

1)Find a pair with the given sum in an array,Given an unsorted integer array, find a pair with the given sum in it.

Source Code:

```
def find(nums, target):
    seen = set()
    print(seen)
    for num in nums:
        complement = target - num
        if complement in seen:
            print("Pair found:", (complement, num))
        seen.add(num)
nums = []
target = int(input("Enter the target"))
n=int(input("Enter the number of elements:"))
for i in range(n):
    element=int(input("Enter the elements"))
    nums.append(element)
find(nums, target)
```

Output:

```
C:\Users\vbara\PycharmProjects\pythonProject2\venv
Enter the target10
Enter the number of elements:6
Enter the elements8
Enter the elements7
Enter the elements2
Enter the elements5
Enter the elements3
Enter the elements1
set()
Pair found: (8, 2)
Pair found: (7, 3)

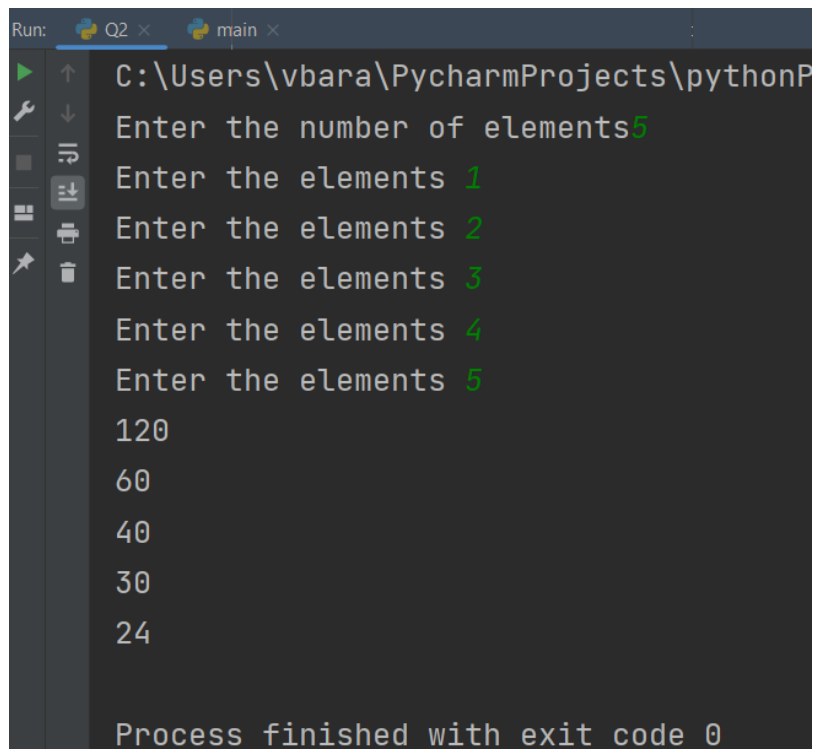
Process finished with exit code 0
```

2) Given an integer array, replace each element with the product of every other element without using the division operator.

Source Code:

```
l=[]
n=int(input("Enter the number of elements"))
for i in range(n):
    elements=int(input("Enter the elements "))
    l.append(elements)
mul=1
for k in range(n):
    temp=l[k]
    for m in l:
        if m==temp:
            continue
        else:
            mul=mul*m
    print(mul)
    mul=1
```

Output:



The screenshot shows a PyCharm Run console window with a dark theme. The window has a title bar with 'Run:' and two tabs: 'Q2' and 'main'. On the left is a vertical toolbar with icons for running, stepping through code, and other debugging actions. The main area of the console displays the following text:

```
C:\Users\vbara\PycharmProjects\pythonP
Enter the number of elements5
Enter the elements 1
Enter the elements 2
Enter the elements 3
Enter the elements 4
Enter the elements 5
120
60
40
30
24

Process finished with exit code 0
```

3) Maximum Sum Circular Subarray. Given a circular integer array, find a subarray with the largest sum in it.

