Data Structures

Lab 1

Q1. Get two values from the user and swap them.

#include <iostream>

using namespace std;

int main(){

int a,b;

cout<<"Enter first number ";

cin>>a;

cout<<"Enter second number";

cin>>b;

cout<<"Before Swaping "<<a<<" "<<b<<endl;

int temp = a;

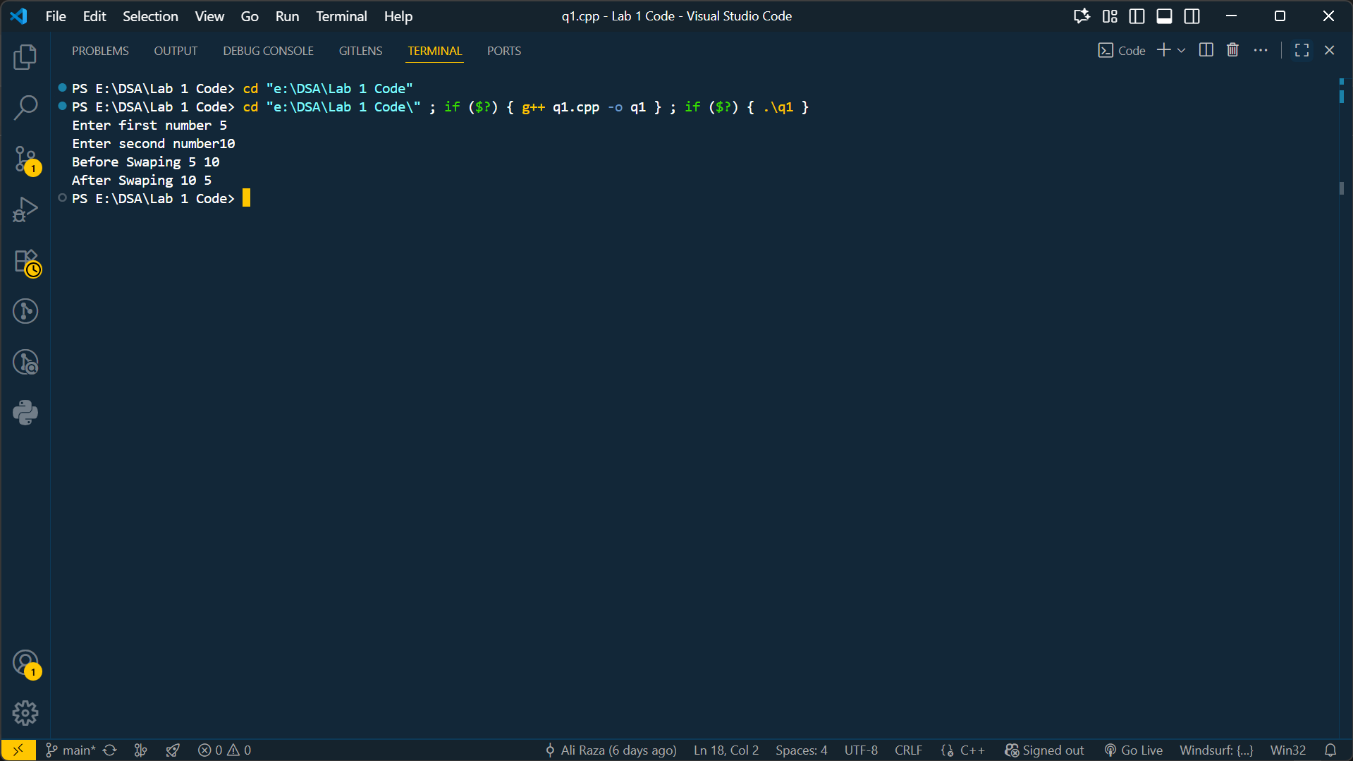
a = b;

b = temp;

cout<<"After Swaping "<<a<<" "<<b;

return 0;

}



Q2 . Ask user to enter a three digit number. Then display the number in reverse order.

#include <iostream>

using namespace std;

int main(){

int a;

cout<<"Enter a three digit Number\t";

cin>>a;

while (a>0)

{

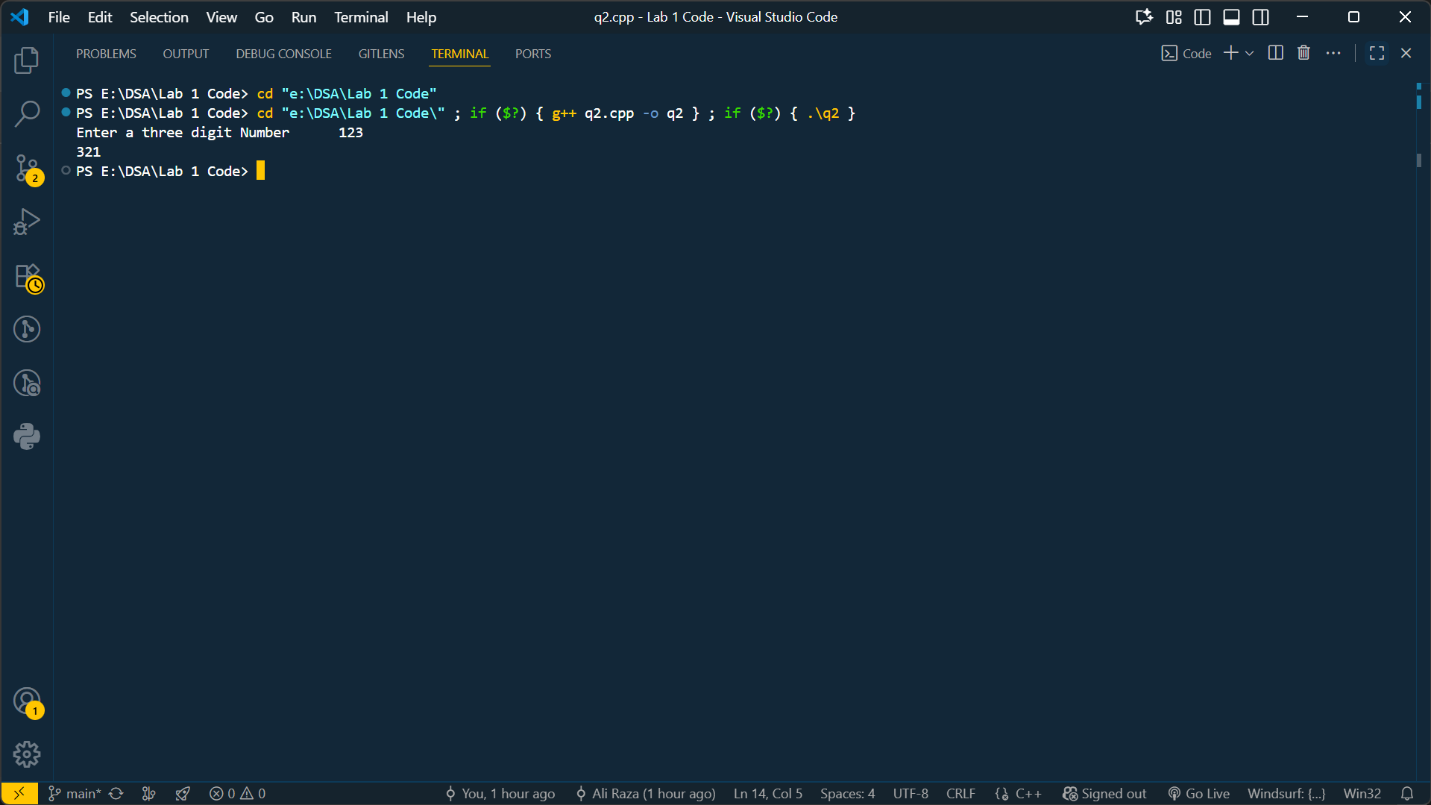
cout<<a%10;

a/=10;

}

return 0;

}



Q3. A program that takes an n digits integer from user and shows the digits on the screen separately i.e. if user enters 6572, it displays 6,5,7,2 separately and a total of individual numbers as well e.g 20 in given case

#include <iostream>

using namespace std;

int main(){

string num ;

cout<<"Enter a digit ";

getline(cin,num);

