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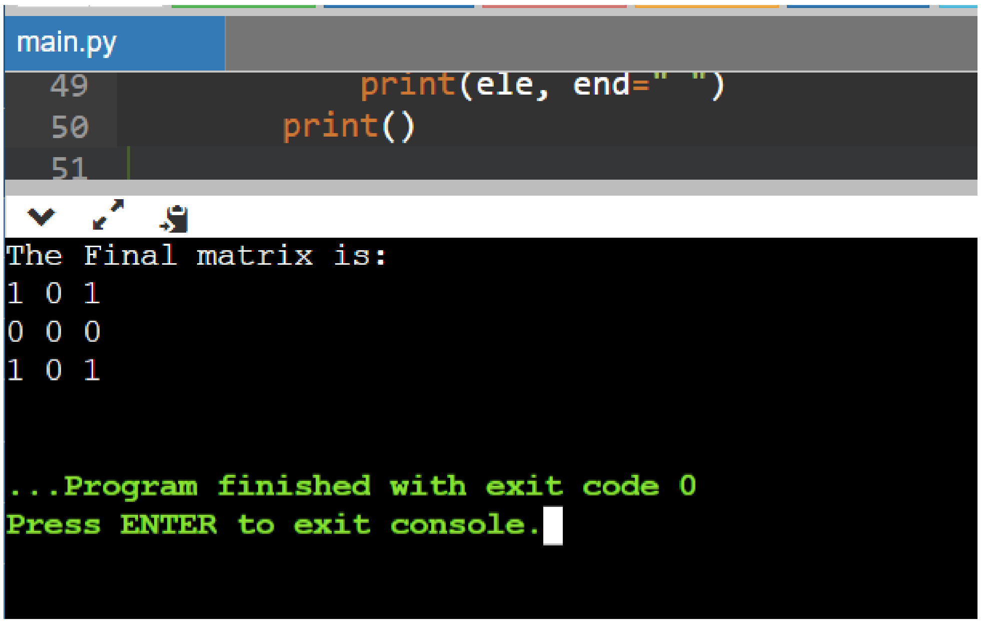
Day – 1 : Arrays – I

Problem 1 – Set Matrix Zeros

```
def zeroMatrix(matrix, n, m):
    # int row[n] = {0}; --> matrix[..][0]
    # int col[m] = {0}; --> matrix[0][..]

    col0 = 1
    for i in range(n):
        for j in range(m):
            if matrix[i][j] == 0:
                # mark i-th row:
                matrix[i][0] = 0

                # mark j-th column:
                if j != 0:
                    matrix[0][j] = 0
                else:
                    col0 = 0

    for i in range(1, n):
        for j in range(1, m):
            if matrix[i][j] != 0:
                # check for col & row:
                if matrix[i][0] == 0 or matrix[0][j] == 0:
                    matrix[i][j] = 0


if matrix[0][0] == 0:
        for j in range(m):
            matrix[0][j] = 0
    if col0 == 0:
        for i in range(n):
            matrix[i][0] = 0

    return matrix



matrix = [[1, 1, 1], [1, 0, 1], [1, 1, 1]]
n = len(matrix)
m = len(matrix[0])
ans = zeroMatrix(matrix, n, m)

print("The Final matrix is:")
for row in ans:
            for ele in row:
                    print(ele, end=" ")
             print()
```



main.py

```
                print(ele, end=" ")
            print()

