Bindu Kumari.B

2VX23UE010

Expt 1a selection sort

In [5]:

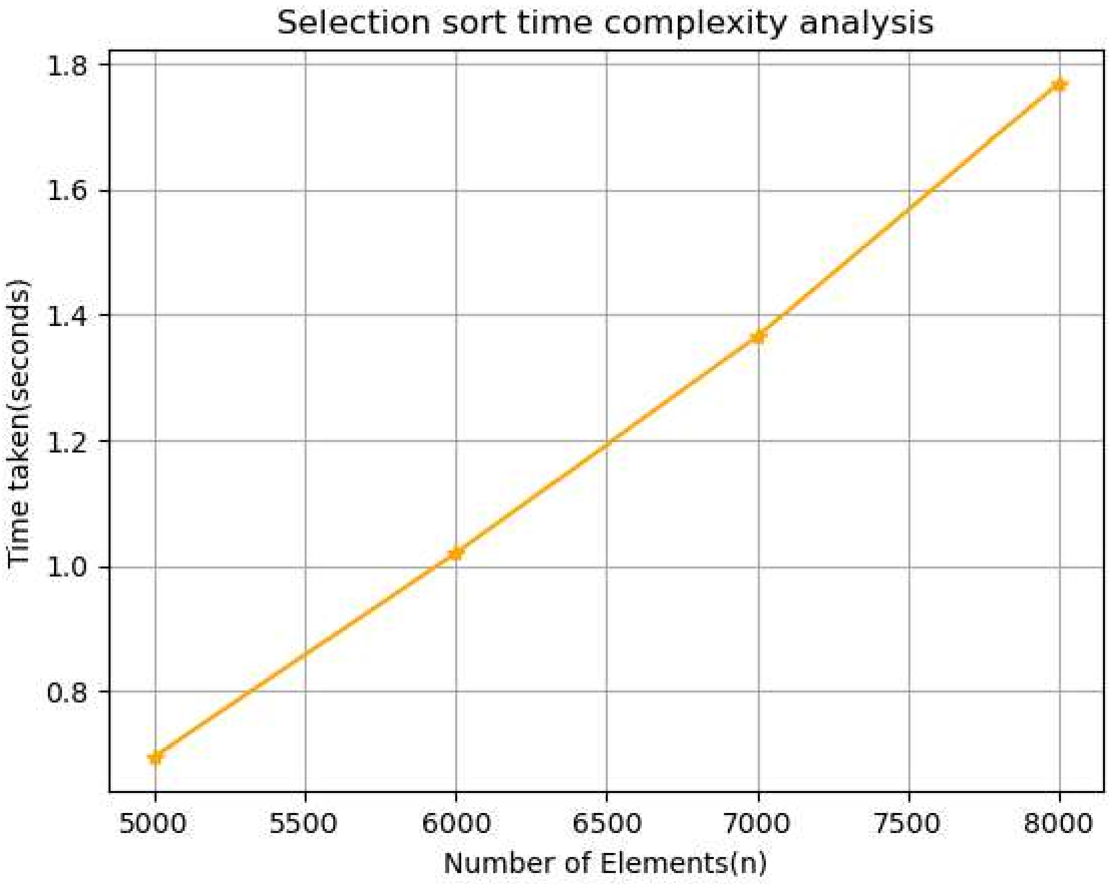
```
import time
import random
import matplotlib.pyplot as plt

arr=input("enter the list of elements seperately with spaces").split()
arr=[int(x) for x in arr]
print("input array:",arr)

n=len(arr)

def selection_sort(arr):
    for i in range(n):
        min_idx=i
        for j in range(i+1,n):
            if arr[j]<arr[min_idx]:
                min_idx=j
        arr[i],arr[min_idx]=arr[min_idx],arr[i]
    return arr

sorted_arr=selection_sort(arr)
print("Sorted Array",sorted_arr)


#Time taken to sort
start_time = time.time()
sorted_arr = selection_sort(arr)
end_time = time.time()

print("Time taken to sort",end_time-start_time,"seconds")
```

```
enter the list of elements seperately with spaces7 6 5 4 3 2
input array: [7, 6, 5, 4, 3, 2]
Sorted Array [2, 3, 4, 5, 6, 7]
Time taken to sort 0.0 seconds
```

In [6]:

```
#For n>5000
n_values=[5000,6000,7000,8000]
time_values=[]

for n in n_values:
    arr=[random.randint(1,9) for _ in range(n)]

    start_time=time.time()
    sorted_arr=selection_sort(arr)
    end_time=time.time()

    time_taken=end_time-start_time
    print("time taken to sort",n,"elements:",time_taken,"seconds")
    time_values.append(time_taken)


#plotting the graph
plt.plot(n_values,time_values,"orange",marker="*")
plt.xlabel('Number of Elements(n)')
plt.ylabel('Time taken(seconds)')
plt.title('Selection sort time complexity analysis')
plt.grid(True)
plt.show( )
```

```
time taken to sort 5000 elements: 0.6957223415374756 seconds
time taken to sort 6000 elements: 1.0200424194335938 seconds
time taken to sort 7000 elements: 1.364715576171875 seconds
time taken to sort 8000 elements: 1.7679531574249268 seconds
```



In [ ]: