ASSIGNMENT 1- DAA

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Code:

```cpp
#include<bits/stdc++.h>

#include <cstdlib>

#include <ctime>

#include <chrono>

using namespace std;

using namespace std::chrono;


long int binary_search(long int arr[],int minm, int maxm,int num)
{
    int mid;
    if (maxm >= minm) {
        mid = (minm + maxm)/2;

        if (arr[mid] == num)
            cout<<"Your search result find at position No. :"<< mid;

        else if (arr[mid] > num){
            return binary_search(arr, minm, mid - 1, num);}

        else
            return binary_search(arr, mid + 1, maxm, num);
    }
    else
        cout<<"\nSearch Not Found";
}
```

```cpp
void linear_search(long int arr[],int n,int num)
{
    for (int i = 0; i < n; i++)
    {
        if (arr[i] == num)
        {
            cout<<"\nYour search result found at position No. : "<< i;
        }
    }
}



int main(){
    int minm,maxm,n,num;
    long int arr[100000];

    srand(time(0));
    n = 100000;

    for( int i=0; i<n; i++)
    {
        arr[i] = i+1;
    }
    minm = 0;
    maxm = n;

    num = (rand() % 100000 + 1);

      auto start = high_resolution_clock::now();
    binary_search(arr,minm,maxm,num);
    auto stop = high_resolution_clock::now();

    auto duration = duration_cast<microseconds>(stop - start);
```

```cpp
        cout << "\nTime taken by Binary Search: "<< duration.count() << " microseconds"
<< endl;


    auto startL = high_resolution_clock::now();

    linear_search(arr,n,num);

    auto stopL = high_resolution_clock::now();


    auto durationL = duration_cast<microseconds>(stopL - startL);


    cout << "\n\nTime taken by Linear Search: "<< durationL.count() << " microseconds"
<< endl;


 return 0;

}
```

OUTPUT

```
Your search result find at position No. :21267
Time taken by Binary Search: 20 microseconds

Your search result found at position No. : 21267

Time taken by Linear Search: 72 microseconds



Exit code: 0 (normal program termination)
```

Value	BInarySearch (µs)	LinearSearch (µs)
49541	33	165
57832	27	80
67529	34	160
81593	34	127
47951	34	131
87213	37	127
10146	21	73
65548	44	170
85747	33	162
57773	31	126
58647	32	127
96650	21	73
65532	33	143
26126	33	165
15005	38	126

Graph for above table: