MAY 2024

1. Let the variable x be "dog" and the variable y be "cat". Write the values returned by the following operations: a) x\*4 + ' ' + 4\*y b) x\*len(x+y)

ans)a)dogdogdogdog' + ' ' + 'catcatcatcat' results in 'dogdogdogdog catcatcatcat'

b)'dog' \* 6 results in 'dogdogdogdogdogdog'

2. What will be the output if the following code fragments are executed? for j in range(2,10,4):

print(j)

ans)output

2

6

3)Write a python program to find out the eldest and youngest of three individuals , with their ages being input through the keyboard.(without using max, min functions

Ans)# Input ages of three individuals

age1 = int(input("Enter age of first person: "))

age2 = int(input("Enter age of second person: "))

age3 = int(input("Enter age of third person: "))

# Find eldest and youngest

if age1 >= age2 and age1 >= age3:

eldest = age1

elif age2 >= age1 and age2 >= age3:

eldest = age2

else:

eldest = age3

if age1 <= age2 and age1 <= age3:

youngest = age1

elif age2 <= age1 and age2 <= age3:

youngest = age2

else:

youngest = age3

# Output results

print("The eldest person is:", eldest)

print("The youngest person is:", youngest)

Enter age of first person: 25

Enter age of second person: 30

Enter age of third person: 22

The eldest person is: 30

The youngest person is: 22

b) Consider the mathematical expression (a+b)2=a2+2ab+b2. Write a Python program that takes user input for values of a and b, then evaluates both sides of the expresfinally compares the result and print whether the equation holds true or false

ans)# Input values for a and b

a = float(input("Enter the value of a: "))

b = float(input("Enter the value of b: "))

# Evaluate both sides of the equation

left\_side = (a + b) \*\* 2

right\_side = a \*\* 2 + 2 \* a \* b + b \*\* 2

# Compare and print whether the equation holds true or false

if left\_side == right\_side:

print("The equation holds true.")

else:

print("The equation does not hold true.")

Enter the value of a: 3

Enter the value of b: 4

The equation holds true.

4)enumerate the various selection structures and control statements types in python and elucidate each with suitable examples

ans)if condition:

# block of code

eg;x = 10

if x > 5:

print("x is greater than 5")

x is greater than 5

if condition:

# block of code if condition is true

else:

# block of code if condition is false

eg:x = 3

if x > 5:

print("x is greater than 5")

else:

print("x is less than or equal to 5")

x is less than or equal to 5

if condition1:

# block of code if condition1 is true

elif condition2:

# block of code if condition2 is true

else:

# block of code if neither condition1 nor condition2 is true

eg:x = 10

if x > 15:

print("x is greater than 15")

elif x > 5:

print("x is greater than 5 but less than or equal to 15")

else:

print("x is less than or equal to 5")

output

x is greater than 5 but less than or equal to 15

b) write a python programme to print a

factorial of a given number

ans)# Function to calculate factorial using a loop

def factorial(n):

result = 1

for i in range(1, n + 1):

result \*= i

return result

# Take input from the user

number = int(input("Enter a number: "))

# Check if the number is non-negative

if number < 0:

print("Factorial is not defined for negative numbers")

else:

# Calculate and print the factorial

print(f"The factorial of {number} is: {factorial(number)}")

MAY 2023

1.What is the output of the following Python code. Justify your answer.

x = 'abcd'

for i in range(len(x)):

print(i)

Output:

0

1

2

3

2. Write the syntax and semantics of the multiway-if statement.

if condition1:

# Block executed if condition1 is True

elif condition2:

# Block executed if condition1 is False and condition2 is True

elif condition3:

# Block executed if all previous conditions are False and condition3 is True

else:

# Block executed if all conditions are False

3.Write a Python program to find the roots of a quadratic equation, ax

2

+ bx + c =

0 . Consider the cases of both real and imaginary roots.

a = float(input("Enter coefficient a: "))

b = float(input("Enter coefficient b: "))

c = float(input("Enter coefficient c: "))

if a == 0:

print("This is not a quadratic equation.")

else:

discriminant = b\*\*2 - 4\*a\*c

if discriminant > 0:

root1 = (-b + discriminant\*\*0.5) / (2 \* a)

root2 = (-b - discriminant\*\*0.5) / (2 \* a)

print("Roots are real and distinct:")

print("Root 1 =", root1)

print("Root 2 =", root2)

elif discriminant == 0:

root = -b / (2 \* a)

print("Roots are real and equal:")

print("Root =", root)

else:

real\_part = -b / (2 \* a)

imaginary\_part = (-discriminant)\*\*0.5 / (2 \* a)

print("Roots are imaginary:")

print(f"Root 1 = {real\_part} + {imaginary\_part}i")

print(f"Root 2 = {real\_part} - {imaginary\_part}i")

4. Write a Python program to check whether a number is Armstrong number or not.

An Armstrong number is an n-digit number that is equal to the sum of the n

th

powers of its digits.

