6/6/24

Quick Sort

+ Sorting the given set of N integers using quick sort & compute the time taken
+ Plot the graph of the time taken for N using MS excel.

Program:-

```
#include<stdio.h>
#include<time.h>
#include<stdlib.h>

void quick(int a[], int low, int high);
int partition(int a[], int low, int high);
void main(){
    int a[15000], n, j, i, ch, temp;
    clock_t, start, end;

    while(1){
        printf("\n1: For manual entry of N value and
                array elements");
        printf("\n2: To display time taken for
        sorting no of N range 500 to 14500");
        printf("\n3: to exit");
        printf("%d", &ch);
```

```
switch (ch)
{
case 1:
    printf("\n Enter the no of elements:");
    scanf("%d", &n);
    printf("Enter array elements:");
    for (i=0; i<n; i++)
    {
        scanf("%d", &a[i]);
    }
    start = clock();
    quick_sort(a, 0, n-1);
    end = clock();
    printf("\n Time taken to sort %d no is %f
            Secs", n, ((double)(end-start))/
            clock_per_sec));
    n = n+10000;
}
break;

case 3:
    exit(0);
}
getchar();
}

void quick_sort(int a[], int low, int high)
{
    if (low < high)
    {
```

```
if(low < high)
{
  int pi = partition(a, low, high);
  quick_sort(a, low, pi - 1);
  quick_sort(a, pi + 1, high);
}
}

int partition(int a[], int low, int high)
{
  int pivot = a[high];
  for(int j = low; j <= high - 1; j++)
  {
    if(a[j] < pivot) {
      i++;
      int temp = a[i];
      a[i] = a[j];
      a[j] = temp;
    }
  }
  int temp = a[i+1];
  a[i+1] = a[high];
  a[high] = temp;
  return (i+1);
}
```

Output:-

1) 1: For manual entry of N value and array elements
2: To display Time taken for sorting no of elements N in range 5000 to 145000.

Enter your choice: 1

Enter no of elements: 8

Enter array elements: 1 8 7 2 7 4 5 6

Sorted array is: 1 2 3 4 5 6 7 8

Enter your choice: 2

Time Taken to sort:
5000 is 0.015000 Sec
6000 is 0.016000 Sec
7000 is 0.071000 Sec
8000 is 0.031000 Sec
9000 is 0.32000 Sec
10000 is 0.046000 Sec
12000 is 0.063000 Sec
13000 is 0.079000 Sec
14000 is 0.093000 Sec
15000 is 0.11000 Sec

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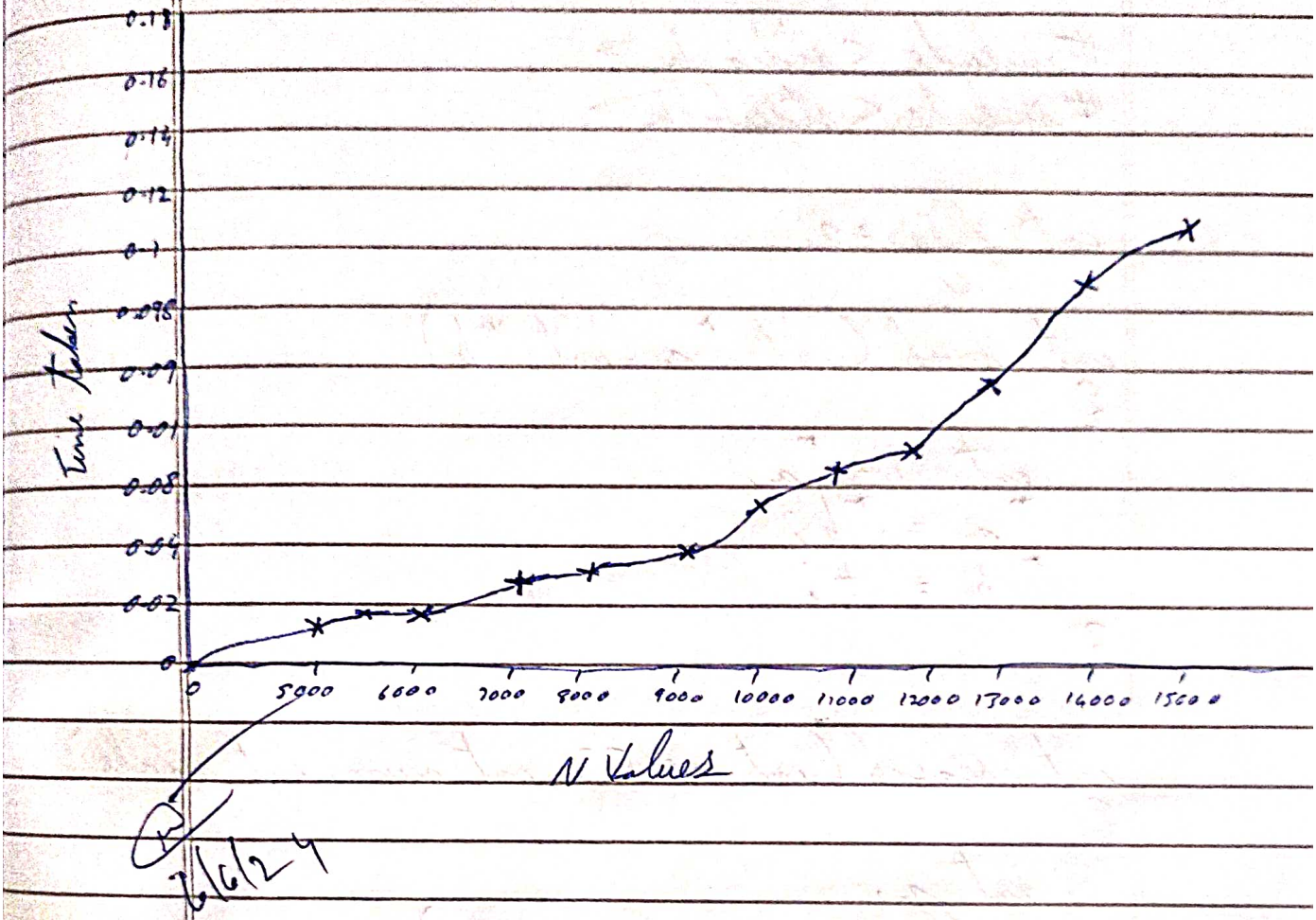
PAGE NO: Usha Gold

Graph:-



7/6/24