Source Code:

```
def fun(nums):
    total_sum = 0
    max_sum = 0
    current_max = 0
    min_sum = 0
    current_min = 0

    for num in nums:
        total_sum += num

        current_max = max(num, current_max + num)
        max_sum = max(max_sum, current_max)

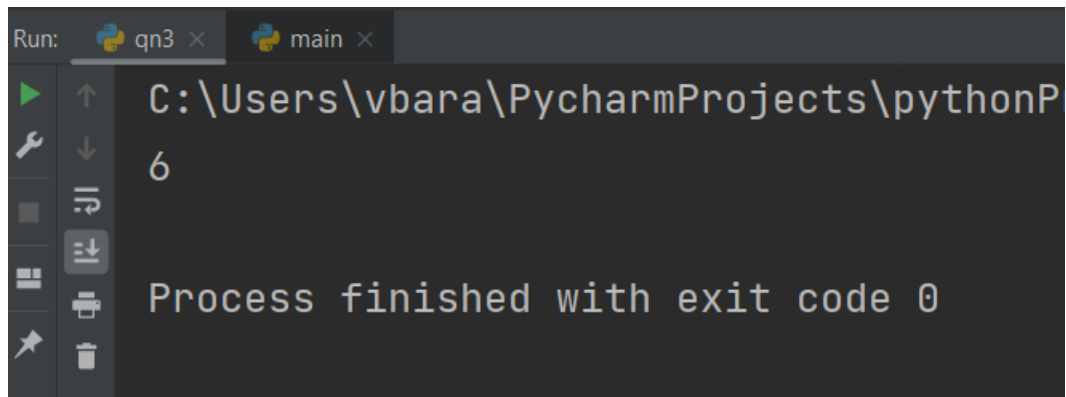
        current_min = min(num, current_min + num)
        min_sum = min(min_sum, current_min)

    if total_sum == min_sum:
        return max_sum

    return max(max_sum, total_sum - min_sum)

input_array = [2, 1, -5, 4, -3, 1, -3, 4, -1]
result = fun(input_array)
print(result)
```

Output:

A screenshot of the PyCharm Run console. The top bar shows 'Run:' followed by two tabs: 'qn3' and 'main'. The console output is as follows:

```
C:\Users\vbara\PycharmProjects\pythonP
6
Process finished with exit code 0
```

The console window has a dark theme. On the left side, there is a vertical toolbar with icons for running (green play button), stepping through code (up and down arrows), and other debugging actions. The output text is in a monospaced font.

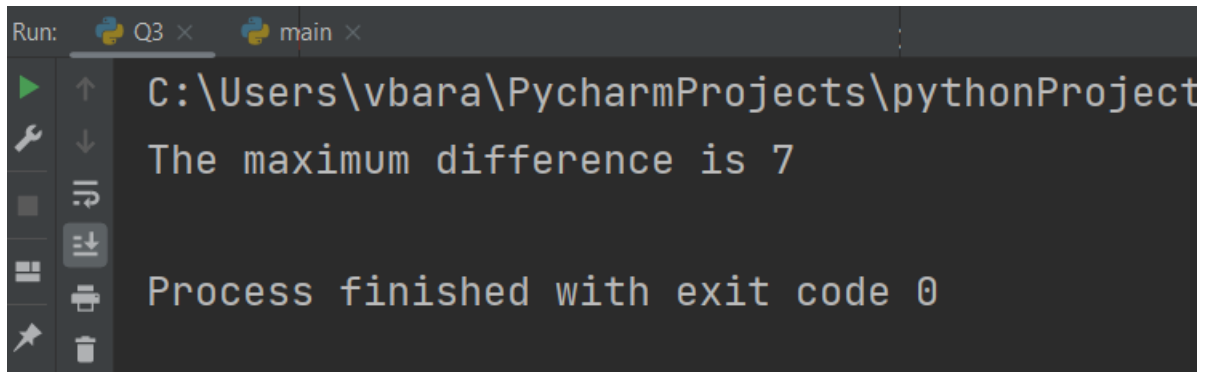
4) Find the maximum difference between two array elements that satisfies the given constraints

Given an integer array, find the maximum difference between two elements in it such that the smaller element appears before the larger element.

Source Code:

```
def max_difference(arr):  
  
    min_element = arr[0]  
    max_difference = arr[1] - arr[0]  
  
    for num in arr:  
        if num - min_element > max_difference:  
            max_difference = num - min_element  
  
        if num < min_element:  
            min_element = num  
  
    return max_difference  
  
arr = [2, 7, 9, 5, 1, 3, 5 ]  
result = max_difference(arr)  
print("The maximum difference is",result)
```

Output:

A screenshot of the PyCharm Run console. The top bar shows 'Run:' followed by two tabs: 'Q3' and 'main'. The console output is as follows:

```
C:\Users\vbara\PycharmProjects\pythonProject  
The maximum difference is 7  
  
Process finished with exit code 0
```

