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#Quick_sort
import time
import matplotlib.pyplot as plt
start=time.time()
from random import randint
def create_list(size=5,max=10):
    return[randint(0,max)for i in range(size)]
def quick_sort(list):
    if len(list)<=1:
        return list
    smaller,equal,large=[],[],[]
    pivot=list[randint(0,len(list)-1)]

    for x in list:
        if x< pivot:
            smaller.append(x)
        elif x==pivot:
            equal.append(x)
        else:
            large.append(x)

    return quick_sort(smaller)+equal+quick_sort(large)

list=create_list()
print("Before sorting the elements:")
print(list)
print("\n")

x_axis=[]
y_axis=[]
for k in range(1,2000,100):
    result=quick_sort(list)
    print("Run time of program:",round(time.time()-start,6))
    x_axis.append(k*100)
    y_axis.append(round(time.time()-start,6))

print("After sorting the elements:")
print(result)

plt.plot(x_axis,y_axis,marker="o")
plt.title("Quick sort time complexity is O(n*logn)")
plt.xlabel("time")
plt.ylabel("time")
plt.show()
********************************output********************************
**
Before sorting the elements:
[6, 0, 8, 1, 0]


Run time of program: 0.049037
Run time of program: 0.06597
Run time of program: 0.07901
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Run time of program: 0.087001
Run time of program: 0.1
Run time of program: 0.110971
Run time of program: 0.119969
Run time of program: 0.130971
Run time of program: 0.147977
Run time of program: 0.162975
Run time of program: 0.180499
Run time of program: 0.187509
Run time of program: 0.200676
Run time of program: 0.212012
Run time of program: 0.220013
Run time of program: 0.232013
Run time of program: 0.244054
Run time of program: 0.253044
Run time of program: 0.265012
Run time of program: 0.280259
After sorting the elements:
[0, 0, 1, 6, 8]
```


Quick sort time complexity is O(n*logn)