

Write a program to find roots of quadratic equation.

```
import cmath

a = 1
b = -3
c = 2

d = b*b - 4*a*c

root1 = (-b + cmath.sqrt(d)) / (2*a)
root2 = (-b - cmath.sqrt(d)) / (2*a)

print(root1, root2)
```

(2+0j) (1+0j)

Write a program to transpose 3*3 matrix.

```
matrix = [
    [1, 2, 3],
    [4, 5, 6],
    [7, 8, 9]
]

transpose = []

for i in range(3):
    row = []
    for j in range(3):
        row.append(matrix[j][i])
    transpose.append(row)

print(transpose)
```

[[1, 4, 7], [2, 5, 8], [3, 6, 9]]

Check whether a list follows ascending or descending or no-order.

```
lst = [1, 2, 3, 4]

if lst == sorted(lst):
    print("Ascending")
elif lst == sorted(lst, reverse=True):
    print("Descending")
else:
    print("No order")
```

Ascending

Multiply a column matrix with row matrix.

```
col = [[1], [2], [3]]
row = [[4, 5, 6]]

result = []

for i in range(len(col)):
    r = []
```

```

        for j in range(len(row[0])):
            r.append(col[i][0] * row[0][j])
        result.append(r)

print(result)

```

```
[[4, 5, 6], [8, 10, 12], [12, 15, 18]]
```

```

# Shuffle playlist n-times (loop).

import random

playlist = ["song1", "song2", "song3", "song4", "song5"]
n = 3

for i in range(n):
    random.shuffle(playlist)
    print("Shuffle", i+1, ":", playlist)

```

```

Shuffle 1 : ['song5', 'song4', 'song2', 'song3', 'song1']
Shuffle 2 : ['song5', 'song2', 'song3', 'song4', 'song1']
Shuffle 3 : ['song5', 'song2', 'song3', 'song1', 'song4']

```

```

# Remove duplicate characters from string irrespective of case and keep order

s = "Bookshops"

seen = set()
result = ""

for ch in s:
    if ch.lower() not in seen:
        seen.add(ch.lower())
        result += ch

print(result)

```

Bokshp

```

# Calculate geometric mean of list.

import math

lst = [1, 2, 3, 4]

product = 1
for i in lst:
    product *= i

gm = product ** (1/len(lst))
print(gm)

```

2.213363839400643

```

# Calculate compound interest.

P = 1000
R = 5

```

```
T = 2
```

```
CI = P * (1 + R/100) ** T - P  
print(CI)
```

```
102.5
```

```
# Concatenate list elements (strings and numbers) into a single string.
```

```
lst = ["Hello", 123, "World", 45]
```

```
result = ""
```

```
for i in lst:  
    result += str(i)
```

```
print(result)
```

```
Hello123World45
```

```
# Use Counter: most frequent, least frequent, display counts.
```

```
from collections import Counter
```

```
lst = [1, 2, 2, 3, 3, 3, 4]
```

```
count = Counter(lst)
```

```
most = count.most_common(1)[0][0]  
least = min(count, key=count.get)
```

```
print("Most frequent:", most)  
print("Least frequent:", least)  
print("Counts:", count)
```

```
Most frequent: 3
```

```
Least frequent: 1
```

```
Counts: Counter({3: 3, 2: 2, 1: 1, 4: 1})
```

