <iostream>
using namespace std;
int main() {
   int rows, cols;
   cout << "Enter the number of rows: ";
   cin >> rows;
   cout << "Enter the number of columns: ";
   cin >> cols;
   int matrix1[rows][cols], matrix2[rows][cols], result[rows][cols];
   cout << "Enter elements of the first matrix:" << endl;
   for (int i = 0; i < rows; i++) {
      for (int j = 0; j < cols; j++) {
         cin >> matrix1[i][j];
      }
   }
   cout << "Enter elements of the second matrix:" << endl;
   for (int i = 0; i < rows; i++) {
      for (int j = 0; j < cols; j++) {
         cin >> matrix2[i][j];
      }
   }
   for (int i = 0; i < rows; i++) {
      for (int j = 0; j < cols; j++) {
         result[i][j] = matrix1[i][j] + matrix2[i][j];
      }
   }
   cout << "The resulting matrix after addition is:" << endl;
   for (int i = 0; i < rows; i++) {
      for (int j = 0; j < cols; j++) {
         cout << result[i][j] << " ";
      }
      cout << endl;
```

```
    }
    return 0;
}
```

OUTPUT:



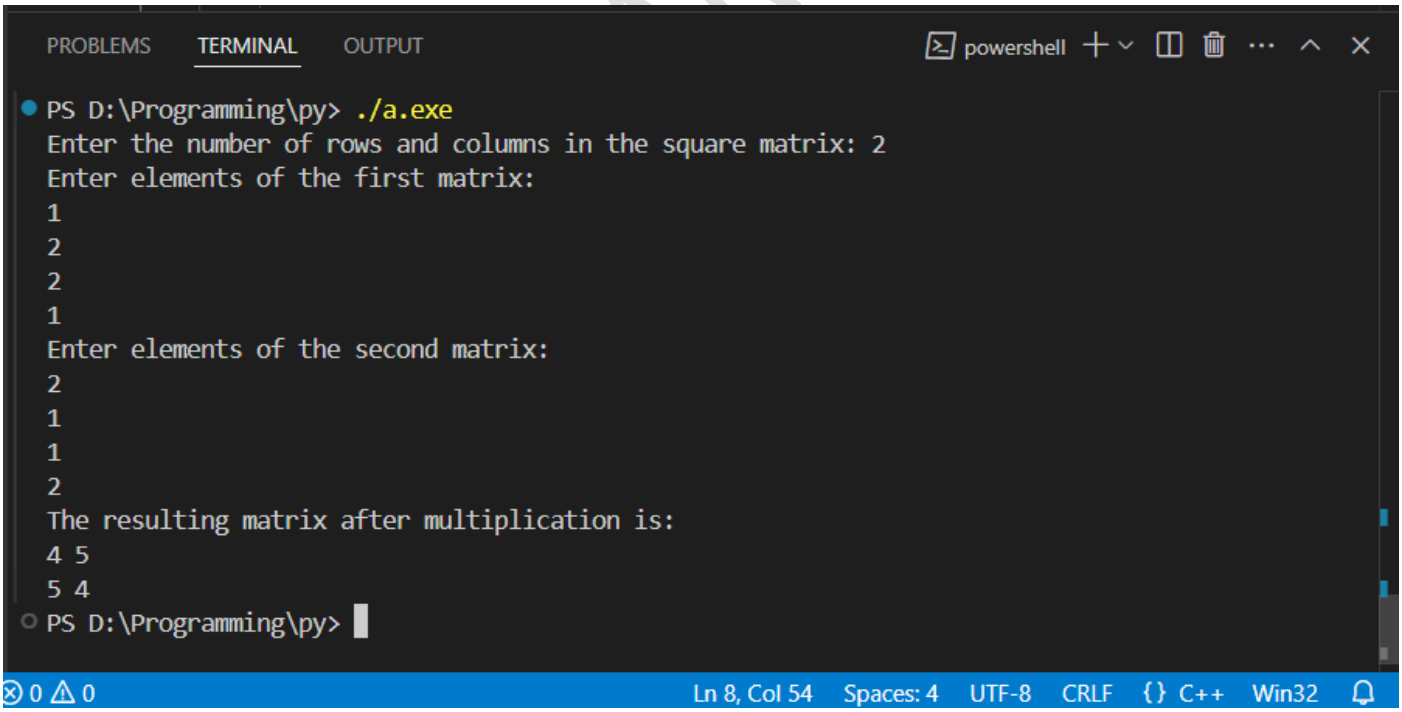
QUE 22: WAP to multiply 2d matrix.

SOLUTION:

```
#include <iostream>
using namespace std;
int main()
{
   int n;
   cout << "Enter the number of rows and columns in the square matrix: ";
   cin >> n;
   int matrix1[n][n], matrix2[n][n], result[n][n]={0};
   cout << "Enter elements of the first matrix:" << endl;
   for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
         cin >> matrix1[i][j];
      }
   }
   cout << "Enter elements of the second matrix:" << endl;
   for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
         cin >> matrix2[i][j];
      }
   }
```

```
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            for (int k = 0; k < n; k++) {
                result[i][j] += matrix1[i][k] * matrix2[k][j];
            }
        }
    }
    cout << "The resulting matrix after multiplication is:" << endl;
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            cout << result[i][j] << " ";
        }
        cout << endl;
    }
    return 0;
}
```

OUTPUT:



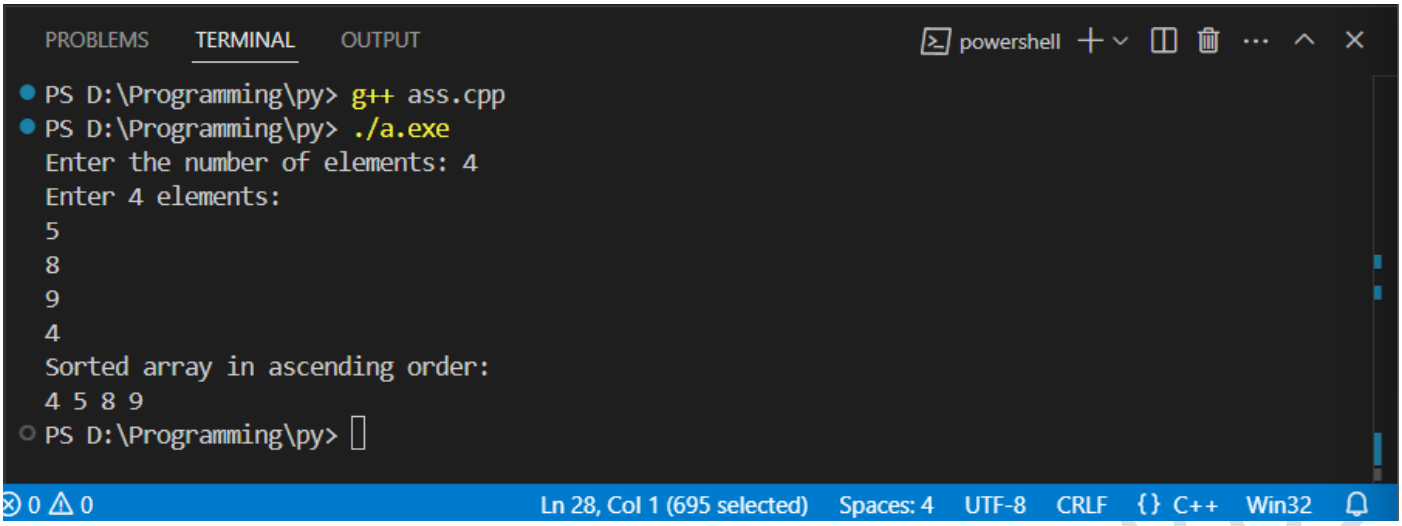
QUE 23: WAP to sort an array in ascending order.

SOLUTION:

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

```
int main()
{
   int n,arr[n];
   cout << "Enter the number of elements: ";
   cin >> n;
   cout << "Enter " << n << " elements:" << endl;
   for (int i = 0; i < n; i++) {
      cin >> arr[i];
   }
   for (int i = 0; i < n - 1; i++) {
      for (int j = 0; j < n - i - 1; j++) {
         if (arr[j] > arr[j + 1]) {
            int temp = arr[j];
            arr[j] = arr[j + 1];
            arr[j + 1] = temp;
         }
      }
   }
   cout << "Sorted array in ascending order:" << endl;
   for (int i = 0; i < n; i++) {
      cout << arr[i] << " ";
   }
   cout << endl;
   return 0;
}
```

OUTPUT:

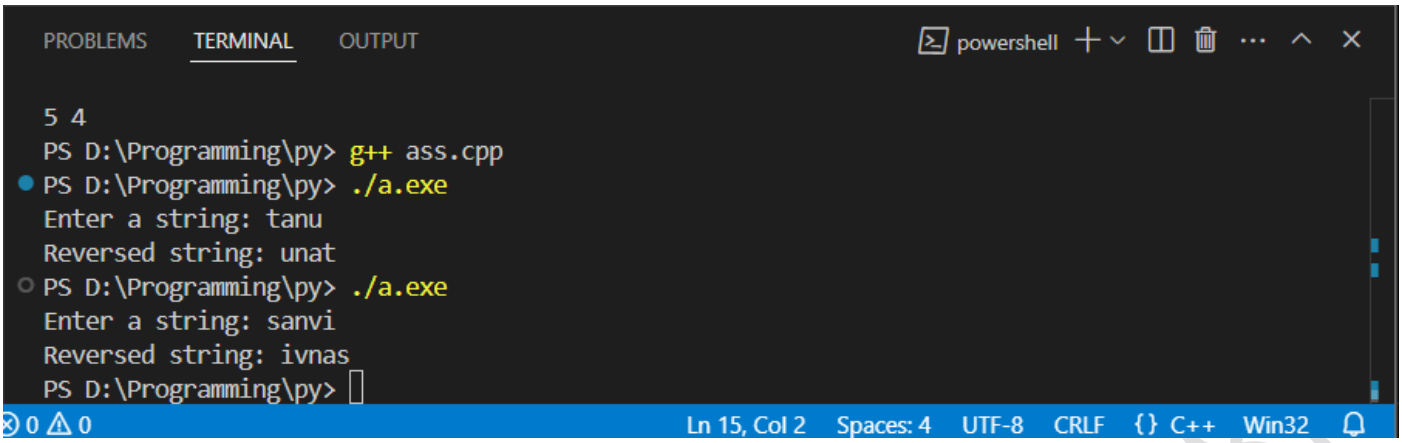


QUE 24: WAP to reverse a given string.

SOLUTION:

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
   string str, rev;
   cout << "Enter a string: ";
   cin >> str;
   int len = str.length();
   for (int i = len - 1; i >= 0; i--) {
      rev += str[i];
   }
   cout << "Reversed string: " << rev;
return 0;
}
```

OUTPUT:



QUE 25: WAP to count all the vowels in a given string.

SOLUTION:

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
   string str;
   int vowelCount = 0;
   cout << "Enter a string: ";
   getline(cin, str);
   for (char c : str)
   {
      if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u' ||

       c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U')
       {

          vowelCount++;
       }
   }
    cout << "Number of vowels in the string: " << vowelCount << endl;
   return 0;
}
```

OUTPUT:

```
PS D:\Programming\py> g++ fact.cpp
PS D:\Programming\py> ./a.exe
Enter a string: tanu
Number of vowels in the string: 2
PS D:\Programming\py>
```

QUE 26: WAP to check if a given string is a palindrome or not.

SOLUTION:

```
#include<iostream>
using namespace std;
int main(){
string st;
cout<<"Enter a string \n";
cin>>st;
int flag=0;
int len=st.size();
for (int i=0;i<len/2;i++)
if(st[i] != st[len-1-i])
{
flag=1;
}
if(flag==0)
cout<<"Palindrome Word";
else
cout<<" Not Palindrome Word";
return 0;
}
```

OUTPUT:

