# Question 1 C#

# What data type is each of the following?

# 5 -> integer

# 5.0 -> float

# 5 > 1-> Boolean (True)

# '5'-> String

# 5 \* 2-> integer (10)

# '5' \* 2-> string (‘55’)

# '5' + '2'-> error

# 5 / 2-> float (2.5)

# 5 % 2-> integer

# {5, 2, 1}-> list

# 5 == 3-> bool

# Pi (the number)-> float(3.141)

# Question 2

# C# Write (and evaluate) C# expressions that answer these questions:

# a. How many letters are there in 'Supercalifragilisticexpialidocious'?

# b. Does 'Supercalifragilisticexpialidocious' contain 'ice' as a substring?

# c. Which of the following words is the longest: Supercalifragilisticexpialidocious, Honorificabilitudinitatibus, or Bababadalgharaghtakamminarronnkonn?

# d. Which composer comes first in the dictionary: 'Berlioz', 'Borodin', 'Brian', 'Bartok', 'Bellini', 'Buxtehude', 'Bernstein'. Which one comes last?

# using System;

# using System.Collections.Generic;

# string str1 = "Supercalifragilisticexpialidocious";

# Console.WriteLine("There are {0} letters in str1", str1.Length);

# string str2 = "Supercalifragilisticexpialidocious";

# string str3 = "ice";

# Console.WriteLine("The value of str3 is in str2 = {0}", str2.Contains(str3));

# string str4 = "Supercalifragilisticexpialidocious";

# string str5 = "Honorificabilitudinitatibus";

# string str6 = "Bababadalgharaghtakamminarronnkonn";

# if ((str4.Length>=str5.Length) && (str4.Length>=str6.Length))

# Console.WriteLine("The longgest word is = {0}", str4);

# 

# else if (str5.Length >= str6.Length)

# Console.WriteLine("The longgest word is = {0}", str5);

# else

# Console.WriteLine("The longgest word is = {0}", str6)

# ;

# var MyList = new List<string>();

# MyList.Add("Berlioz");

# MyList.Add("Borodin");

# MyList.Add("Brian");

# MyList.Add("Bartok");

# MyList.Add("Bellini");

# MyList.Add("Buxtehude");

# MyList.Add("Bernstein");

# MyList.Sort();

# Console.WriteLine(string.Join("\n",

# MyList));

# Question 3

Implement function triangleArea(a,b,c) that takes as input the lengths of the 3 sides of a triangle and returns the area of the triangle. By Heron's formula, the area of a triangle with side lengths a, b, and c is s(s - a)(s -b)(s -c) , where s = (a+b+c)/2.

triangleArea(2,2,2)

1.7320508075688772

using System;

namespace TriangleArea

{

class Program

{

static void Main(string[] args)

{

Console.WriteLine(triangleArea(3, 4, 5));

}

static double triangleArea(double a, double b, double c)

{

double s = (a + b + c) / 2;

return Math.Sqrt(s \* (s - a) \* (s - b) \* (s - c));

}

}

}

# Question 4

Write a program in C# Sharp to separate odd and even integers in separate arrays. Go to the editor Test Data : Input the number of elements to be stored in the array :5 Input 5 elements in the array : element - 0 : 25 element - 1 : 47 element - 2 : 42 element - 3 : 56 element - 4 : 32 Expected Output: The Even elements are: 42 56 32 The Odd elements are : 25 47

public class OddEven//public class OddEven

{

static void Main(string[] args)//main method

{

Console.Write("Input the number of elements to be stored in the array: ");/\* asking for array length input from user \*/

int total = Convert.ToInt32(Console.ReadLine());/\* taking input from user and convert into Int32 \*/

Console.WriteLine("Input "+total+" elements in the array : ");/\* asking array element input from user \*/

int[] array = new int[total];/\* declaring array \*/

for(int i=0;i<total;i++)/\* iterating loop from to total number of element in array\*/

{

Console.Write("element - "+i+" : ");/\* asking for input \*/

array[i] = Convert.ToInt32(Console.ReadLine());/\* taking input from user \*/

}

int[] odd = new int[total];/\* declaring odd array \*/

int[] even = new int[total];/\* declaring even array \*/

int j = 0;/\* declared for loop iteration \*/

for(int i=0;i<total;i++)/\* iterating loop from to total number of element in array\*/

{

if(array[i]%2 == 0)/\* checking if element is even or not \*/

{

even[j++] = array[i];//then add into even array

}

}

Console.WriteLine("\nThe Even elements are : ");/\* printing Even elements \*/

for(int i=0;i<j;i++)/\* iterating loop from to total number of element in array\*/

