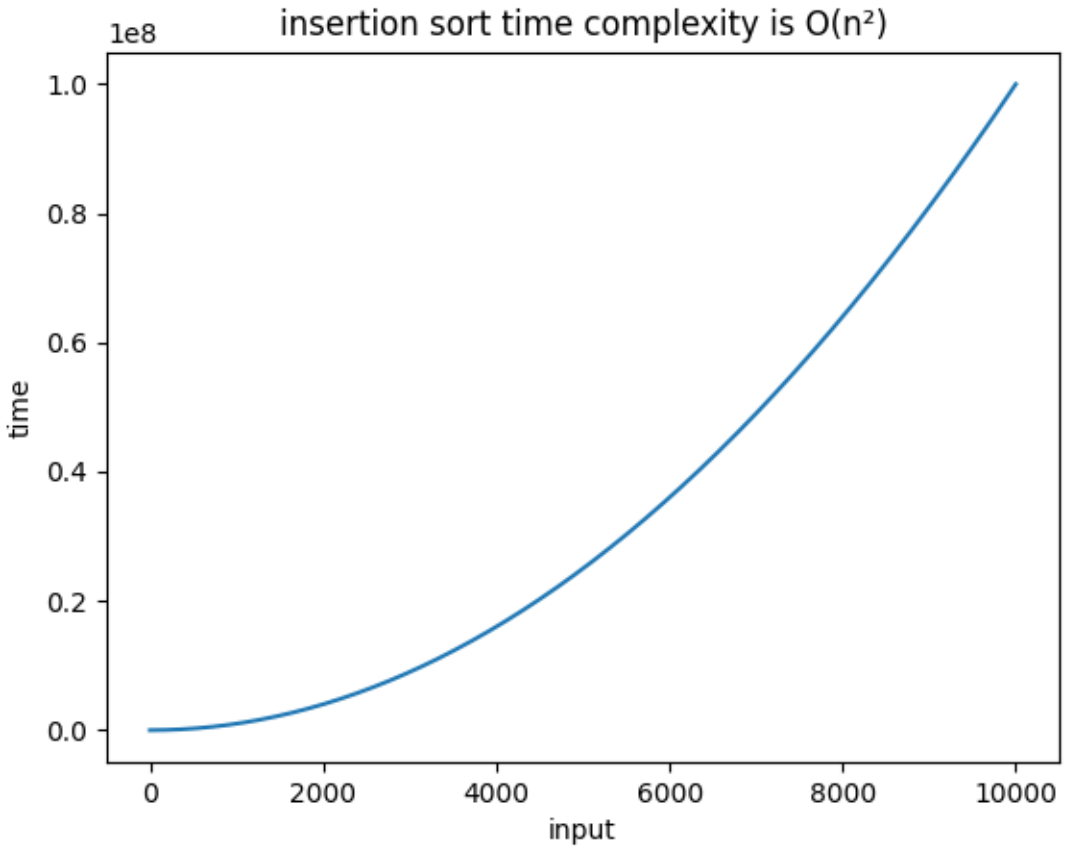
```
#insertion_sort
import time
import tracemalloc
import matplotlib.pyplot as plt
start=time.time()

def sort(nums):
    for i in range(1,len(nums)):
        key=nums[i]
        j=i-1
        while j>=0 and key<nums[j]:
            nums[j+1]=nums[j]
            nums[j]=nums[j+1]
            j-=1

        nums[j+1]=key

tracemalloc.start()
nums=[12,11,13,5,6]
print("Before sorting the elements:")
print(nums)
print("\n")
print("After sorting the element:")
sort(nums)
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("insertion sort time complexity is O(n\u00b2)")
plt.xlabel("input")
plt.ylabel("time")
plt.show()
```

```
*******************************output*************************************
*
Before sorting the elements:
[12, 11, 13, 5, 6]


After sorting the element:
[5, 6, 11, 12, 13]
Memory Space= 15600 bytes
Run time of program: 0.02395153045654297
```


insertion sort time complexity is O(n²)
1e8
1.0
0.8
0.6
0.4
0.2
0.0
time
0
2000
4000
6000
8000
10000
input