```
PS D:\Programming\py> g++ fact.cpp
PS D:\Programming\py> ./a.exe
Enter a string
tanu
 Not Palindrome Word
PS D:\Programming\py> ./a.exe
Enter a string
annunna
Palindrome Word
PS D:\Programming\py>
```

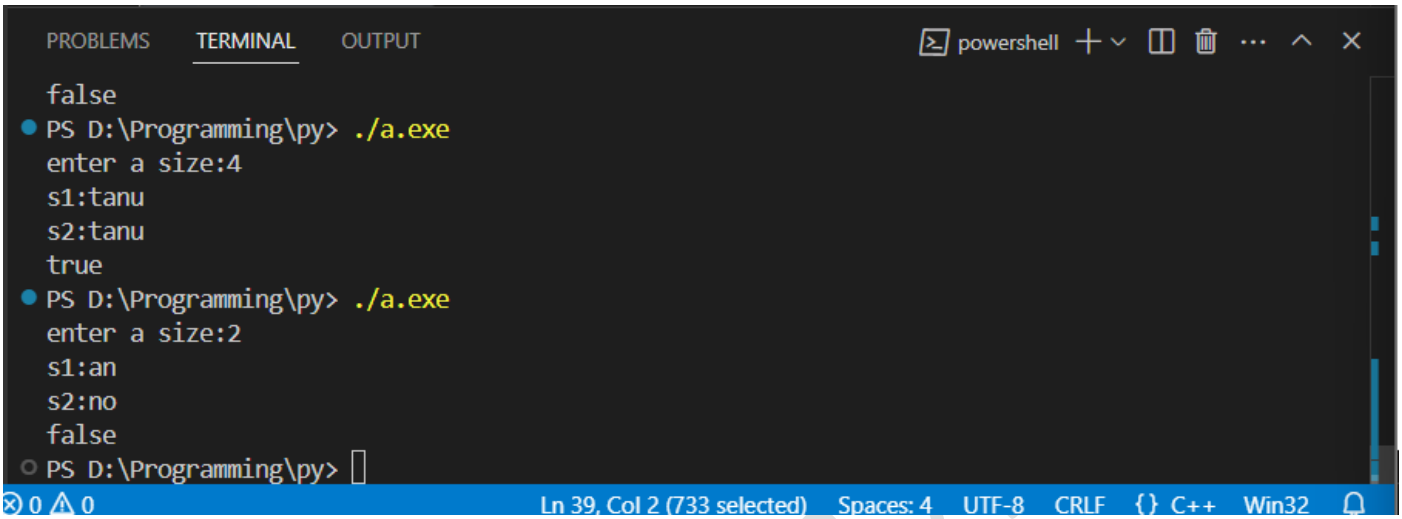
QUE 27: WAP to check f a given string is an anagram or not.

SOLUTION:

```
#include<iostream>
using namespace std;
int main(){
  int arr[26]={0};
  cout << "enter a size:";
  int size;
  cin >> size;
  cout << "s1:";
  char s1[size];
  for(int i=0;i<size;i++){
    cin >> s1[i];
  }
  char s2[size];
  cout << "s2:";
  for(int i=0;i<size;i++){
    cin >> s2[i];
  }
  for(int i=0;i<size;i++){
    int a = s1[i]-'a';
    arr[a]=arr[a]+1;
  }
  for(int i=0;i<size;i++){
    int a = s2[i]-'a';
    arr[a]=arr[a]-1;;
  }
  int flag=0;
  for(int i=0;i<26;i++){
    if(arr[i]!=0){
      flag=1;
      break;
    }
  }
```

```
    (flag==0)? cout << "true" : cout << "false";
    return 0;
}
```

OUTPUT:



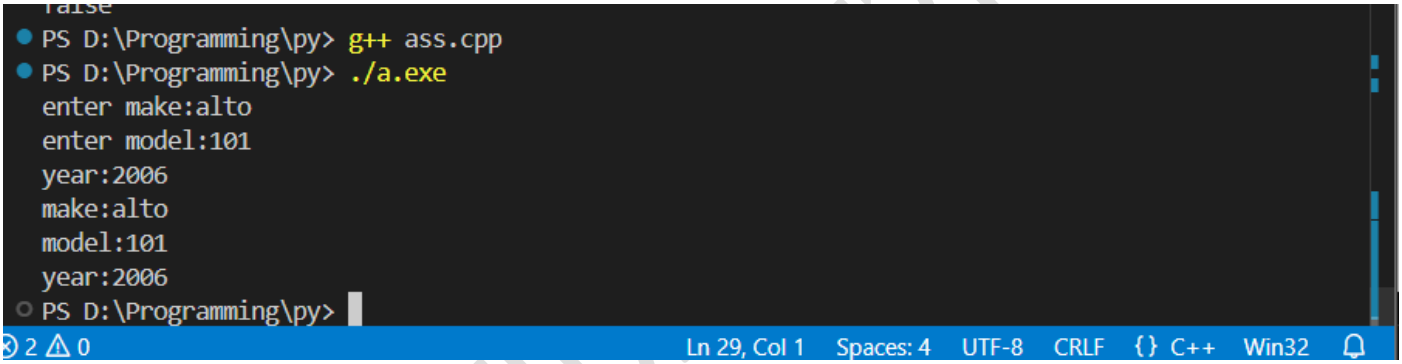
QUE 28: Define a class called Car with attributes such as make, model, and year. Include member functions to set and get these attributes. Create an object of the Car class and demonstrate the use of its member functions.

SOLUTION:

```
#include<iostream>
using namespace std;
class car {
   string make;
   string model;
   int year;
   public:
   void setData(){
      cout << "enter make:";
      cin >> make;
      cout << "enter model:";
      cin >> model;
      cout << "year:";
      cin >> year;
   }
```

```
    void getData(){
        cout << "make:" << make << endl;
        cout << "model:" << model << endl;
        cout << "year:" << year << endl;
    }
};
int main ( ) {
    car c1;
    c1.setData();
    c1.getData();
    return 0;
}
```

OUTPUT:



Que 29. Define a class called Address with attributes such as street, city, and zipCode. Create a class called Person that has an Address object as a member variable. Demonstrate composition by creating a Person object and accessing its Address attribute.

SOLUTION:

```
#include <iostream>
#include <string>
using namespace std;
class Address {
public:
    string street;
    string city;
    string zipCode;
    Address(string s, string c, string z)
    {
```

```
        street = s;
        city = c;
        zipCode = z;
    }
};
class Person {
public:
    string name;
    Address address;
    Person(string n, string s, string c, string z) {
        name = n;
        address = Address(s, c, z); // Initialize Address object
    }

    // Function to display Person details
    void displayDetails() {
        cout << "Name: " << name << endl;
        cout << "Address: " << address.street << ", " << address.city << " " << address.zipCode
<< endl;
    }
};
int main() {
    Person person("John Doe", "123 Main St", "Anytown", "12345");
    person.displayDetails();
    return 0;
}
```

OUTPUT:

```
  Default case is Matched.
PS D:\Programming\py> g++ n.cpp
PS D:\Programming\py> ./a.exe
  Name: John Doe
  Address: 123 Main St, Anytown 12345
PS D:\Programming\py>
```

QUE 30: Write a program to display the minimum, maximum, sum, search and average of elements of an array.

SOLUTION:

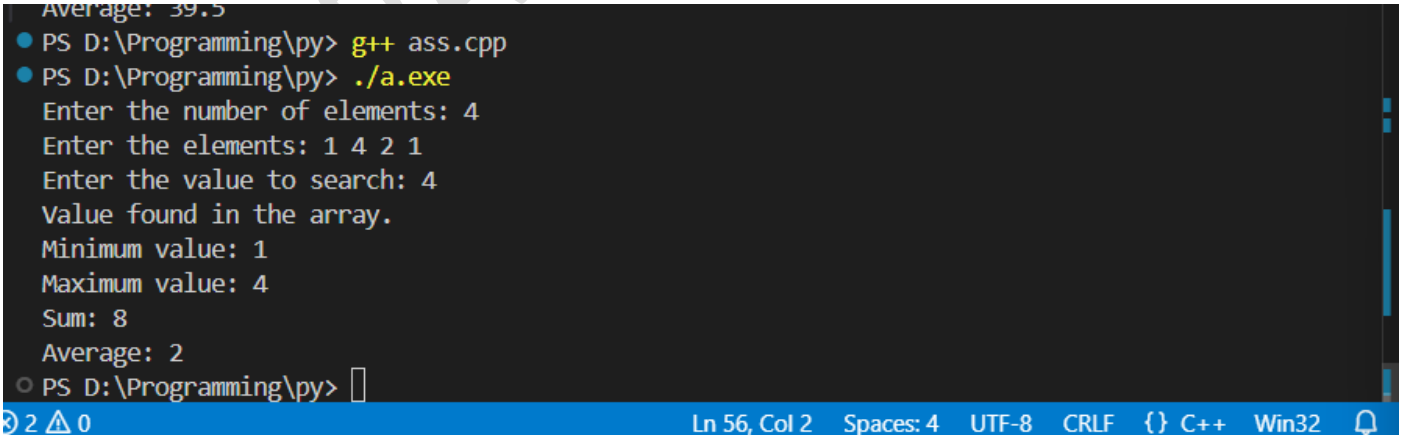
```
#include <iostream>
```

