linear_binary.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
clock_t start, end;
double cpu_time;
int linear_search(int arr[], int high, int low, int key)
{
    if (low<high)
        return -1;
    if (arr[high] == key)
        return high;
    if (arr[low] == key)
        return low;
    return linear_search(arr,high+1,low-1,key);
}
int binary_search(int arr[],int high, int low, int key)
{
    if (low>=high)
    {
        int mid = (high+low)/2;
        if (arr[mid]==key)
        {
            return mid;
        }
        if (arr[mid]>key)
        {
            return binary_search(arr,high,mid-1,key);
        }
        return binary_search(arr, mid + 1, low, key);
    }
    return -1;
}
int main()
{

    int k,pos,c,d,i,n,temp,choice,key,j,flag=1,arr[10000];
    srand(time(0));
```

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    srand(time(0));
    while (flag==1)
    {
        printf("1:Linear_Search\n2:Binary_Search\n3:Exit\n");
        printf("Enter your choice\n");
        scanf("%d", &choice);
        switch(choice)
        {
            case 1:
            printf("Enter the number of elements:\n");
            scanf("%d", &n);
            for (k = 1; k <= n; k++)
            {
               arr[k]=rand()%100;
               printf("%d ",arr[k]);
            }
            printf("\nEnter the Element to be Searched : \n");
            scanf("%d", &key);
            start = clock();
            pos = linear_search(arr, 0, n-1, key);
            for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
            end = clock();
            cpu_time = (double)(end - start) / CLOCKS_PER_SEC;
            if(pos == -1)
            {
             printf("Element is not present in the Array\n");
            }
            else
            {
             printf("Element is present at the Position %d\n", pos);
            }
            printf("Execution time for linear_search = %f ms\n", cpu_time*1000);
            break;
            case 2:
            printf("Enter the number of elements:");
            scanf("%d", &n);
            for (int k =1; k<=n; k++)
```

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for (int k =1; k<=n; k++)
{
   arr[k]=rand()%100;
}
for (i=1; i <=n;i++)
{
    for (j = i + 1; j <= n; ++j)
    {
        if (arr[i] >arr[j])
        {
            temp =arr[i];
            arr[i] = arr[j];
            arr[j] = temp;
        }
    }
}
for (int k =1; k <=n; k++)
{
   printf("%d ",arr[k]);
}
printf("\nEnter the element to be Searched :\n");
scanf("%d", &flag);
start = clock();
for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
pos = binary_search(arr, 0, n - 1, flag);
end = clock();
cpu_time = (double)(end - start) / CLOCKS_PER_SEC;
if(pos == -1)
{
 printf("Element is not present in array\n");
}
else
{
 printf("Element is present at the Position %d\n", pos);
}
printf("Execution time for binary_search = %f ms\n", cpu_time*1000);
break;
```

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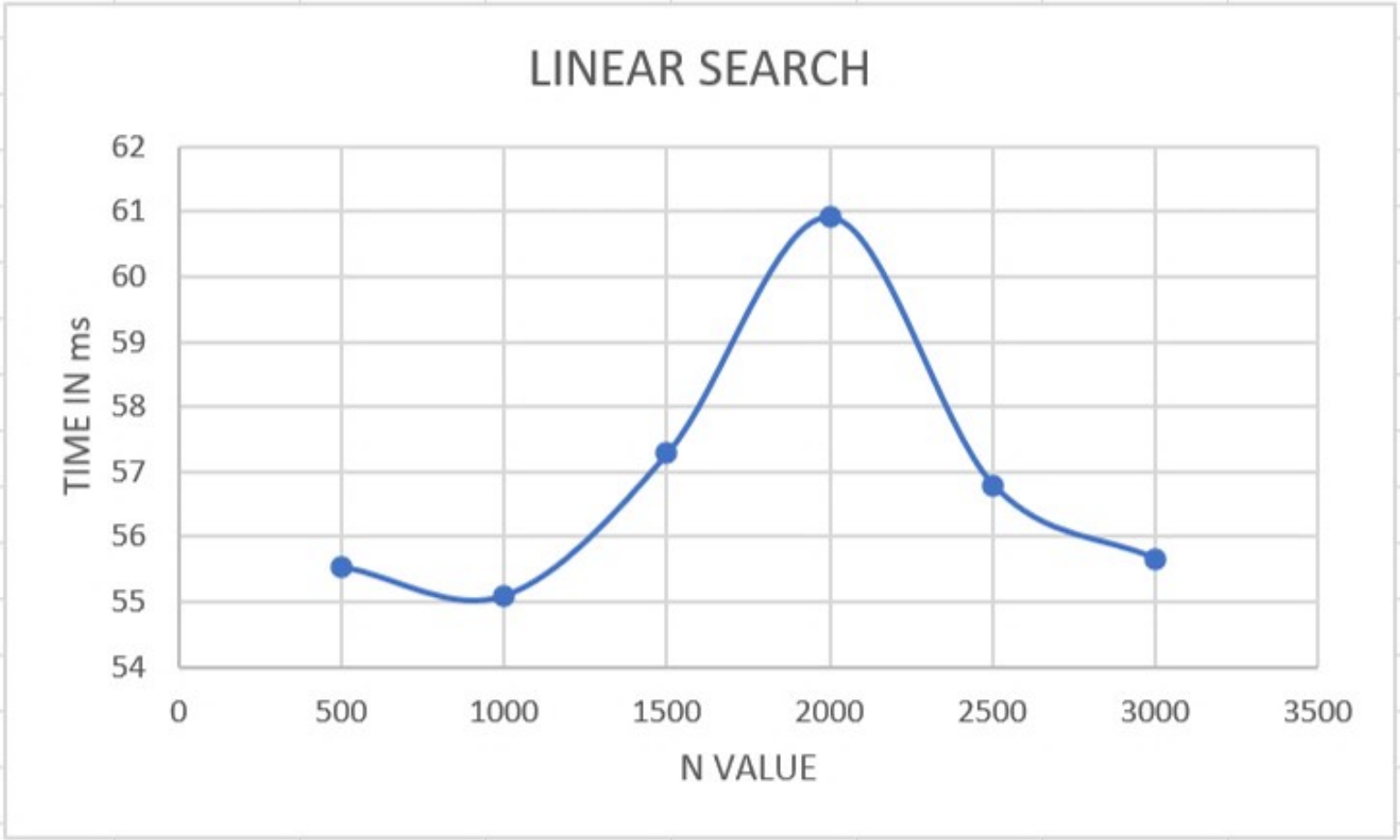
                    {
                        temp =arr[i];
                        arr[i] = arr[j];
                        arr[j] = temp;
                    }
                }
            }
            for (int k =1; k <=n; k++)
            {
               printf("%d ",arr[k]);
            }
            printf("\nEnter the element to be Searched :\n");
            scanf("%d", &flag);
            start = clock();
            for (c = 1; c <= 5000; c++) for (d = 1; d <= 5000; d++) { }
            pos = binary_search(arr, 0, n - 1, flag);
            end = clock();
            cpu_time = (double)(end - start) / CLOCKS_PER_SEC;
            if(pos == -1)
            {
             printf("Element is not present in array\n");
            }
            else
            {
             printf("Element is present at the Position %d\n", pos);
            }
            printf("Execution time for binary_search = %f ms\n", cpu_time*1000);
            break;
            default:flag=0;
        }
    }
    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL 1: powershell

```
Enter the number of elements:
400
89 55 54 32 35 78 33 99 5 10 28 80 17 27 35 56 11 74 94 91 68 70 4 87 11 23 67 68 66 90 47 2 10 86 56 17 15 61 32 8 10 10 12 46 3 82 10 38 13 20 11 22 16 46 82 18 11 80 24 60 81 31 13 63 88 34 83 40 0
68 93 68 26 34 19 83 93 14 37 88 33 41 53 74 53 85 69 35 80 66 20 51 48 85 55 3 83 73 82 15 35 98 9 24 27 79 58 54 87 8 16 65 88 12 84 15 96 15 66 61 64 64 30 5 62 17 29 40 98 82 3 31 84 79 86 83 36 16
 71 61 12 11 31 15 1 85 65 48 92 29 21 10 19 2 32 58 44 22 43 44 78 90 21 44 38 67 81 0 39 93 31 70 17 0 10 0 38 97 58 82 42 82 67 80 40 20 97 78 42 56 85 8 6 0 48 45 41 15 99 14 73 75 47 90 9 46 69 73
 67 87 25 94 69 54 82 25 64 35 65 8 55 71 95 76 43 96 28 32 34 66 94 90 73 33 21 61 85 45 4 38 69 47 88 65 94 22 96 47 99 10 8 94 11 80 25 80 52 38 1 35 9 96 72 76 56 19 27 31 68 25 92 86 32 42 9 46 53
 25 51 38 28 18 62 78 28 90 12 35 42 99 43 59 21 74 15 4 41 62 32 79 71 43 59 27 79 51 42 24 13 27 77 44 43 9 64 81 43 37 74 47 24 30 27 40 43 27 61 65 89 5 39 27 61 46 82 91 47 62 45 54 26 25 80 64 78
 18 80 54 59 18 77 70 55 60 23 54 11 83 57 64 3 64 18 61 68 78 54 63 75 80 73 65 6 38 22 13 34 14 79 23 61 24 71 17 95 59 72 12 48 27 38 66 92 40 32 6 5 48 81 11
Enter the Element to be Searched :
18
Element is present at the Position 363
Execution time for linear_search = 56.000000 ms
1:Linear_Search
2:Binary_Search
3:Exit
Enter your choice
2
Enter the number of elements:200
0 0 1 2 2 2 2 3 4 6 6 6 7 7 7 8 8 9 9 9 10 11 11 11 11 13 13 13 14 15 15 15 17 17 17 18 18 18 20 20 21 21 21 22 22 23 23 24 24 24 24 24 25 25 27 28 28 29 29 29 29 30 31 31 31 32 32 32 33 33 33 34 34 34
 34 36 37 37 38 38 38 38 38 38 39 39 40 40 40 41 41 42 42 43 43 44 44 44 44 44 45 45 45 46 46 47 47 49 49 49 49 50 50 51 51 51 52 52 52 53 54 54 54 55 55 57 59 59 59 59 59 60 60 61 62 62 62 62 63 64 64
 64 65 65 65 66 66 66 66 67 67 68 68 69 69 70 71 72 72 72 72 72 74 75 76 78 78 80 80 80 80 80 80 80 81 82 84 84 85 85 87 87 88 88 88 88 89 90 90 92 93 94 94 94 95 95 96 97 97 97
Enter the element to be Searched :
10
Element is present at the Position 21
Execution time for binary_search = 78.000000 ms
PS C:\Users\muska\OneDrive\Desktop\C programs>
```

N value	TIME IN ms
500	55.533
1000	55.092
1500	57.284
2000	60.906
2500	56.793
3000	55.654



N value	TIME IN ms
500	53.188
1000	50.081
1500	52.353
2000	52.76
2500	56.939
3000	56.289