Examples: 153 = 1^3

+ 5^3

+ 3^3

, 1634= 1

^4

+ 6^4

+ 3^4

+ 4^4

num = int(input("Enter a number: "))

num\_str = str(num)

num\_digits = len(num\_str)

sum\_of\_powers = 0

for digit in num\_str:

sum\_of\_powers += int(digit) \*\* num\_digits

if sum\_of\_powers == num:

print(f"{num} is an Armstrong number.")

else:

print(f"{num} is not an Armstrong number.")

5.Write a Python program to display the sum of odd numbers between a

programmer specified upper and lower limit.

lower\_limit = int(input("Enter the lower limit: "))

upper\_limit = int(input("Enter the upper limit: "))

odd\_sum = 0

for num in range(lower\_limit, upper\_limit + 1):

if num % 2 != 0:

odd\_sum += num

print(f"The sum of odd numbers between {lower\_limit} and {upper\_limit} is: {odd\_sum}")

6.

e ^x=1+x+ x^2/2!+ x^3/3! +x^4/4!+…

Given the value of x, write a Python program to evaluate the following series upto

n terms:

x = float(input("Enter the value of x: "))

n = int(input("Enter the number of terms (n): "))

result = 1

term = 1

for i in range(1, n):

term = term \* (x / i)

result += term

print(f"The value of e^{x} up to {n} terms is: {result}")

JAN 2024

Q. Explain type conversion with example.Ans: Implicit Type Conversion:This occurs automatically when the data types are compatible, and there is no loss ofinformation.eg: Python converts num\_int (an integer) to a float automatically before performing theadditionnum\_int = 10num\_float = num\_int + 2.5print(num\_float)print(type(num\_float))Output: 12.5Output: <class 'float'>Explicit Type Conversion:This requires the programmer to use predefined functions like int(), float(), str(), etc., toconvert data types.eg: the programmer explicitly specifies the desired data type using conversion functions.num\_float = 5.7num\_int = int(num\_float)print(num\_int)print(type(num\_int))Output: 5Output: <class 'int'>

Q. Write a program that accepts the lengths of three sides of a triangle as inputs andoutputs whether or not the triangle is a right triangle.Ans:def is\_right\_triangle(a, b, c):sides = sorted([a, b, c])return sides[0]\*\*2 + sides[1]\*\*2 == sides[2]\*\*2try:side1 = float(input("Enter the length of the first side: "))side2 = float(input("Enter the length of the second side: "))side3 = float(input("Enter the length of the third side: "))if is\_right\_triangle(side1, side2, side3):print("The triangle is a right triangle.")else:print("The triangle is NOT a right triangle.")except ValueError:print("Please enter valid numeric values for the sides.")Output:Enter the length of the first side: 3Enter the length of the second side: 4Enter the length of the third side: 5The triangle is a right triangle.

Q. Write a Python program to print all numbers between 100 and 1000 whose sumof digits is divisible by 9.Ans: def sum\_of\_digits(num):return sum(int(digit) for digit in str(num))print("Numbers between 100 and 1000 whose sum of digits is divisible by 9:")for number in range(100, 1000):if sum\_of\_digits(number) % 9 == 0:print(number, end=" ")Output:Numbers between 100 and 1000 whose sum of digits is divisible by 9:108 117 126 135 144 153 162 171 180 189 198 207 216 225 234 243 252 261 270 279288 297 306 315 324 333 342 351 360 369 378 387 396 405 414 423 432 441 450 459468 477 486 495 504 513 522 531 540 549 558 567 576 585 594 603 612 621 630 639648 657 666 675 684 693 702 711 720 729 738 747 756 765 774 783 792 801 810 819 828837 846 855 864 873 882 891 900 909 918 927 936 945 954 963 972 981 990 999

Q. Illustrate the use of range() in Python.Ans: The range() function in Python generates a sequence of numbers. It is commonly used inloops to iterate over a sequence of values.Syntax:range(stop)range(start, stop)range(start, stop, step)eg: Generate numbers from 1 to 10 with a step of 2for i in range(1, 11, 2):print(i, end=" ")Output: 1 3 5 7 9

Q. Write a Python program to print all prime factors of a given number.Ans: def prime\_factors(n):print(f"Prime factors of {n} are:", end=" ")while n % 2 == 0:print(2, end=" ")n //= 2factor = 3while factor \* factor <= n:while n % factor == 0:print(factor, end=" ")n //= factorfactor += 2if n > 2:print(n, end=" ")print()try:number = int(input("Enter a positive integer: "))if number > 0:prime\_factors(number)else:print("Please enter a positive integer.")except ValueError:print("Invalid input. Please enter a valid positive integer."

Output

Enter a positive integer =37

Primefactors=1,37

June 2023

# 1.Python program to calculate the sum of the cosine series

import math

def cosine\_series\_sum(x, n):

cos\_sum = 1

term = 1

for i in range(1, n):

term = -x\*2 / ((2 \* i - 1) \* (2 \* i))

cos\_sum += term

return cos\_sum

angle\_degrees = float(input("Enter the angle in degrees: "))

n\_terms = int(input("Enter the number of terms: "))

angle\_radians = math.radians(angle\_degrees)

result = cosine\_series\_sum(angle\_radians, n\_terms)

print(f"The sum of the cosine series up to {n\_terms} terms is: {result}")

#2. write a python program to find X^Y or pow(X,Y) without using standard function

def power(x, y):

Result = 1

Is\_negative\_exponent = FFals

If y < 0:

Is\_negative\_exponent = True

Y = -y

For \_ in range(y):

Result \*= x

If is\_negative\_exponent:

Result = 1 / result

Return result

Base = float(input(“Enter the base (X): “))

Exponent = int(input(“Enter the exponent (Y): “))

Result = power(base, exponent)

Print(f”{base}^{exponent} = {result}”)

# 3.Write a python program to generate the following type of pattern for the given N

rows where N <= 26.

A

A B

A B C D

A B C D E

Def generate\_pattern(n):

If n > 26:

Print(“N must be less than or equal to 26.”)

Return

For I in range(1, n + 1):

Row = “ “.join(chr(65 + j) for j in range(i))

Print(row)

N = int(input(“Enter the number of rows (N <= 26): “))

Generate\_pattern(n)

# 4.Write a python program to generate prime numbers within a certain range

Def is\_prime(num):

If num <= 1:

Return False

For I in range(2, int(num\*\*0.5) + 1):

If num % I == 0:

Return False

Return True

Def generate\_primes(start, end):

Primes = []

For num in range(start, end + 1):

If is\_prime(num):

Primes.append(num)

Return pprime

Start = int(input(“Enter the starting value of the range: “))

End = int(input(“Enter the ending value of the range: “))

Prime\_numbers = generate\_primes(start, end)

Print(f”Prime numbers between {start} and {end}: {prime\_numbers}”)

June 2022

1)What is the output of the following print statement in python?

(a)print(9//2) (b)print(9/2)

Ans:

(a) print(9//2)

The // operator in Python performs integer (floor) division. It divides the number and truncates the decimal part, returning an integer result.

9 // 2 = 4

Output: 4

(b) print(9/2)

The / operator in Python performs floating-point division. It divides the numbers and returns the result as a float.

9 / 2 = 4.5

Output: 4.5

2)Write a python program to count numbers of even numbera to odd numbers in a given set of n numbers

n = int(input("Enter the number of elements"))

even\_count = 0

odd\_count = 0

print("Enter the numbers:")

for \_ in range(n):

num = int(input())

if num % 2 == 0:

even\_count += 1

else:

odd\_count += 1

print("Number of even numbers:", even\_count)

print("Number of odd numbers:", odd\_count)

3)Write a python program to generate the following type of pattern for the given N rows

1

1 2

1 2 3

1 2 3 4

Ans

N = int(input("Enter the number of rows: "))

for i in range(1, N + 1):

for j in range(1, i + 1):

print(j, end=" ")

print()

4)Mention the different types of loops and control statements in Python and explain each type with suitable example

1. Loops in Python

a. For Loop

Purpose:iterates over a sequence or range of numbers

Syntax:

for variable in sequence:

# code block

Example:

for i in range(5):

print(i)

Output:

0

1

2

3

4

b. While Loop

Purpose: Repeats as long as a condition is True.

Syntax:

while condition:

# code block

Example:

count = 0

while count < 5:

print(count)

count += 1

Output:

0

1

2

3

4

2. Control Statements in Python

a. Break

Purpose: Terminates the loop prematurely.

Example:

for i in range(5):

if i == 3:

break

print(i)

Output:

0

1

2

b. Continue

Purpose: Skips the current iteration and moves to the next.

Example:

for i in range(5):

if i == 3:

continue

print(i)

Output:

0

1

2

4

c. Pass

Purpose: Acts as a placeholder, does nothing when executed.

Example:

for i in range(5):

if i == 3:

pass # Placeholder for future code

print(i)

Output:

0

1

2

3

4

d. Else with Loops

Purpose: Executes a block of code if the loop completes without being interrupted by break.

Example:

for i in range(5):

if i == 6:

break

else:

print("Loop completed without break")

5) Write the Python program to print all the prime numbers less than 1000.

Ans:

for num in range(2, 1000):

for i in range(2, num):

if num % i == 0:

break

else:

print(num, end=" ")

6)Write a Python program to find the distance between two points (x1, y1 )and (x2, y2.)

Ans:

X1= float(input("Enter x1: "))

y1 = float(input("Enter y1: "))

x2 = float(input("Enter x2: "))

y2 = float(input("Enter y2: "))

# Distance formula

distance = ((x2 - x1) \*\* 2 + (y2 - y1) \*\* 2) \*\* 0.5

print("The distance between the two points is:", distance)