

INSTITUTE OF COMPUTER TECHNOLOGY
B-TECH COMPUTER SCIENCE ENGINEERING 2025-26
SUBJECT:-ALGORITHM ANALYSIS & DESIGN

NAME: Rahul Prajapati

ENRLL NO: 23162171020

BRANCH: CYBER SECURITY

BATCH: 52

PRACTICAL_EXAM

```

import time
import random
import matplotlib.pyplot as plt

def selection(array):
    n=len(array)
    for i in range(n):
        min_pos=i
        for j in range(i+1,n):
            if array[j]<array[min_pos]:
                min_pos=j
        array[i]=array[min_pos]
        array[min_pos]=array[i]
    return array

def merge_sort(arr):
    if len(arr) <= 1:
        return arr

    mid = len(arr) // 2
    left = merge_sort(arr[:mid])
    right = merge_sort(arr[mid:])

    return merge(left, right)

def merge(left, right):
    result = []
    i = j = 0

    while i < len(left) and j < len(right):
        if left[i] <= right[j]:
            result.append(left[i])
            i += 1
        else:
            result.append(right[j])
            j += 1

```

```

while i < len(left):
    result.append(left[i])
    i += 1

while j < len(right):
    result.append(right[j])
    j += 1

return result

```



```
data=[74,148,48,103,196,58,99,150]
```

```
sizes=[2,4,6,8,50]
```

```
selection_times=[]
```

```
merge_times=[]
```

```
for n in sizes:
```

```
    arr=data[:n]
```

```
    data1=data.copy()
```

```
    start=time.time()
```

```
    merge_sort=merge_sort(data1)
```

```
    end=time.time()
```

```
    merge_times.append(end-start)
```

```
    data2=data.copy()
```

```
    start=time.time()
```

```
    merge_sort=selection(data2)
```

```
    end=time.time()
```

```
    selection_times.append(end-start)
```

```
print("selection sort times:",selection_times)
```

```
print("merge sort times:",merge_times)
```

```
plt.plot(sizes,selection_times,marker='*',label="selection_sort")
```

```
plt.plot(sizes,merge_times,marker='+',label="merge_sort")
```

OUTPUT:

```
PS C:\Users\Hp\OneDrive\Desktop\exam> python .\internal_practical.py
```

```
Selection Sort Steps: [4950, 19900, 79800, 319600, 1279200, 5118400]
```

```
Merge Sort Steps: [554, 1288, 2968, 6743, 15029, 33300]
```

Figure 1