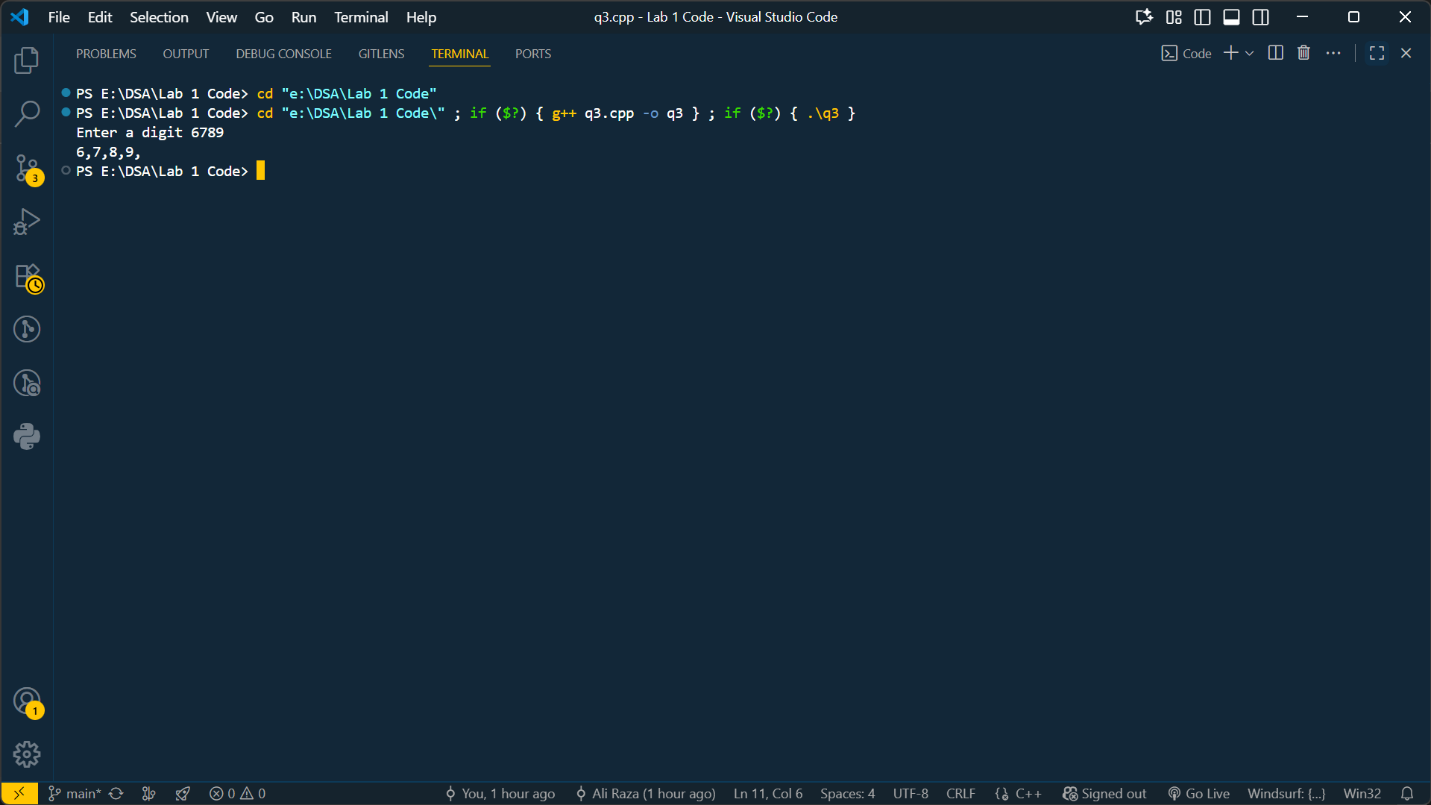
for(char c:num){

cout<<c<<",";

}

return 0;

}



Q4. Write a program that takes radius of a circle from the user and calculates the diameter, circumference and area of the circle and display the result.

#include <iostream>

using namespace std;

int main(){

float r,dia,circum,area;

cout<<"Enter Radius of Circle\t";

cin>>r;

dia = r\*2;

cout<<"Diameter of Circle is \t"<<dia<<endl;

circum = 2\*3.14\*r;

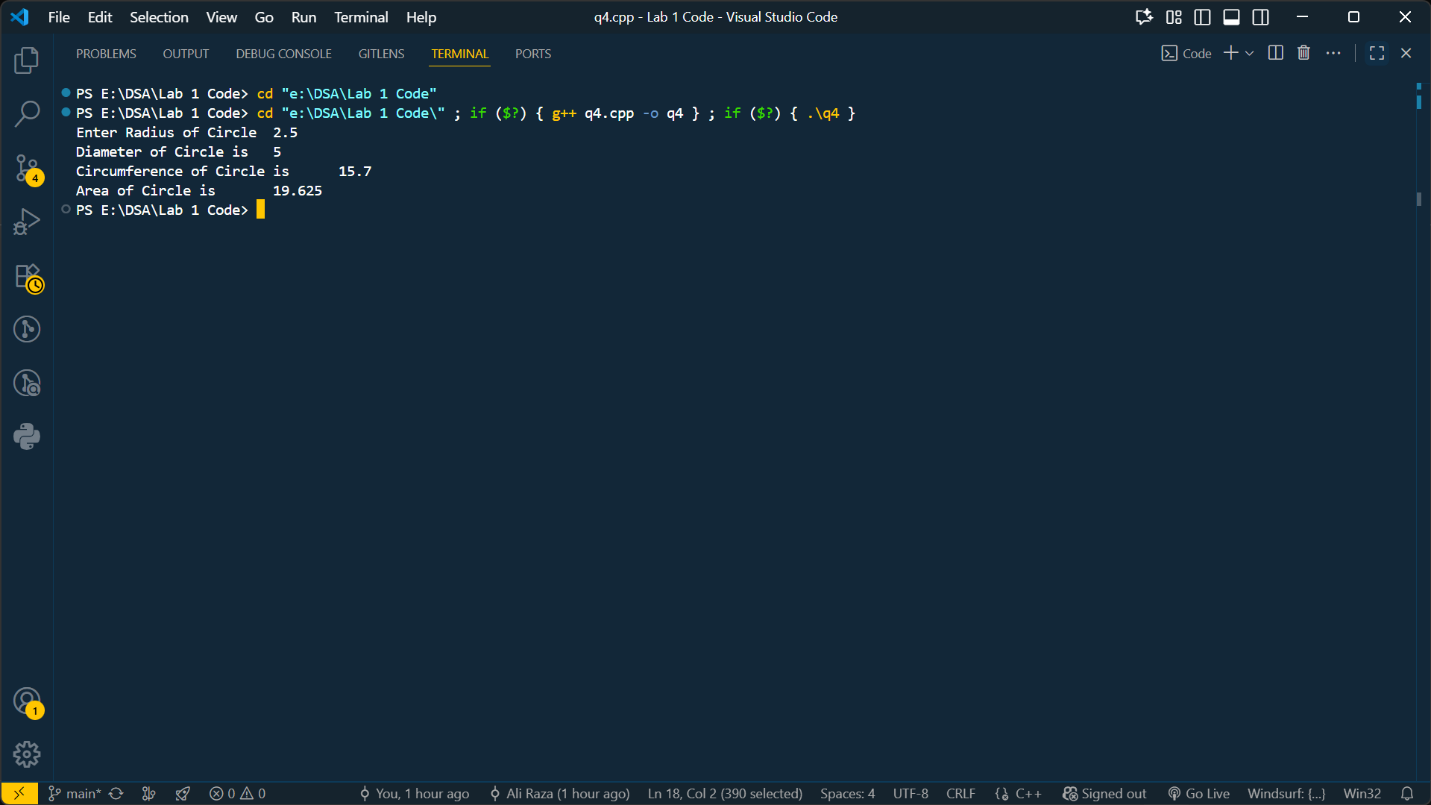
cout<<"Circumference of Circle is \t"<<circum<<endl;

area = 3.14 \*r \*r ;

cout<<"Area of Circle is \t"<<area<<endl;

return 0;

}



Q5 . Write a program which calculates and displays the sum of first 100 integers.

*#include* <iostream>

*using* *namespace* std;

int main(){

    int limit *=* 100;

    int sum *=* 0;

*for* (int i *=* 1; i *<=*100 ; i*++*)

    {

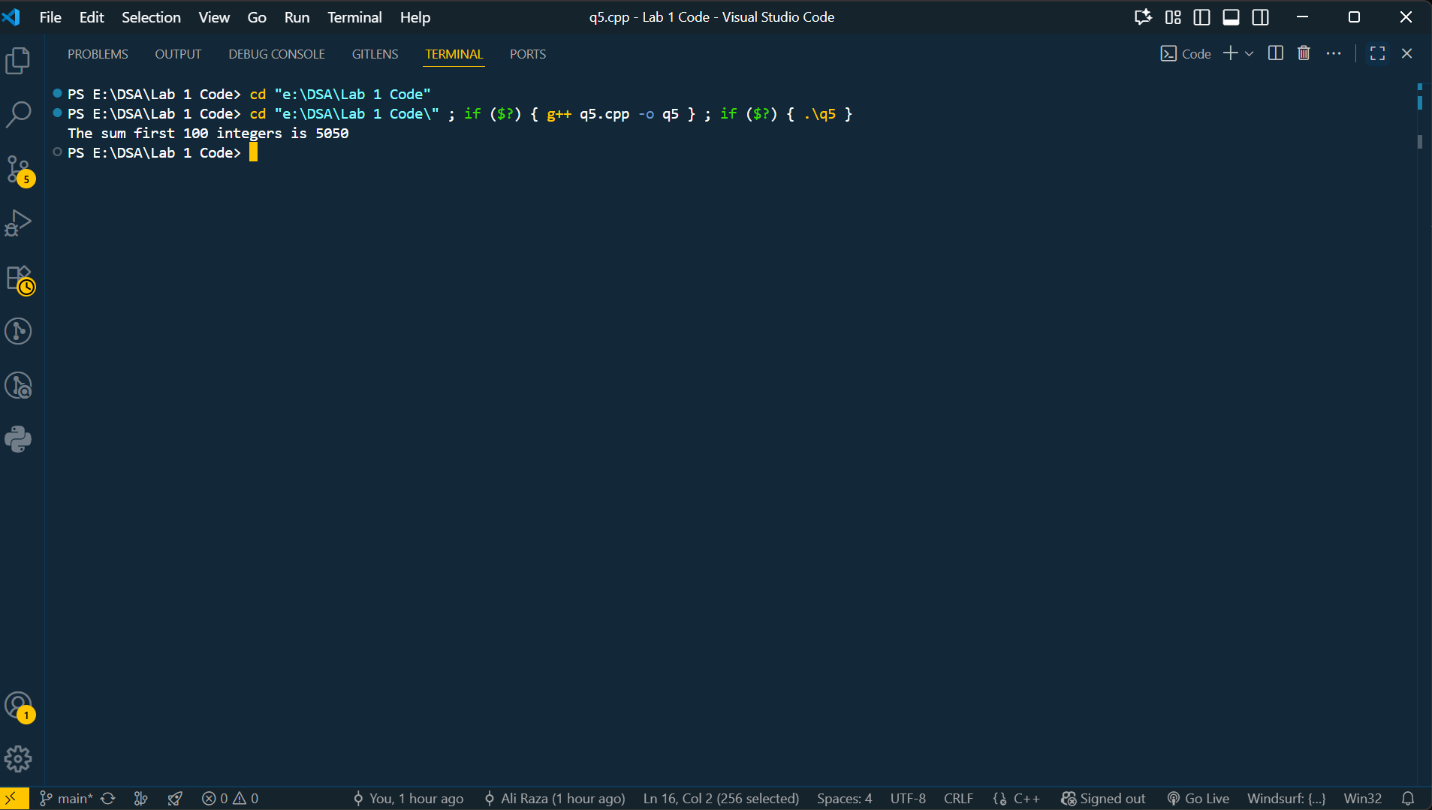
        sum*+=*i;

    }

    cout*<<*"The sum first "*<<*limit*<<*" integers is "*<<*sum*<<*endl;

*return* 0;

}



Q6. Write a program that calculates sum of even numbers for a given upper limit of integers. The user should not be able to give upper limit greater than 1000. The program should contain two functions. The first function GetUpperLimit takes the input from the user and second function SumOfEven calculates the sum of even number up to given upper limit.

*#include* <iostream>

*using* *namespace* std;

int getUpperLimit(){

    int limit;

    cout*<<*"Enter the limit\t";

    cin*>>*limit;

*if* (limit*>*1000)

    {

        cout*<<*"Please enter valid Limit\n";

*return* 0;

    }*else*{

*return* limit;

    }

}

int sumOfEven(int num){

    int sum *=* 0;

*for* (int i *=* 0; i *<=*num; i*+=*2)

    {

        sum*+=*i;

    }

*return* sum;