{

Console.Write(even[i] + " ");/\* print out elements of Even \*/

}

j = 0;/\* reassign for loop iteration \*/

for(int i=0;i<total;i++)/\* iterating loop from to total number of element in array\*/

{

if(array[i]%2 != 0)/\* checking if element is odd or not \*/

{

odd[j++] = array[i];//then add into odd array

}

}

Console.WriteLine("\nThe Odd elements are : ");/\* printing Odd elements \*/

for(int i=0;i<j;i++)/\* iterating loop from to total number of element in array\*/

{

Console.Write(odd[i] + " ");/\* print out element \*/

}

}

}

**Question 5 C#**

1. **Write a function inside(x,y,x1,y1,x2,y2) that returns True or False depending on whether the point (x,y) lies in the rectangle with lower left corner (x1,y1) and upper right corner (x2,y2). >>> inside(1,1,0,0,2,3) True >>> inside(-1,-1,0,0,2,3) False b. Use function inside() from part a. to write an expression that tests whether the point (1,1) lies in both of the following rectangles: one with lower left corner (0.3, 0.5) and upper right corner (1.1, 0.7) and the other with lower left corner (0.5, 0.2) and upper right corner (1.1, 2).**

using System;

public static class Globals

{

public static bool inside(int x, int y, int x1, int y1, int x2, int y2)

{

if (x > x1 && x < x2 && y > y1 && y < y2)

{

return true;

}

return false;

}

// Driver code

internal static void Main()

{

int x;

int y;

int x1;

int y1;

int x2;

int y2;

x = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

y = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

x1 = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

y1 = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

x2 = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

y2 = int.Parse(ConsoleInput.ReadToWhiteSpace(true));

// function call

if (inside(x, y, x1, y1, x2, y2))

{

Console.Write("True");

}

else

{

Console.Write("False");

}

}

}

internal static class ConsoleInput

{

private static bool goodLastRead = false;

public static bool LastReadWasGood

{

Get

using System;

public static class Globals

{

public static bool inside(double x, double y, double x1, double y1, double x2, double y2)

{

if (x > x1 && x < x2 && y > y1 && y < y2)

{

return true;

}

return false;

}

internal static void Main()

{

double x = 1;

double y = 1;

if (inside(x, y, 0.3, 0.5, 1.1, 0.7) && inside(x, y, 0.5, 0.2, 1.1, 2))

{

Console.Write("True");

}

else

{

Console.Write("False");

}

}

}

**Question 6**

You can turn a word into pig-Latin using the following two rules (simplified):

• If the word starts with a consonant, move that letter to the end and append 'ay'. For example, 'happy' becomes 'appyhay' and 'pencil' becomes 'encilpay'. • If the word starts with a vowel, simply append 'way' to the end of the word. For example, 'enter' becomes 'enterway' and 'other' becomes 'otherway' . For our purposes, there are 5 vowels: a, e, i, o, u (so we count y as a consonant). Write a function pig() that takes a word (i.e., a string) as input and returns its pigLatin form. Your function should still work if the input word contains upper case characters. Your output should always be lower case however.

pig('happy')

'appyhay'

pig('Enter')

'enterway'

In [47]:

**def** pig(s):

a**=** s**.**lower()

x**=**a[0]

**if**(x **in** "aeiou"):

**return** (a**+**"way")

**else**:

**return** (a[1:]**+**a[0]**+**"ay")

print(pig("happy"))

print(pig("Enter"))

appyhay

enterway

# Question 7

File bloodtype1.txt records blood-types of patients (A, B, AB, O or OO) at a clinic. Write a function bldcount() that reads the file with name name and reports (i.e., prints) how many patients there are in each bloodtype.

bldcount('bloodtype.txt')

There are 10 patients of blood type A. There is one patient of blood type B. There are 10 patients of blood type AB. There are 12 patients of blood type O. There are no patients of blood type OO.

In [48]:

**def** bldcount(s):

file **=** open(s)

data **=** file**.**read()

bloodtypes **=** data**.**strip()**.**split(' ')

valid\_bloodtypes **=** ["A", "B", "AB", "O", "OO"]

counts **=** [0,0,0,0,0]

**for** bloodtype **in** bloodtypes:

**if** bloodtype **in** valid\_bloodtypes:

idx **=** valid\_bloodtypes**.**index(bloodtype)

counts[idx] **+=** 1

**for** i, bloodtype **in** enumerate(valid\_bloodtypes):

print("There are", counts[i], "patients of bloodtype", bloodtype)

bldcount("bloodtype1.txt")

There are 15 patients of bloodtype A

There are 1 patients of bloodtype B

There are 13 patients of bloodtype AB

There are 15 patients of bloodtype O

There are 0 patients of bloodtype OO

# Question 8

Write a function curconv() that takes as input:

1. a currency represented using a string (e.g., 'JPY' for the Japanese Yen or

'EUR' for the Euro) 2. an amount and then converts and returns the amount in US dollars.

curconv('EUR', 100)

122.96544

curconv('JPY', 100)

1.241401

In [49]:

**def** curConv(Currency, value):

f **=** open("currencies.txt")

lines **=** f**.**readlines()

**for** line **in** lines:

s **=** line**.**strip()**.**split('\t')

code **=** s[0]

convFactor **=** float(s[1])

name **=** s[2]

**if** Currency **==** code:

**return** value **\*** convFactor

print("Converted amount in USD:", curConv('EUR', 100))

print("Converted amount in USD:", curConv('JPY', 100))

Converted amount in USD: 122.96544

Converted amount in USD: 1.241401

# Question 9

Each of the following will cause an exception (an error). Identify what type of exception each will cause. Trying to add incompatible variables, as in adding 6 + ‘a’ Referring to the 12th item of a list that has only 10 items Using a value that is out of range for a function’s input, such as calling math.sqrt(-1.0) Using an undeclared variable, such as print(x) when x has not been defined Trying to open a file that does not exist, such as mistyping the file name or looking in the wrong directory.

In [50]:

6 **+** ‘a’

**File "<ipython-input-50-5d92401daa02>", line 1**

**6 + ‘a’**

**^**

**SyntaxError:** invalid character in identifier

In [51]:

a**=**[1,2,3,4,5,6,7,8,9,10,11]

print(a[12])

**---------------------------------------------------------------------------**

**IndexError** Traceback (most recent call last)

**<ipython-input-51-472fa7afb969>** in <module>

1 a**=[1,2,3,4,5,6,7,8,9,10,11]**

**----> 2** print**(**a**[12])**

**IndexError**: list index out of range

In [52]:

**import** math

math**.**sqrt(**-**1.0)

**---------------------------------------------------------------------------**

**ValueError** Traceback (most recent call last)

**<ipython-input-52-d39e523296ce>** in <module>

1 **import** math

**----> 2** math**.**sqrt**(-1.0)**

**ValueError**: math domain error

In [53]:

print(x)

**---------------------------------------------------------------------------**

**NameError** Traceback (most recent call last)

**<ipython-input-53-fc17d851ef81>** in <module>

**----> 1** print**(**x**)**

**NameError**: name 'x' is not defined

In [54]:

open('f.txt')

**---------------------------------------------------------------------------**

**FileNotFoundError** Traceback (most recent call last)

**<ipython-input-54-fbc4d01d238e>** in <module>

**----> 1** open**('f.txt')**

**FileNotFoundError**: [Errno 2] No such file or directory: 'f.txt'

# Question 10

Encryption is the process of hiding the meaning of a text by substituting letters in the message with other letters, according to some system. If the process is successful, no one but the intended recipient can understand the encrypted message. Cryptanalysis refers to attempts to undo the encryption, even if some details of the encryption are unknown (for example, if an encrypted message has been intercepted). The first step of cryptanalysis is often to build up a table of letter frequencies in the encrypted text. Assume that the string letters is already defined as 'abcdefghijklmnopqrstuvwxyz'. Write a function called frequencies() that takes a string as its only parameter, and returns a list of integers, showing the number of times each character appears in the text. Your function may ignore any characters that are not in letters.

frequencies('The quick red fox got bored and went home.')

[1, 1, 1, 3, 5, 1, 1, 2, 1, 0, 1, 0, 1, 2, 4, 0, 1, 2, 0, 2, 1, 0, 1, 1, 0, 0]

frequencies('apple')

In [55]:

**def** frequencies(s):

letters**=** 'abcdefghijklmnopqrstuvwxyz'

f**=**[0]**\***26

**for** x **in** s :

**if** x **in** letters:

f[ord(x)**-**ord('a')]**=**f[ord(x)**-**ord('a')]**+**1

**return** f

print(frequencies('The quick red fox got bored and went home.'))

print(frequencies('apple'))

[1, 1, 1, 3, 5, 1, 1, 2, 1, 0, 1, 0, 1, 2, 4, 0, 1, 2, 0, 2, 1, 0, 1, 1, 0, 0]

[1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

In [ ]: