Lab 4
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Exercise 1: (Distance between closest pair of points) using divide and conquer.

The complete code:

```
import math

def distance(p1, p2):
    """
    Returns the Euclidean distance between two points.
    """
    return math.sqrt((p1[0] - p2[0])**2 + (p1[1] - p2[1])**2)

def brute_force(points):
    """
    Finds the closest pair of points using brute force.
    """
    n = len(points)
    min_dist = float('inf')
    for i in range(n-1):
        for j in range(i+1, n):
            dist = distance(points[i], points[j])
            if dist < min_dist:
                min_dist = dist
    return min_dist

def closest_pair(points):
    """
    Finds the closest pair of points using divide and conquer.
    """
    n = len(points)
    if n <= 3:
        return brute_force(points)

    # Divide the points into two halves along the x-axis
    mid = n // 2
    left_points = points[:mid]
    right_points = points[mid:]

    # Recursively find the closest pair of points in each half
    left_min = closest_pair(left_points)
    right_min = closest_pair(right_points)

    # Find the minimum distance between the two halves
    min_dist = min(left_min, right_min)
```

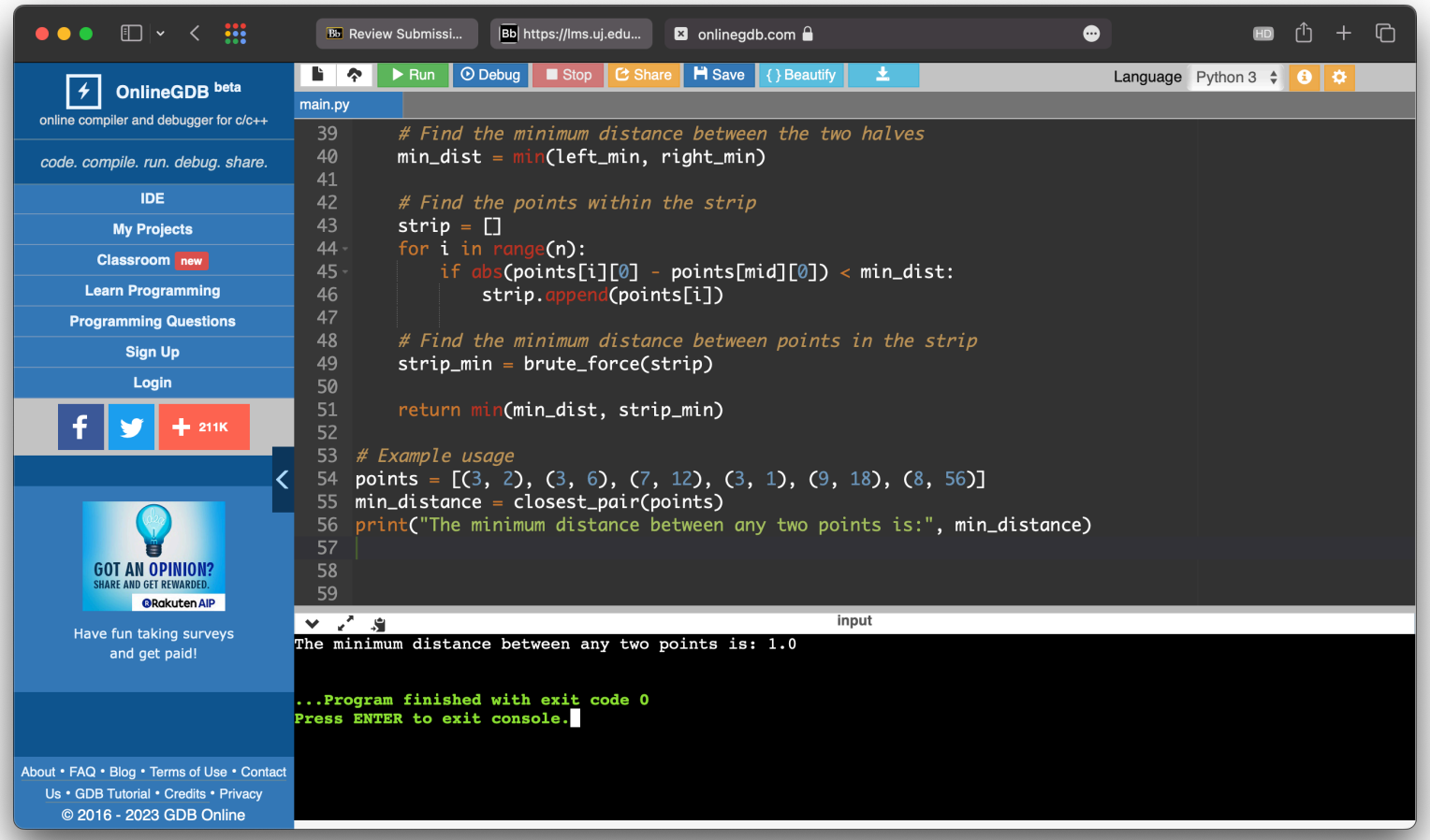
```
# Find the points within the strip
    strip = []
    for i in range(n):
        if abs(points[i][0] - points[mid][0]) < min_dist:
            strip.append(points[i])

    # Find the minimum distance between points in the strip
    strip_min = brute_force(strip)

    return min(min_dist, strip_min)

# Example usage
points = [(3, 2), (3, 6), (7, 12), (3, 1), (9, 18), (8, 56)]
min_distance = closest_pair(points)
                print("The minimum distance between any two points is:", min_distance)
```

PART B: Run your code for the following inputs: p = [(3, 2), (3, 6), (7, 12), (3, 1), (9, 18), (8, 56)]; and attach screenshot of final output of your code



The minimum distance between any two points is: 1.0