1. Write a function that counts how many concentric layers a rug.

**Examples**

count\_layers([

"AAAA",

"ABBA",

"AAAA"

]) ➞ 2

count\_layers([

"AAAAAAAAA",

"ABBBBBBBA",

"ABBAAABBA",

"ABBBBBBBA",

"AAAAAAAAA"

]) ➞ 3

count\_layers([

"AAAAAAAAAAA",

"AABBBBBBBAA",

"AABCCCCCBAA",

"AABCAAACBAA",

"AABCADACBAA",

"AABCAAACBAA",

"AABCCCCCBAA",

"AABBBBBBBAA",

"AAAAAAAAAAA"

]) ➞ 5

**Ans:**

def count\_layers(l):

length=len(l)-1

n=len(l)//2

ans=0

for i in range(0, n):

if l[i]==l[length]:

ans+=1

length-=1

print(ans+1)

2. There are many different styles of music and many albums exhibit multiple styles. Create a function that takes a list of musical styles from albums and returns how many styles are unique.

**Examples**

unique\_styles([

"Dub,Dancehall",

"Industrial,Heavy Metal",

"Techno,Dubstep",

"Synth-pop,Euro-Disco",

"Industrial,Techno,Minimal"

]) ➞ 9

unique\_styles([

"Soul",

"House,Folk",

"Trance,Downtempo,Big Beat,House",

"Deep House",

"Soul"

]) ➞ 7

**Ans:**

def unique\_styles(l):

l\_new=[]

for i in l:

ls=i.split(",")

for j in ls:

if j not in l\_new:

l\_new.append(j)

print(len(l\_new))

3. Create a function that finds a target number in a list of prime numbers. Implement a binary search algorithm in your function. The target number will be from 2 through 97. If the target is prime then return "yes" else return "no".

**Examples**

primes = [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97]

is\_prime(primes, 3) ➞ "yes"

is\_prime(primes, 4) ➞ "no"

is\_prime(primes, 67) ➞ "yes"

is\_prime(primes, 36) ➞ "no"

**Ans:**

def is\_prime(l, x):

low = 0

high = len(l) - 1

mid = 0

while low <= high:

mid = (high + low) // 2

if l[mid] < x:

low = mid + 1

elif l[mid] > x:

high = mid - 1

else:

print("yes")

return

print("no")

4. Create a function that takes in n, a, b and returns the number of positive values raised to the nth power that lie in the range [a, b], inclusive.

**Examples**

power\_ranger(2, 49, 65) ➞ 2

# 2 squares (n^2) lie between 49 and 65, 49 (7^2) and 64 (8^2)

power\_ranger(3, 1, 27) ➞ 3

# 3 cubes (n^3) lie between 1 and 27, 1 (1^3), 8 (2^3) and 27 (3^3)

power\_ranger(10, 1, 5) ➞ 1

# 1 value raised to the 10th power lies between 1 and 5, 1 (1^10)

power\_ranger(5, 31, 33) ➞ 1

power\_ranger(4, 250, 1300) ➞ 3

**Ans:**

def power\_ranger(n, a, b):

count=0

num=int(a\*\*(1/n))

while num\*\*n<=b:

if num\*\*n>=a:

count+=1

num+=1

print(count)

5. Given a number, return the difference between the maximum and minimum numbers that can be formed when the digits are rearranged.

**Examples**

rearranged\_difference(972882) ➞ 760833

# 988722 - 227889 = 760833

rearranged\_difference(3320707) ➞ 7709823

# 7733200 - 23377 = 7709823

rearranged\_difference(90010) ➞ 90981

# 91000 - 19 = 90981

**Ans:**

def rearranged\_difference(num):

string=str(num)

lst=list(string)

lst.sort(reverse=True)

num1=int("".join(lst))

lst.sort()

num2=int("".join(lst))

print(num1-num2)