```
using namespace std;
int main() {
   int n;
   cout << "Enter the number of elements: ";
   cin >> n;
   int arr[n];
   cout << "Enter the elements: ";
   for (int i = 0; i < n; i++) {
      cin >> arr[i];
   }
   // Find minimum
   int minVal = arr[0];
   for (int i = 1; i < n; i++) {
      if (arr[i] < minVal) {
         minVal = arr[i];
      }
   }
   // Find maximum
   int maxVal = arr[0];
   for (int i = 1; i < n; i++) {
      if (arr[i] > maxVal) {
         maxVal = arr[i];
      }
   }
   // Calculate sum
   int sum = 0;
   for (int i = 0; i < n; i++) {
      sum += arr[i];
   }
   // Search for an element
   int searchVal;
   cout << "Enter the value to search: ";
   cin >> searchVal;
   bool found = false;
```

```
    for (int i = 0; i < n; i++) {
        if (arr[i] == searchVal) {
            found = true;
            break;
        }
    }
    if (found) {
        cout << "Value found in the array." << endl;
    } else {
        cout << "Value not found in the array." << endl;
    }
    // Calculate average
    double average = (double)sum / n;

    // Display results
    cout << "Minimum value: " << minVal << endl;
    cout << "Maximum value: " << maxVal << endl;
cout << "Sum: " << sum << endl;
    cout << "Average: " << average << endl;
    return 0;
}
```

OUTPUT:



QUE 31: Define a class student with the following specification

Private members of class student

admno integer

sname 20 character

eng. math, science float

total float

Public member function of class student

ctotal() a function to calculate eng + math + science with float return type.

Takedata() Function to accept values for admno, sname, eng, science Showdata() Function to display all the data members on the screen.

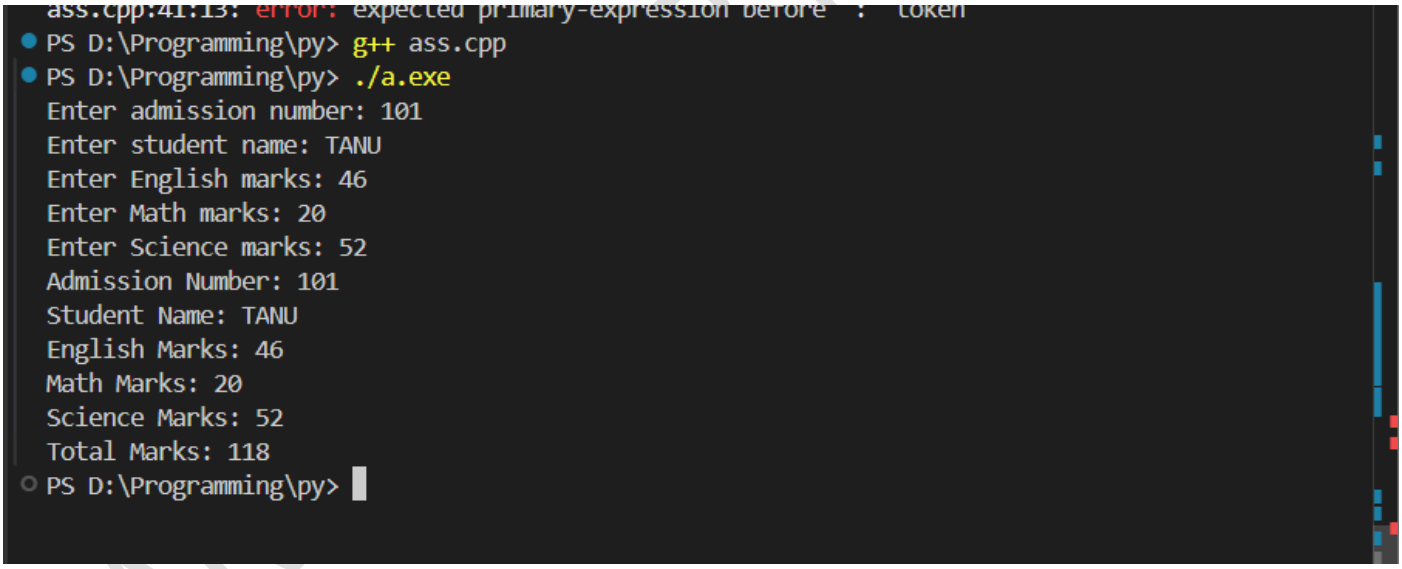
SOLUTION:

```
#include <iostream>
using namespace std;
class Student {
private:
  int admno;
  char sname[20];
  float eng, math, science;
  float total;
public:
  // Function to calculate total
  float ctotal() {
    total = eng + math + science;
    return total;
  }

  void takeData() {
    cout << "Enter admission number: ";
    cin >> admno;
    cout << "Enter student name: ";
    cin >> sname;
    cout << "Enter English marks: ";
    cin >> eng;
    cout << "Enter Math marks: ";
    cin >> math;
    cout << "Enter Science marks: ";
    cin >> science;
  }
```

```
    void showData() {
        cout << "Admission Number: " << admno << endl;
        cout << "Student Name: " << sname << endl;
        cout << "English Marks: " << eng << endl;
        cout << "Math Marks: " << math << endl;
        cout << "Science Marks: " << science << endl;
        cout << "Total Marks: " << ctotal() << endl;
    }
};
int main() {
    Student student;
    student.takeData();
    student.showData();
    return 0;
}
```

OUTPUT:



QUE 32: Define a class in C++ with following description:

Private Members

A data member Flight number of type integer

A data member Destination of type string

A data member Distance of type float

A data member Fuel of type float

A member function CALFUEL() to calculate the value of Fuel as per the following criteria

Distance	Fuel
<=1000	500
more than 1000 and <=2000	1100
more than 2000	2200

Public Members

A function FEEDINFO() to allow user to enter values for Flight Number, Destination, Distance & call function CALFUEL() to calculate the quantity of Fuel.

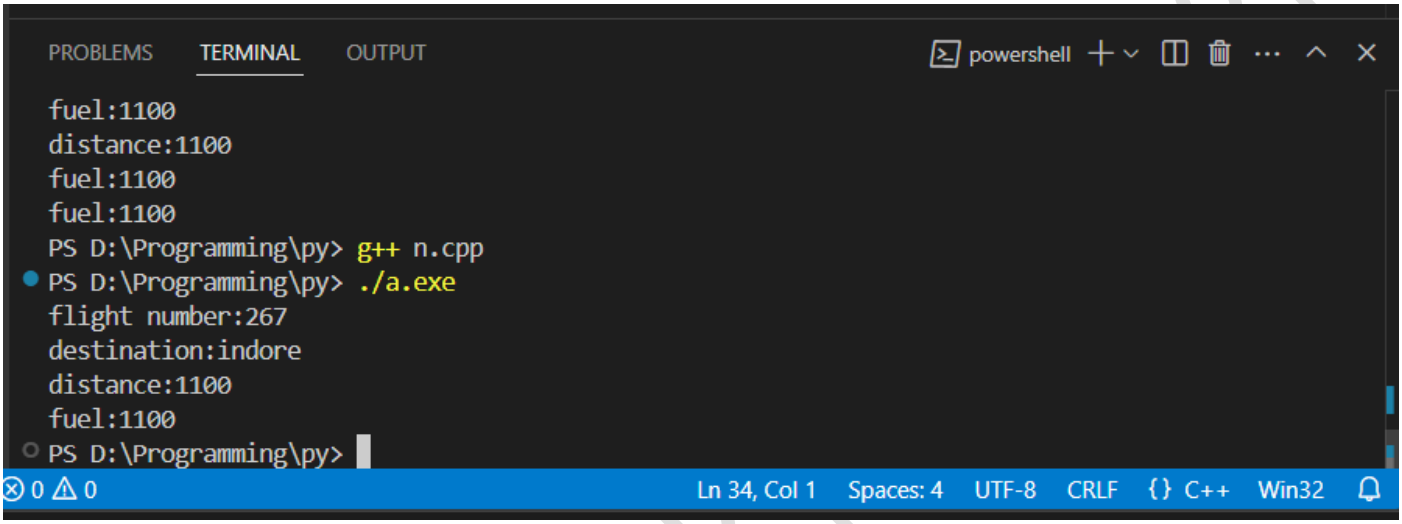
A function SHOWINFO() to allow user to view the content of all the data members.

SOLUTION:

```
#include<iostream>
using namespace std;
class travel{
  int flightNumber;
  string destination;
  int distance;
  float fuel;
  void calFuel(){
    if(distance<=1000) fuel=500;
    else if(distance>1000 && distance<=2000) fuel=1100;
    else fuel=2200;
  }
  public :
  void feedInfo(int fn,string des,int dist){
    flightNumber=fn;
    destination=des;
    distance=dist;
    calFuel();
  }
  void showInfo(){
    cout << "flight number:" << flightNumber << endl;
    cout << "destination:" << destination << endl;
    cout << "distance:" << distance << endl;
    cout << "fuel:" << fuel << endl;
  }
```

