Exercises

1) Write a Python program to merge two sorted arrays into a single sorted array.
2) Write a Python program to find the median of an array.
3) Write a Python program to find the mode of an array.
4) Write a Python program to find the average of an array.
5) Write a Python program to find the standard deviation of an array.
6) Write a Python program to find the variance of an array.
7) Write a Python program to find the range of an array.
8) Write a Python program to find the percentile of an array.
9) Write a Python program to find the frequency of each element in an array.
10) Write a Python program to find the index of the first occurrence of a specified element in an array.

Exercises and solution

1) Write a Python program to merge two sorted arrays into a single sorted array.

```
def merge_sorted_arrays(arr1, arr2):
    i, j = 0, 0
    merged_arr = []
    while i < len(arr1) and j < len(arr2):
        if arr1[i] < arr2[j]:
            merged_arr.append(arr1[i])
            i += 1
        else:
            merged_arr.append(arr2[j])
            j += 1
    while i < len(arr1):
        merged_arr.append(arr1[i])
        i += 1
    while j < len(arr2):
        merged_arr.append(arr2[j])
        j += 1
    return merged_arr
```

2) Write a Python program to find the median of an array.

```
def find_median(arr):
    arr.sort()
    n = len(arr)
    if n % 2 == 0:
        median = (arr[n//2 - 1] + arr[n//2])/2
    else:
        median = arr[n//2]
    return median
```

3) Write a Python program to find the mode of an array.

```
from collections import Counter

def find_mode(arr):
    counter = Counter(arr)
    mode = counter.most_common(1)
    return mode[0][0]
```

4) Write a Python program to find the average of an array.

```
def find_average(arr):
    n = len(arr)
    if n == 0:
        return 0
    return sum(arr)/n
```

5) Write a Python program to find the standard deviation of an array.

```
import math

def find_standard_deviation(arr):
    n = len(arr)
    if n == 0:
        return 0
    mean = sum(arr)/n
    variance = sum((x - mean)**2 for x in arr)/n
    std_deviation = math.sqrt(variance)
    return std_deviation
```

6) Write a Python program to find the variance of an array.

```
def find_variance(arr):
    n = len(arr)
    if n == 0:
        return 0
    mean = sum(arr)/n
    variance = sum((x - mean)**2 for x in arr)/n
    return variance
```

7) Write a Python program to find the range of an array.

```
def find_range(arr):
    if len(arr) == 0:
        return 0
    return max(arr) - min(arr)
```

8) Write a Python program to find the percentile of an array.

```
def find_percentile(arr, p):
    arr.sort()
    n = len(arr)
    index = (p/100) * (n-1)
    if index.is_integer():
        percentile = arr[int(index)]
    else:
        percentile = (arr[int(index)] + arr[int(index)+1])/2
    return percentile
```

9) Write a Python program to find the frequency of each element in an array.

```
from collections import Counter

def find_frequency(arr):
    counter = Counter(arr)
```

```
    frequency_dict = dict(counter)
    return frequency_dict
```

10) Write a Python program to find the index of the first occurrence of a specified element in an array.

```
def find_first_occurrence(arr, num):
    for i in range(len(arr)):
        if arr[i] == num:
            return i
    return -1

# example usage
arr = [2, 3, 5, 7, 7, 8, 9]
num = 7
index = find_first_occurrence(arr, num)
if index == -1:
    print(f"{num} is not found in the array.")
else:
    print(f"The index of the first occurrence of {num} is {index}.")
```