171) 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

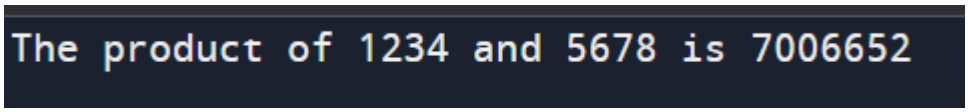
Expected Output: z=1234×5678=7016652

AIM: To write a python program for two integers X=1234 and Y=5678: Use the Karatsuba algorithm to compute the product Z=X x Y

PROGRAM:

```
def karatsuba(x, y):
    # Base case for recursion
    if x < 10 or y < 10:
        return x * y

    n = max(len(str(x)), len(str(y)))
    m = n // 2

    high1, low1 = divmod(x, 10**m)
    high2, low2 = divmod(y, 10**m)

    z0 = karatsuba(low1, low2)
    z1 = karatsuba((low1 + high1), (low2 + high2))
    z2 = karatsuba(high1, high2)

    return (z2 * 10**(2*m)) + ((z1 - z2 - z0) * 10**m) + z0

x = 1234
y = 5678
z = karatsuba(x, y)
print(f"The product of {x} and {y} is {z}")
```

OUTPUT:



TIME COMPLEXITY : O(N^2)