```
#Bubble_Sort
import time
import tracemalloc
import matplotlib.pyplot as plt
start=time.time()

def bubble_sort(nums):
    for i in range(len(nums)-1,0,-1):
        for j in range(i):
            if(nums[j]>nums[j+1]):
                temp=nums[j]
                nums[j]=nums[j+1]
                nums[j+1]=temp
            print(nums)
        print("\n")

tracemalloc.start()
nums=[5,3,8,4,1]
print("before sorting the element:")
print(nums)
print("\n")

bubble_sort(nums)
print("after sorting the elements:")
print(nums)
print("memory space=",tracemalloc.get_tracemalloc_memory(),"bytes")
end=time.time()
print("run time of program:",end-start)
tracemalloc.stop()

x=list(range(1,10000))
plt.plot(x,[y*y for y in x])
plt.title("Bubble sort time complexity is o(n\u00b2)")
plt.xlabel("input")
plt.ylabel("time")
plt.show()
```

**********output**********

```
before sorting the element:
[5, 3, 8, 4, 1]


[3, 5, 8, 4, 1]
[3, 5, 8, 4, 1]
[3, 5, 4, 8, 1]
[3, 5, 4, 1, 8]


[3, 5, 4, 1, 8]
[3, 4, 5, 1, 8]
[3, 4, 1, 5, 8]


[3, 4, 1, 5, 8]
```

```
[3, 1, 4, 5, 8]


[1, 3, 4, 5, 8]


after sorting the elements:
[1, 3, 4, 5, 8]
memory space= 15760 bytes
run time of program: 0.0909428596496582
```