170. Given two integers X=1234 and Y=5678: Use the Karatsuba algorithm to compute the product Z=X x Y

Test Case 1:

Input: x=1234,y=5678

Expected Output: z=1234×5678=7016652

Code:

```
def karatsuba_multiply(x, y):
    if x < 10 or y < 10:
        return x * y
    num_digits = max(len(str(x)), len(str(y)))
    m = num_digits // 2
    high1 = x // (10 ** m)
    low1 = x % (10 ** m)
    high2 = y // (10 ** m)
    low2 = y % (10 ** m)
    z0 = karatsuba_multiply(low1, low2)
    z1 = karatsuba_multiply((low1 + high1), (low2 + high2))
    z2 = karatsuba_multiply(high1, high2)
    result = z2 * (10 ** (2 * m)) + (z1 - z2 - z0) * (10 ** m) + z0
    return result
x = 1234
y = 5678
z = karatsuba_multiply(x, y)
print(f"Result of {x} × {y} = {z}")
```

output:

Time complexity:f(n)=o(nlogn)