}

int main(){

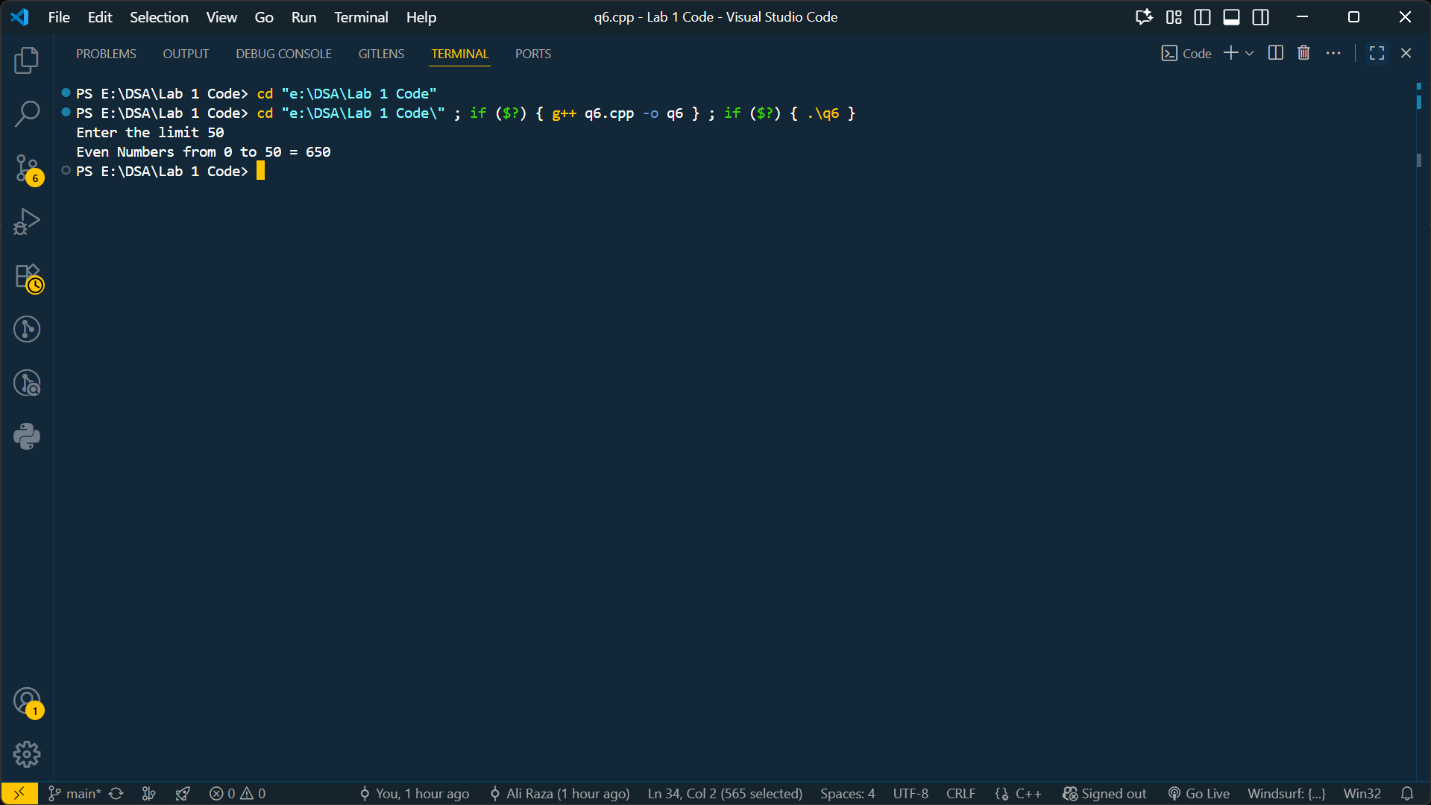
    int num *=* getUpperLimit();

    int sum *=* sumOfEven(num);

    cout*<<*"Even Numbers from 0 to "*<<*num*<<*" = "*<<*sum;

*return* 0;

}



Q7. Write a function that calculates the factorial of a given number by using iteration and recursion

*#include* <iostream>

*using* *namespace* std;

int facByIter(int n){

    int fac *=* 1;

*for* (int i *=* 1; i *<=*n; i*++*)

    {

        fac *\*=* i;

    }

*return* fac;

}

int facByRec(int n){

*if* (n *==* 1)

    {

*return* 1;

    }*else*{

*return* n*\** facByRec(n*-*1);

    }

}

int main(){

    int num *=* 5;