```
};
int main(){
    travel t1;
   t1.feedInfo(267,"indore",1100);
   t1.showInfo();
   return 0;
}
```

OUTPUT:



QUE 33: Write a menu driven program to perform following:

a) Input a matrix

b) Display matrix

c) Add two matrices

d) Multiply two matrices

e) Transpose a matrix

SOLUTION:

```
#include <iostream>
using namespace std;
class matrix
{
   int arr1[3][3];
   int arr2[3][3];

public:
   void Switch(int button)
```

```
{
   switch (button)
   {
   case 1:
      inputdata();
      break;
   case 2:
      displaydata();
      break;
   case 3:
      add();
      break;
   case 4:
      multiply();
      break;
   case 5:
      transpose();
      break;
   default:
      printf("Default case is Matched.");
      break;
   }
}
void inputdata()
{
   cout << "enter 9 elements for matrix 1:";
   for (int i = 0; i < 3; i++)
   {
      for (int j = 0; j < 3; j++)
      {
         cin >> arr1[i][j];
      }
   }
   cout << " enter 9 elements for matrix 2:";
```

```
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            cin >> arr2[i][j];
        }
    }
}
void displaydata()
{
    cout << "array 1:\n";
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            cout << arr1[i][j] << " ";
        }
        cout << endl;
    }
    cout << "array 2:\n";
    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            cout << arr2[i][j] << " ";
        }
        cout << endl;
    }
}
void add()
{
    cout << "sum of two matrix";
    for (int i = 0; i < 3; i++)
    {
```

```
      for (int j = 0; j < 3; j++)
      {
         int r = arr1[i][j] + arr2[i][j];
         cout << r << " ";
      }
      cout << endl;
   }
}
void multiply()
{
   printf("the resultant matrix\n");
   for (int i = 0; i < 3; i++)
   {
      int d = 0;
      for (int j = 0; j < i; j++)
      {
         d = arr2[i][j];
         arr2[i][j] = arr2[j][i];
         arr2[j][i] = d;
      }
   }
   int r = 0;
   for (int i = 0; i < 3; i++)
   {
      for (int j = 0; j < 3; j++)
      {
      for (int k = 0; k < 3; k++)
         {
            r = arr1[i][k] * arr2[j][k] + r;
         }
         cout << r << " ";
      }
   }
}
```

```
  void transpose()
  {
    cout << "transpose of both matrix:";
    for (int i = 0; i < 3; i++)
    {
      int d = 0;
      for (int j = 0; j < i; j++)
      {
        d = arr1[i][j];
        arr1[i][j] = arr1[j][i];
        arr1[j][i] = d;
      }
    }
    for (int i = 0; i < 3; i++)
    {
      int d = 0;
      for (int j = 0; j < i; j++)
      {
        d = arr2[i][j];
        arr2[i][j] = arr2[j][i];
        arr2[j][i] = d;
      }
    }
    displaydata();
  }
};
int main()
{
  matrix m1;
  cout << "enter 1 for input matrix:" << endl;
  cout << "enter 2 for output matrix:" << endl;
  cout << "enter 3 for add two matrix:" << endl;
  cout << "enter 4 for multiply two matrix:" << endl;
  cout << "enter 5 for transpose of matrix:" << endl;
```

```
    int button;
    cout << "enter button:";
    cin >> button;
    m1.Switch(button);
    cout << "enter button:";
    cin >> button;
    m1.Switch(button);
    cout << "enter button:";
    cin >> button;
    m1.Switch(button);
    return 0;
}
```

OUTPUT:

```
 9
PS D:\Programming\py> g++ n.cpp
PS D:\Programming\py> ./a.exe
enter 1 for input matrix:
enter 2 for output matrix:
enter 3 for add two matrix:
enter 4 for multiply two matrix:
enter 5 for transpose of matrix:
enter button:1
enter 9 elements for matrix 1:1 2 3 6 5 4 7 8 9
 enter 9 elements for matrix 2:1 2 3 6 9 8 7 4 5
enter button:5
transpose of both matrix:array 1:
1 6 7
2 5 8
3 4 9
array 2:
1 6 7
2 9 4
3 8 5
enter button:
```