```

```
The Final matrix is:
1 0 1
0 0 0
1 0 1


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Press ENTER to exit console.
```
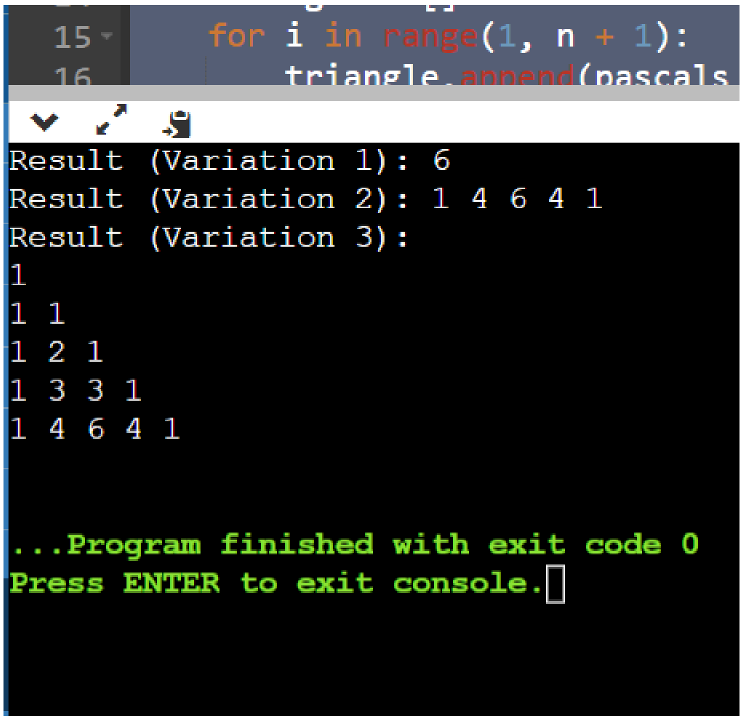

Problem – 2 : **Pascal's Triangle**

```
def pascals_triangle_element(r, c):
    if c == 1 or c == r:
        return 1
    else:
        return pascals_triangle_element(r - 1, c - 1) + pascals_triangle_element(r - 1, c)


def pascals_triangle_row(n):
    row = []
    for i in range(1, n + 1):
        row.append(pascals_triangle_element(n, i))
    return row


def pascals_triangle(n):
    triangle = []
    for i in range(1, n + 1):
        triangle.append(pascals_triangle_row(i))
    return triangle


# Variation 1: Print the element at position (r, c) in Pascal's triangle
r = 5
c = 3
element = pascals_triangle_element(r, c)
print("Result (Variation 1):", element)


# Variation 2: Print the n-th row of Pascal's triangle
n = 5
row = pascals_triangle_row(n)
print("Result (Variation 2):", ' '.join(str(x) for x in row))
```

```
# Variation 3: Print the first n rows of Pascal's triangle
n = 5
triangle = pascals_triangle(n)
print("Result (Variation 3):")
for row in triangle:
    print(' '.join(str(x) for x in row))
```



```
    for i in range(1, n + 1):
        triangle.append(pascals
```

```
Result (Variation 1): 6
Result (Variation 2): 1 4 6 4 1
Result (Variation 3):
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1


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```
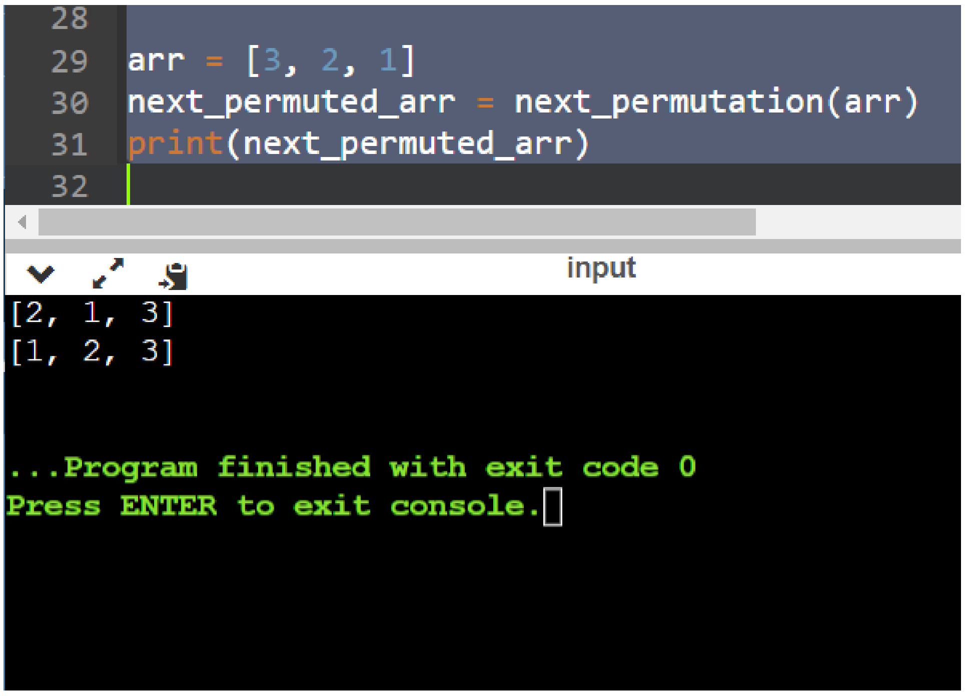

Problem – 3 : Next permutation array

```
def next_permutation(arr):
    n = len(arr)
    i = n - 2



    while i >= 0 and arr[i] >= arr[i+1]:
        i -= 1
    if i >= 0:
        j = n - 1
        while arr[j] <= arr[i]:
            j -= 1
        arr[i], arr[j] = arr[j], arr[i]

    left = i + 1
    right = n - 1
    while left < right:
        arr[left], arr[right] = arr[right], arr[left]
        left += 1
        right -= 1

    return arr



arr = [1, 3, 2]
next_permuted_arr = next_permutation(arr)
print(next_permuted_arr)

arr = [3, 2, 1]
next_permuted_arr = next_permutation(arr)
print(next_permuted_arr)
```



```
arr = [3, 2, 1]
next_permuted_arr = next_permutation(arr)
print(next_permuted_arr)
```

```
[2, 1, 3]
[1, 2, 3]


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```

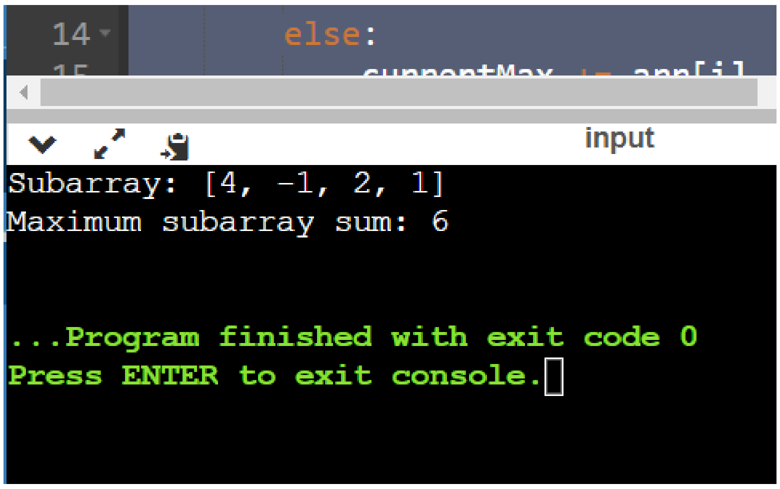
Problem – 4 : Kadane's Algorithm

```
def max_subarray_sum(arr):
    if not arr:
        return 0

    currentMax = arr[0]
    globalMax = arr[0]
    start, end = 0, 0
    subarray = [arr[0]]

    for i in range(1, len(arr)):
        if arr[i] > arr[i] + currentMax:
            currentMax = arr[i]
            start = i
        else:
            currentMax += arr[i]
        if currentMax > globalMax:
            globalMax = currentMax
            end = i
            subarray = arr[start:end+1]

    print("Subarray:", subarray)
    return globalMax
arr = [-2, 1, -3, 4, -1, 2, 1, -5, 4]
max_sum = max_subarray_sum(arr)
print("Maximum subarray sum:", max_sum)
```



```
    else:
        currentMax += arr[i]
```

```
Subarray: [4, -1, 2, 1]
Maximum subarray sum: 6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```

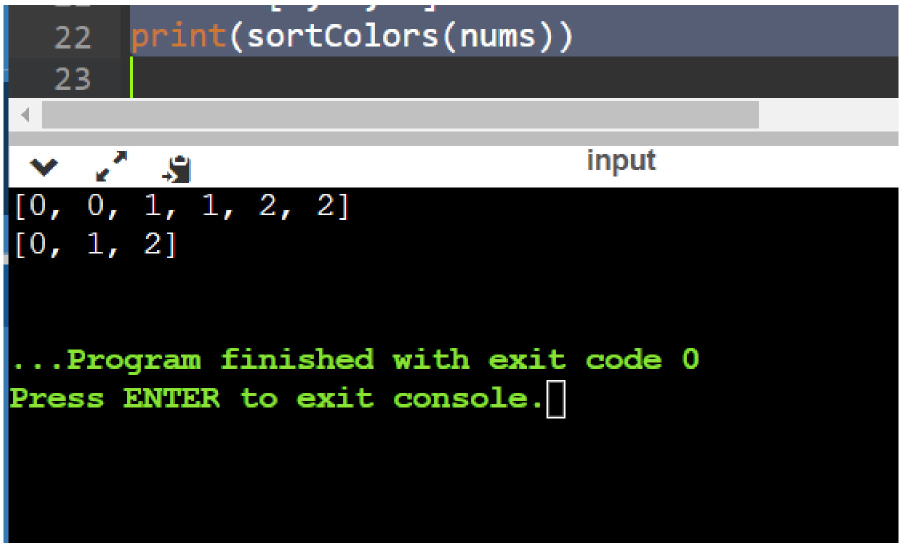
Problem – 5 : Sort an array of 0’s, 1’s, and 2’s

```
def sortColors(nums):
    low = 0
    mid = 0
    high = len(nums) - 1

    while mid <= high:
        if nums[mid] == 0:
            nums[mid], nums[low] = nums[low], nums[mid]
            low += 1
            mid += 1
        elif nums[mid] == 1:
            mid += 1
        else:
            nums[mid], nums[high] = nums[high], nums[mid]
            high -= 1

    return nums
nums = [2, 0, 2, 1, 1, 0]
print(sortColors(nums))

nums = [2, 0, 1]
print(sortColors(nums))
```



```
print(sortColors(nums))
```

```
[0, 0, 1, 1, 2, 2]
[0, 1, 2]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```

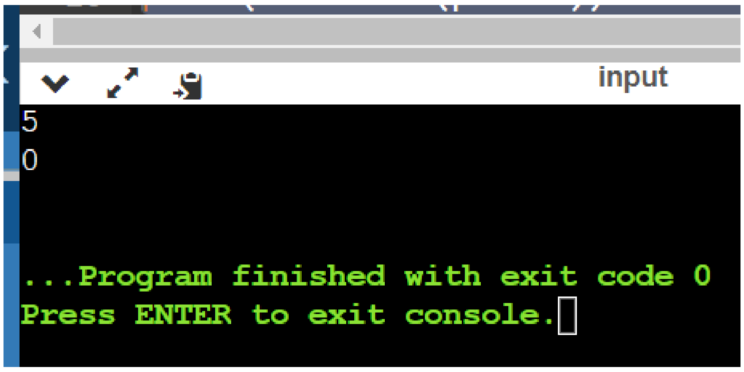
Problem – 6 : Stock buy & sell

```
def maxProfit(prices):
    minPrice = float('inf')
    maxProfit = 0

    for price in prices:
        if price < minPrice:
            minPrice = price
        elif price - minPrice > maxProfit:
            maxProfit = price - minPrice

    return maxProfit
prices = [7, 1, 5, 3, 6, 4]
print(maxProfit(prices))

prices = [7,6,4,3,1]
print(maxProfit(prices))
```



```
5
0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```