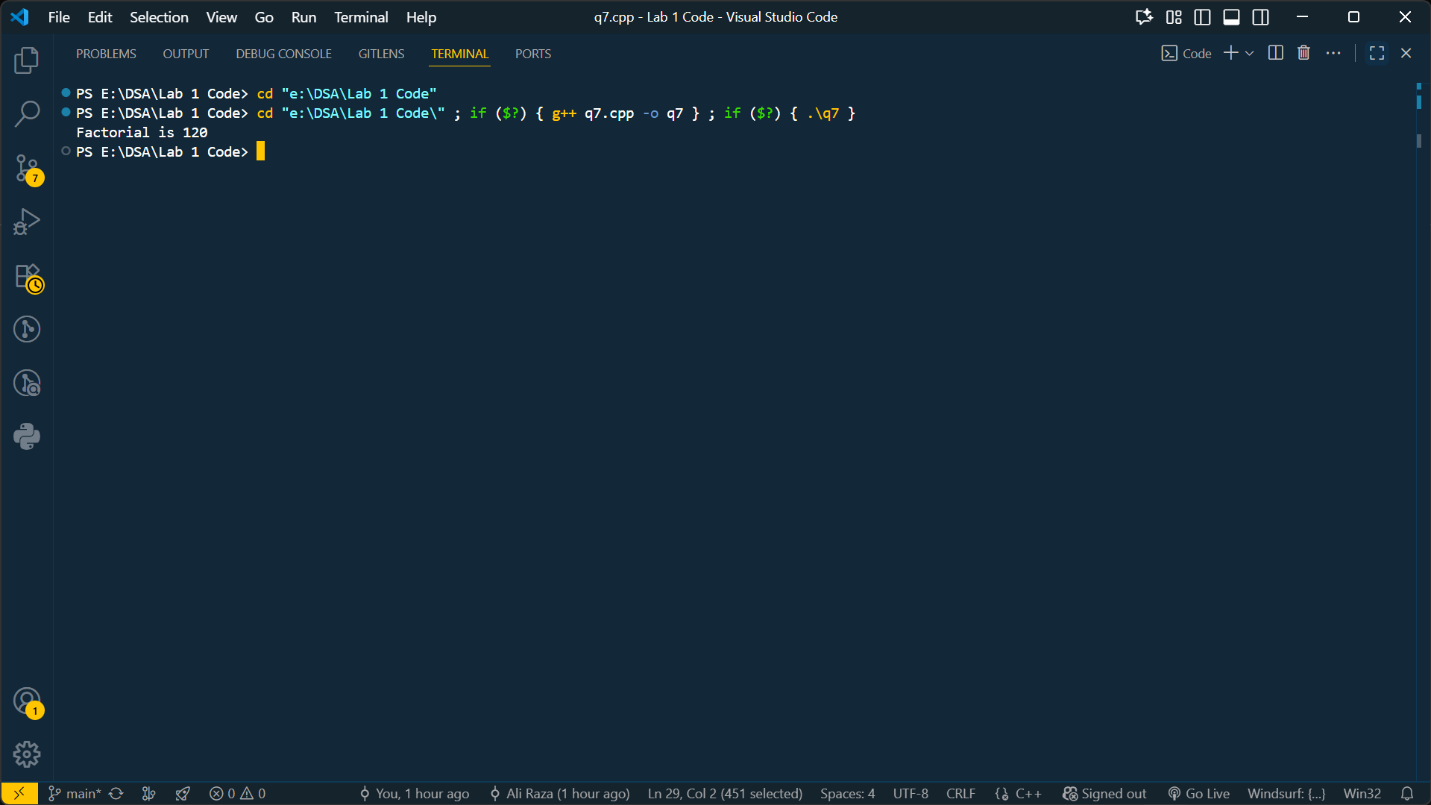
*// int fac = facByIter(num);*

    int fac *=* facByRec(num);

    cout*<<*"Factorial is "*<<*fac;

*return* 0;

}



Q8. Write a program which takes an integer input from user and displays its table. The table is displayed up to the multiplier entered by the user

*#include* <iostream>

*using* *namespace* std;

void tablePrint(int num,int multiplier){

*for* (int i *=* 1; i *<=* multiplier; i*++*)

    {

        cout*<<*num*<<*" \* "*<<*i*<<*" = "*<<*num*\**i*<<*endl;

    }

}

int main(){

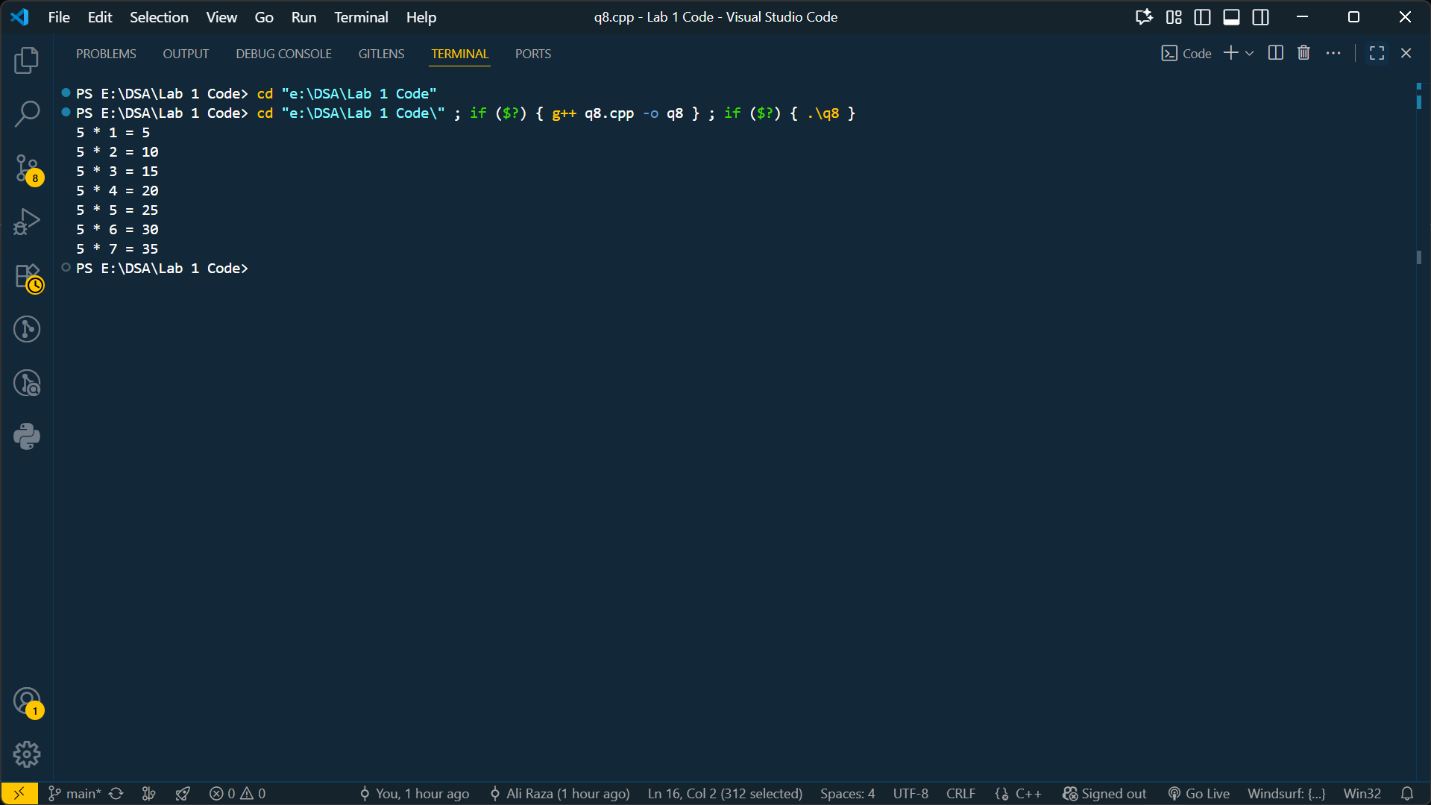
    int table *=* 5;

