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Programiz Python Online Compiler

main.py

```
1- def median_of_medians(arr, k):
2-     def partition(arr, l, r):
3-         pivot = arr[r]
4-         i = l
5-         for j in range(l, r):
6-             if arr[j] <= pivot:
7-                 arr[i], arr[j] = arr[j], arr[i]
8-                 i += 1
9-         arr[i], arr[r] = arr[r], arr[i]
10-        return i
11-    def select(arr, l, r, k):
12-        if l == r:
13-            return arr[l]
14-        pivot_index = partition(arr, l, r)
15-        if k == pivot_index:
16-            return arr[k]
17-        elif k < pivot_index:
18-            return select(arr, l, pivot_index - 1, k)
19-        else:
20-            return select(arr, pivot_index + 1, r, k)
21-    return select(arr, 0, len(arr) - 1, k - 1)
22- arr1 = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
23- k1 = 6
24- print(median_of_medians(arr1, k1))
25- arr2 = [23, 17, 31, 44, 55, 21, 20, 18, 19, 27]
26- k2 = 5
27- print(median_of_medians(arr2, k2))
```

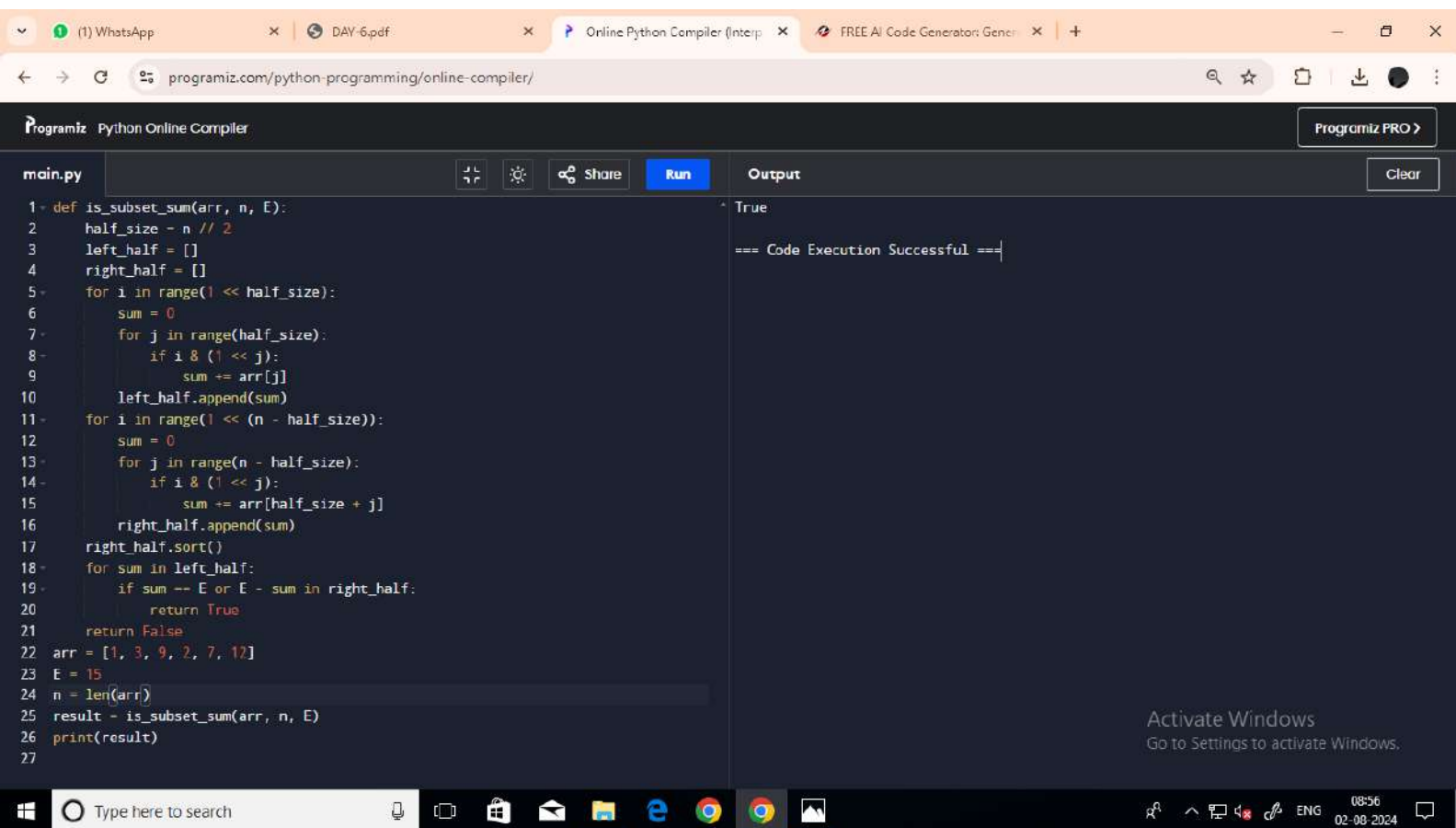
Output

```
6
21
=== Code Execution Successful ===
```

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main.py

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```
1 def strassen_matrix_multiply(A, B):
2     if len(A) == 2:
3         a, b, c, d = A[0][0], A[0][1], A[1][0], A[1][1]
4         e, f, g, h = B[0][0], B[0][1], B[1][0], B[1][1]
5         p1 = a * (f - h)
6         p2 = (a + b) * h
7         p3 = (c + d) * e
8         p4 = d * (g - e)
9         p5 = (a + d) * (e + h)
10        p6 = (b - d) * (g + h)
11        p7 = (a - c) * (e + f)
12        C = [[p5 + p4 - p2 + p6, p1 + p2], [p3 + p4, p1 + p5 - p3 - p7]]
13        return C
14    else:
15        return "Input matrices are not 2x2."
16 A = [[1, 7], [3, 5]]
17 B = [[1, 3], [7, 5]]
18 C = strassen_matrix_multiply(A, B)
19 print(C)
20
```

Output

[[50, 38], [38, 34]]

=== Code Execution Successful ===

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main.py

```
1 def karatsuba(x, y):
2     if x < 10 or y < 10:
3         return x * y
4     m = max(len(str(x)), len(str(y)))
5     m2 = m // 2
6     high1, low1 = divmod(x, 10**m2)
7     high2, low2 = divmod(y, 10**m2)
8     z0 = karatsuba(low1, low2)
9     z1 = karatsuba((low1 + high1), (low2 + high2))
10    z2 = karatsuba(high1, high2)
11    return z2 * 10**(2*m2) + (z1 - z2 - z0) * 10**m2 + z0
12 x = 1234
13 y = 5678
14 z = karatsuba(x, y)
15 print(f"Result of {x} x {y} = {z}")
16
```

Run

Output

Result of 1234 x 5678 = 7006652

=== Code Execution Successful ===

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