**INTORDUCTION TO ALGORITHMS – EC351**

**ASSIGNMENT – 2**

**1.Find the sum of two numbers A and B**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

X = float(input('Enter the value of X : '))

Y = float(input('Enter the value of Y : '))

Z= X+Y

print('The value of Z : ',Z)

end\_time = datetime.now()

print('Duration:{}' .format(end\_time - start\_time))

**Algorithm**

Step-1 Start

Step-2 Input first number say A O(1)

Step-3 Input second number say B O(1)

Step-4 SUM = A + B O(1)

Step-5 Display SUM O(1)

Step-6 Stop

**Observations**

Time complexity = O(1)+ O(1)+ O(1)+ O(1)= O(1) . Its time complexity is constant in time.

**2. Convert temperature from Celsius(C) to Fahrenheit (F)**

**and Fahrenheit to Celsius**

**Sol : a) Celsius(C) to Fahrenheit (F)**

from datetime import datetime

start\_time = datetime.now()

celsius=float(input('Enter the celsius : '))

fahrenheit = (celsius \* 1.8) + 32

print(celsius,' celsius is equal to',fahrenheit)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1. Start

Step-2 Input temperature in Celsius say C O(1)

Step-3 F = (celsius \* 1.8) + 32 O(1)

Step-4 Display Temperature in Fahrenheit F,C O(1)

Step-5 Stop

**Observations**

Time complexity = O(1)+ O(1)+ O(1) = O(1). Time complexity is constant time.

**B) Fahrenheit to Celsius**

from datetime import datetime

start\_time = datetime.now()

Fahrenheit=float(input('Enter the Fahrenheit : '))

celsius = (Fahrenheit - 32) / 1.8

print(Fahrenheit,' Fahrenheit is equal to',celsius)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1. Start

Step-2 Input temperature in Celsius say C O(1)

Step-3 F = (Fahrenheit - 32) / 1.8 O(1)

Step-4 Display Temperature in celsius F,C O(1)

Step-5 Stop

**Observations**

Time complexity = O(1)+ O(1)+ O(1) = O(1). Time complexity is constant time.

**3.Find Area(A) and Perimeter (P)of a Square**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

X=float(input('Enter the side : '))

Perimeter = 4\*X

Area = X\*X

print('Perimeter of Square : ',Perimeter)

print('Area of Square : ',Area)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1 Start

Step-2 Input Side Length of Square say X O(1)

Step-3 Area = X x X O(1)

Step-4 PERIMETER = 4 x X O(1)

Step-5 Display AREA, PERIMETER O(1)

Step-6 Stop

**Observations**

Time complexity = O(1)+O(1)+O(1)+O(1) = O(1). Time complexity is constant time.

**4. Find the Compound Interest (CI)**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

p = float(input("Enter the principle amount : "))

r = float(input("Enter the rate of interest : "))

t = float(input("Enter the time in the years: "))

Compound\_Intrest = p \* (pow((1 + r / 100), t))

print("Principle amount : ", p)

print("Interest rate : ", r)

print("Time in years : ", t)

print("compound Interest : ", Compound\_Intrest)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1 Start

Step-2 Input value of p, t, r O(1)

Step-3 Compound\_Intrest = p \* (pow((1 + r / 100), t)) O(1)

Step-4 Display CI O(1)

Step-5 Stop

**Observations**

Time complexity = O(1)+ O(1)+ O(1) = O(1). Time complexity is constant time.

**5. Swap Two Numbers using Temporary Variable**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

x = float(input("Enter the Value of X : "))

y = float(input("Enter the Value of Y : "))

temp = x

x = y

y = temp

print('The value of x after swapping: ',x)

print('The value of y after swapping: ',y)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1 Start

Step-2 Input Two Numbers Say x, y O(1)

Step-3 TEMP = x O(1)

Step-4 x = y O(1)

Step-5 y = temp O(1)

Step-6 Display After Swap Values x, y O(1)

Step-7 Stop

**Observations**

Time complexity = O(1)+O(1)+O(1)+O(1)+O(1) = O(1). Time complexity is constant time.

**6. Find the Smallest of two numbers A and B**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

x=float(input('Enter the value of X : '))

y=float(input('Enter the value of Y : '))

if x<y:

print('The smallest number is : ',x)

else:

print('The smallest number is : ',y)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm :**

Step-1 Start

Step-2 Input two numbers say x, y

Step-3 If x < y print smallest is x O(1)

Else print smallest is y O(1)

Step-4 Stop

**Observations** :

Time complexity = O(1)+O(1) = O(1). Time complexity is constant time.

**7. Find the largest of three numbers A, B and C**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

x = float(input("Enter first number: "))

y = float(input("Enter second number: "))

z = float(input("Enter third number: "))

if (x >= y) and (x >= z):

largest = x

elif (y >= x) and (y >= z):

largest = y

else:

largest = z

print("The largest number is", largest)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm**

Step-1 Start

Step-2 Input three numbers say x, y, z

Step-3 if (x >= y) and (x >= z): O(1)

largest = x

elif (y >= x) and (y >= z): O(1)

largest = y

else: O(1)

largest = z

Step-4 Stop

**Observations**

Time complexity = O(1)+O(1)+O(1) =O(1). Time complexity is constant time.

**8. Find Even number between 1 to 50**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

for num in range(1,50):

if num%2==0:

print ('The even numbers are : ',num)

num=num+1

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm :**

Step-1 Start

Step-2 num = 1

Step-3 if num%2==0 O(1)

Step-4 Display num O(1)

Step-5 num=num+1 O(1)

Step-6 Stop

**Observations**

Time complexity = O(1)+ O(1) + O(1) = O(1). Time complexity is constant time

**9. Find Sum of Series 1+2+3+......+N**

**Sol :**

from datetime import datetime

start\_time = datetime.now()

num = float(input('Enetr the Number : '))

if num < 0:

print("Enter a positive number")

else:

sum = 0

while(num > 0):

sum += num

num -= 1

print("The sum is", sum)

end\_time = datetime.now()

print('Duration : {}'.format(end\_time - start\_time))

**Algorithm :**

Step-1 Start

Step-2 Input Value of Num

Step-3 if num < 0 O(1)

Step-4 Display that to enter a positive num O(1)

Step-5 else sum = 0 O(1)

Step-6 while(num > 0) O(n)

sum += num

num -= 1

Step-7 Display the sum O(1)

Step-8 Stop

**Observations**

Time complexity = O(1)+(1)+O(1)+O(n)+O(1) = O(n).

Time complexity is linear time here because the time complexity depends on the value of ‘n’ and number of times the loop repeats .

by

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