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**CS6B**

# Programming in Python CST 362

## ASSIGNMENT – 2

1. **Print the sin series x-x^3/3!+x^5/5!....x^n/n! ( read n)**

```
In [69]: n = int(input("Enter value of n:"))
         count = 1
         print("x",end='')
         for i in range(2,n+1):
             if i%2!=0:
                 count=count+1
                 if count%2==0:
                     print('- x^',i,'/',i,'!',end='')
                 else:
                     print('+ x^',i,'/',i,'!',end='')

         Enter value of n:9
         x- x^ 3 / 3 !+ x^ 5 / 5 !- x^ 7 / 7 !+ x^ 9 / 9 !
```

2. **In the above program read the value x and find the sum of the series.**

```
In [1]: import math

        x = float(input("Enter the value of x: "))
        n = int(input("Enter the number of terms to include in the series: "))

        sum = 0
        sign = 1

        for i in range(1, n+1):
            term = sign * (x ** (2*i - 1)) / math.factorial(2*i - 1)
            sum += term
            sign *= -1

        print("The sum of the series is:", sum)

        Enter the value of x: 3
        Enter the number of terms to include in the series: 4
        The sum of the series is: 0.09107142857142847
```

**3.1**

```
1
1 2
1 2 3
1 2 3 4
```

**The pyramid is given for n=4 do this for any n.**

```
In [7]: n = int(input("Enter the number: "))  # Change this value to print pyramid for any n

        for i in range(1, n+1):
            for j in range(n-i):
                print("", end="")
            for j in range(1, i+1):
                print(j, end=" ")
            print()
```

```
Enter the number: 4
1
1 2
1 2 3
1 2 3 4
```

**4. Reverse a number and also find the sum of the digits Eg: i/p : 546 o/p:reverse=645 sum=15**

```
In [9]: num = int(input("Enter a number: "))
        rev_num = 0
        sum_digits = 0

        while num > 0:
            digit = num % 10
            rev_num = rev_num * 10 + digit
            sum_digits += digit
            num //= 10

        print("Reversed number:", rev_num)
        print("Sum of digits:", sum_digits)
```

```
Enter a number: 456
Reversed number: 654
Sum of digits: 15
```

**5. Positive integer is called an Armstrong number of order n if abcd….= a^n + b^n + c^n + d^n + where n is the length of the number Eg: 153 = 1\*1\*1 + 5\*5\*5 + 3\*3\*3 // 153 is an Armstrong Number. Eg:1634= 1\*\*4+6\*\*4+3\*\*4+4\*\*4=1634 //1634 is an Armstrong Number.**

```
In [10]: num = int(input("Enter a positive integer: "))
         order = len(str(num))
         sum = 0

         temp = num
         while temp > 0:
             digit = temp % 10
             sum += digit ** order
             temp //= 10

         if num == sum:
             print(num, "is an Armstrong number of order", order)
         else:
             print(num, "is not an Armstrong number of order", order)

         Enter a positive integer: 153
         153 is an Armstrong number of order 3
```

**6. Find the square root of a number using Newton's method ( refer the text book/blog for reference)**

```
In [11]: def newton_sqrt(num):
             guess = num/2
             while True:
                 new_guess = (guess + num/guess)/2
                 if abs(new_guess - guess) < 0.0001:
                     return new_guess
                 guess = new_guess

         # Take user input
         number = float(input("Enter a number to find the square root: "))

         # Call the function and print the result
         print("The square root of", number, "is:", newton_sqrt(number))

         Enter a number to find the square root: 9
         The square root of 9.0 is: 3.0000000000393214
```

**7. Write a program that computes an investment report. Analysis The inputs to this program are the following: An initial amount to be invested (a floating-point number) A period of years (an integer) An interest rate (a percentage expressed as an integer)**

```
Enter the investment amount: 10000.00
Enter the number of years: 5
Enter the rate as a %: 5
Year  Starting balance  Interest  Ending balance
  1          10000.00     500.00        10500.00
  2          10500.00     525.00        11025.00
  3          11025.00     551.25        11576.25
  4          11576.25     578.81        12155.06
  5          12155.06     607.75        12762.82
Ending balance: $12762.82
Total interest earned: $2762.82
```

**Figure**     The user interface for the investment report program

```python
In [51]: initial_amount = float(input("Enter the initial amount to be invested: "))
         years = int(input("Enter the number of years: "))
         interest_rate = float(input("Enter the interest rate (%): "))

         current_amount = initial_amount
         total_interest_earned = 0
         print("Year\tStarting balance\tInterest\tEarning Balance\n")
         for year in range(1, years+1):
             initial_amount = current_amount
             interest_earned = current_amount * interest_rate / 100
             current_amount += interest_earned
             total_interest_earned += interest_earned
             if year==1:
                 print(f"{year}\t{initial_amount:.2f}\t\t{interest_earned:.2f}\t\t{current_amount:.2f}")
             if year!=1:
                 print(f"{year}\t{initial_amount:.2f}\t\t{interest_earned:.2f}\t\t{current_amount:.2f}")

         print(f"Total interest earned = {total_interest_earned:.2f}")
         print(f"Final balance = {current_amount:.2f}")
```

```
Enter the initial amount to be invested: 10000
Enter the number of years: 5
Enter the interest rate (%): 5
Year    Starting balance        Interest        Earning Balance

1       10000.00                500.00          10500.00
2       10500.00                525.00          11025.00
3       11025.00                551.25          11576.25
4       11576.25                578.81          12155.06
5       12155.06                607.75          12762.82
Total interest earned = 2762.82
Final balance = 12762.82
```

**8. Check whether the given number is a Krishnamurti number (.Use factorial () function from math). For example: 145 = 1! + 4! + 5! = 1 + 24 + 120 = 145 is a Krishnamurthy Number**

```
In [12]:  import math

          num = int(input("Enter a number: "))
          temp = num
          sum = 0

          while temp > 0:
              digit = temp % 10
              sum += math.factorial(digit)
              temp //= 10

          if sum == num:
              print(num, "is a Krishnamurti number.")
          else:
              print(num, "is not a Krishnamurti number.")
```

```
Enter a number: 145
145 is a Krishnamurti number.
```

## 9. Find the sum of the first and last digit of a number( i/p:345 o/p=3+5=8)

```
In [14]:  n = int(input("Enter a number: "))  # get input from user
          last_digit = n % 10  # get the last digit of the number
          first_digit = n  # initialize first_digit variable

          # loop through the digits of the number to find the first digit
          while first_digit >= 10:
              first_digit //= 10

          # calculate the sum of the first and last digit
          result = first_digit + last_digit

          print("The sum of the first and last digit of", n, "is", result)
```

```
Enter a number: 345
The sum of the first and last digit of 345 is 8
```

## 10. Input a number and print it in words ( i/p:345 o/p: Three Four Five)

```
In [15]:  num = input("Enter a number: ")
          words = ["Zero", "One", "Two", "Three", "Four", "Five", "Six", "Seven", "Eight", "Nine"]
          for digit in num:
              print(words[int(digit)], end=" ")
```

```
Enter a number: 345
Three Four Five
```