1. 139. Write a program that finds the closest pair of points in a set of 2D points using the brute force approach.

   Input:
   - A list or array of points represented by coordinates (x, y).

   Points: [(1, 2), (4, 5), (7, 8), (3, 1)]

   Output:
   - The two points with the minimum distance between them.
   - The minimum distance itself.

   Closest pair: (1, 2) - (3, 1) Minimum distance: 1.4142135623730951

Code:

```
import math

def closest_pair_brute_force(points):
    min_distance = float('inf')
    closest_pair = None


    for i in range(len(points)):
        for j in range(i + 1, len(points)):
            p1, p2 = points[i], points[j]
            distance = math.sqrt((p1[0] - p2[0]) ** 2 + (p1[1] - p2[1]) ** 2)

            if distance < min_distance:
                min_distance = distance
                closest_pair = (p1, p2)

    return closest_pair, min_distance

points = [(1, 2), (4, 5), (7, 8), (3, 1)]

closest_pair, min_distance = closest_pair_brute_force(points)
print(f"Closest pair: {closest_pair[0]} - {closest_pair[1]}")
print(f"Minimum distance: {min_distance}")
```

output:

```
PS C:\Users\karth>
PS C:\Users\karth> & C:/Users/karth/AppData/Local/Programs/Python/Python312/python.exe c:/Users/karth/OneDrive/Documents/OriginLab/problems.py
Closest pair: (1, 2) - (3, 1)
Minimum distance: 2.23606797749979
PS C:\Users\karth>
```

Time complexity:$f(n)=o(n^2)$