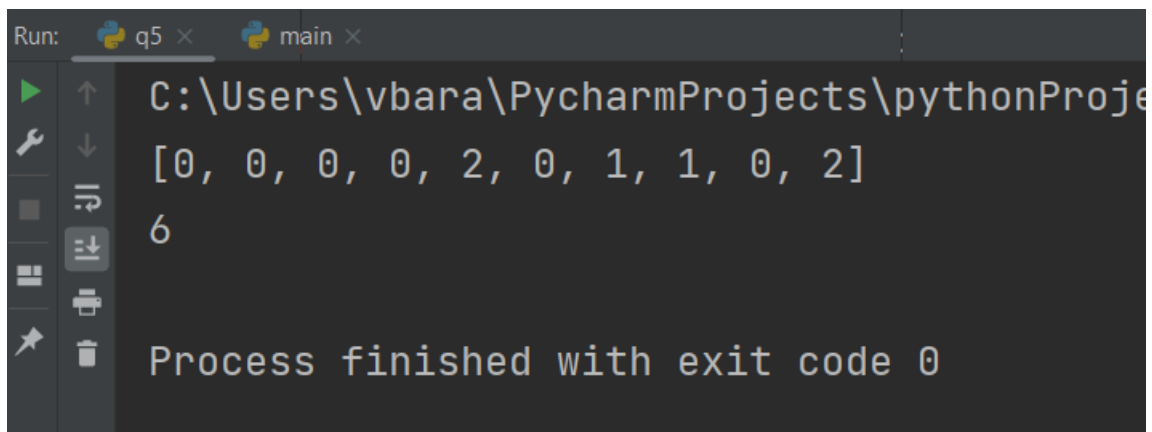
The image shows the PyCharm Run console interface. At the top, there's a 'Run:' label and two tabs: 'Q3' and 'main'. The console area displays the following text: 'C:\Users\vbara\PycharmProjects\pythonProject', 'The maximum difference is 7', and 'Process finished with exit code 0'. On the left side of the console, there is a vertical toolbar with various icons for running and debugging the code.

5) Given an array of integers of size N, the task is to find the first non-repeating element in this array.

Source Code:

```
def repeating_element(arr):  
  
    frequency_list = [0] * (max(arr) + 1)  
  
    for num in arr:  
        frequency_list[num] += 1  
    print(frequency_list)  
    for num in arr:  
        if frequency_list[num] == 1:  
            return num  
  
    return None  
  
arr = [9, 4, 9, 6, 7, 4]  
result = repeating_element(arr)  
print(result)
```

Output:



```
Run: q5 × main ×  
C:\Users\vbara\PycharmProjects\pythonProje  
[0, 0, 0, 0, 2, 0, 1, 1, 0, 2]  
6  
Process finished with exit code 0
```


6) Minimize the maximum difference between the heights

Given the heights of N towers and a value of K, Either increase or decrease the height of every tower by K (only once) where $K > 0$. After modifications, the task is to minimize the difference between the heights of the longest and the shortest tower and output its difference.

Source Code:

```
def fun(heights, k):
    min_height = min(heights)
    max_height = max(heights)

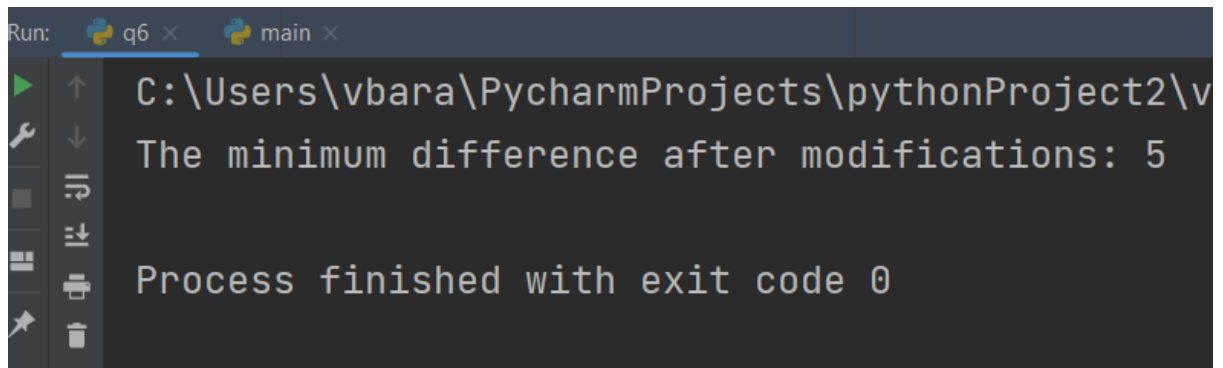
    for i in range(len(heights)):
        if heights[i] - k >= min_height:
            heights[i] -= k
        elif heights[i] + k <= max_height:
            heights[i] += k

    new_min_height = min(heights)
    new_max_height = max(heights)

    return new_max_height - new_min_height

tower_heights = [1, 15, 10]
k_value = 6
result = fun(tower_heights, k_value)
print("The minimum difference after modifications:", result)
```

Output:

A screenshot of the PyCharm Run console. The console has a dark background with light gray text. At the top, there are two tabs: 'q6' and 'main', both with Python icons. The 'q6' tab is active. On the left side of the console, there is a vertical toolbar with icons for running, stepping through code, and other debugging actions. The main area of the console displays the following output:

```
C:\Users\vbara\PycharmProjects\pythonProject2\v
The minimum difference after modifications: 5

Process finished with exit code 0
```