    int multiplier *=* 7;

    tablePrint(table,multiplier);

*return* 0;

}



Q9. Write a program that allows the user to guess a character from ‘a’ to ‘z’. The user should allow maximum five tries for guessing. If the user guesses the number on the first try then he/she gets score 10,000. On second, third, fourth and fifth try gets 8,000, 6,000, 4,000, 2,000 respectively and 0 if he/she could not guess the number.

*#include* <iostream>

*#include* <cstdlib>

*#include* <ctime>

*using* *namespace* std;

int main(){

    int tries *=* 1;

    srand(time(0));

    char randomChar *=* 'a' *+* rand() *%* 26;

*// cout<<"The random Character is "<<randomChar<<endl;*

    char c;

    int score *=* 0;

*do*

    {

        cout*<<*"Enter any character\t";

        cin*>>*c;

*if*(c *==* randomChar){

*if* (tries *==* 1)

            {

                score *+=*10000;

            }*else* *if*(tries *==* 2){

                score*+=*8000;

            }

*else* *if*(tries *==* 3){

                score*+=*6000;

            }

*else* *if*(tries *==* 4){

                score*+=*4000;

            }

*else* *if*(tries *==* 5){

                score*+=*2000;

            }

*break*;

        }

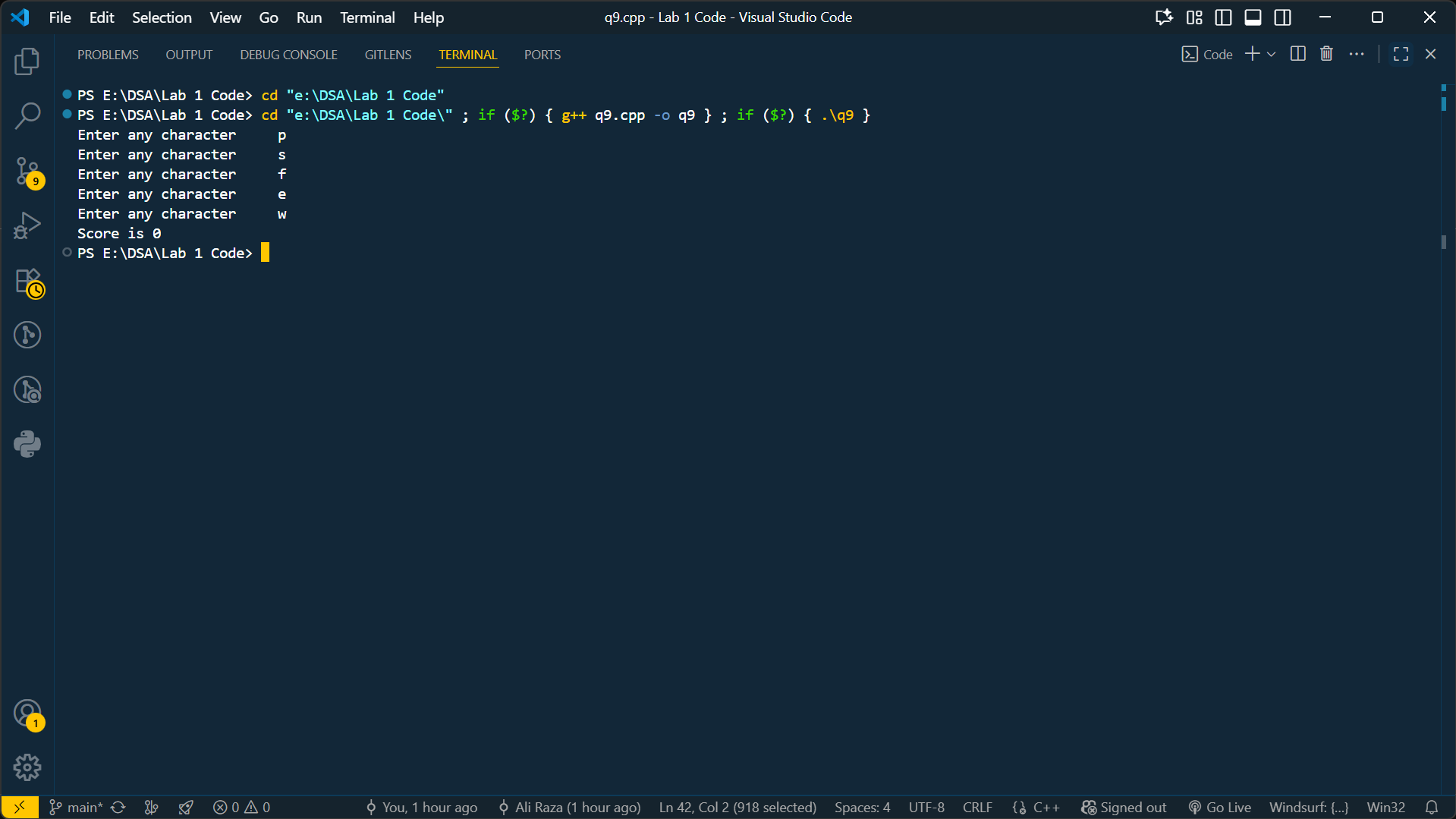
        tries*++*;

    } *while* (tries*<=*5);

    cout*<<*"Score is "*<<*score;

*return* 0;

}



Q10. Write a program to display string from backward e.g. if user enters “Hello World” the program should display “ dlroW olleH”.

*#include* <iostream>

*using* *namespace* std;

int main(){

    string s;

    cout*<<*"Enter a string\t";

    getline(cin,s);

*for* (int i *=* s.length(); i *>=* 0; i*--*)

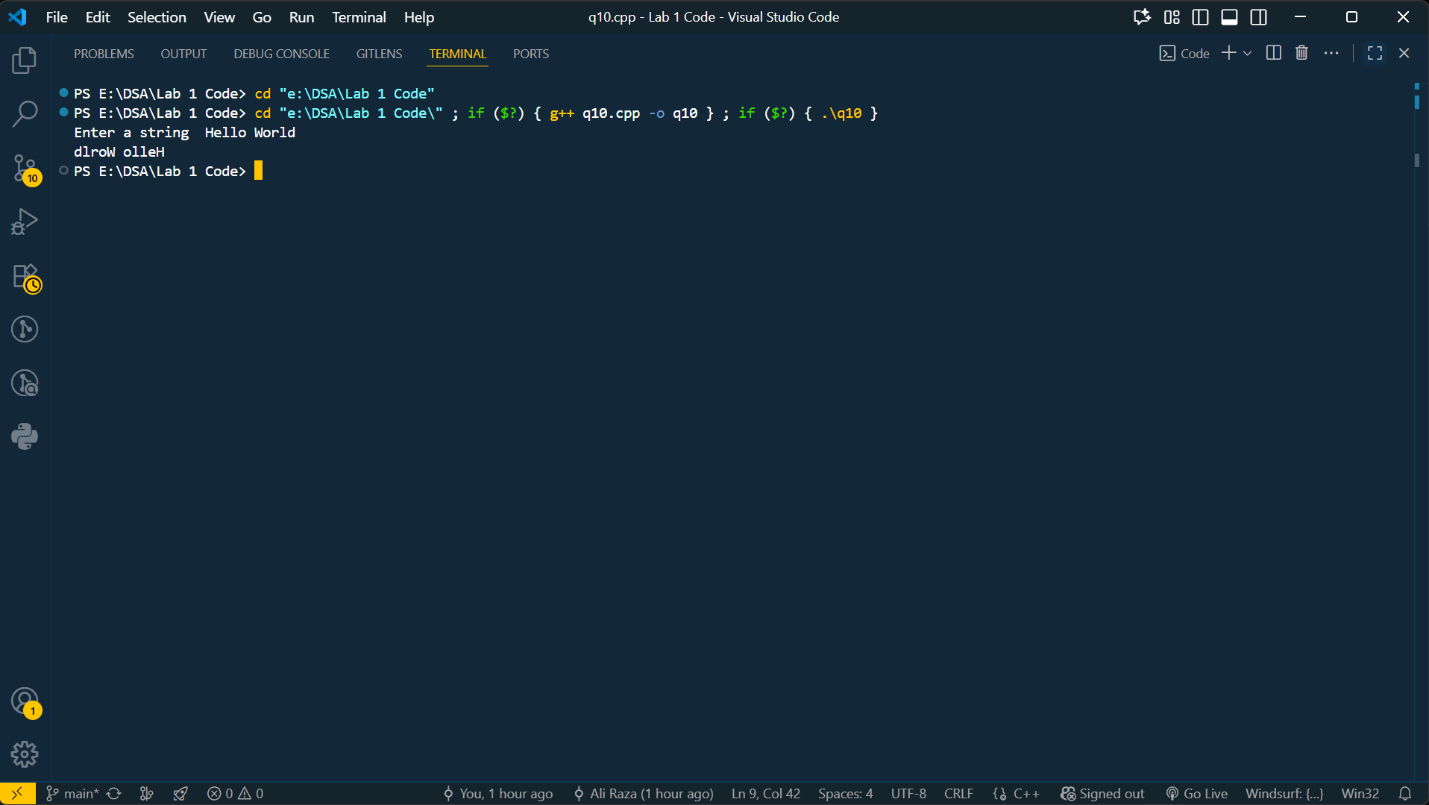
    {

        cout*<<*s*[*i*]*;

    }

*return* 0;

}



Q11. Write a program to count number of words in string e.g. if user enters “This is a string” the program should display 4.

*#include* <iostream>

*using* *namespace* std;

int main(){

    int spaces *=* 1;

    string s;

    cout*<<*"Enter a string\t";

    getline(cin,s);

*for*(char c:s){

*if* (c*==*' ')

        {

            spaces*++*;

        }

    }

    cout*<<*"Total Spaces "*<<*spaces*<<*endl;

*return* 0;

}

