To check the full efficiency of Grover's Search algorithm we need to use a quantum computer .But we don't hav a Quantum computer in our hand till now,because of it's un availability and cost .That's why we have used some matlab functions to check how the algorithm will look like in classical computer.The simulated results are displayed in the graph below and analysed in a proper manner.

We take no of Qubits=6 , then $n=2^{Qubits}=2^6=64$ is the size of the database.Now we will perform a randomized searching of an element in the database.Then we mark the desired element in randomized mode.

```
findmode=mod(round(n*rand+1),n);%desired element in randomized mode
```

Then we define the diffusion operator and the oracle respectively. Then we will run the algorithm upto no of Grover's iteration which is $\frac{\pi}{4} * \sqrt{n}$ times

```
finish=round(pi/4*sqrt(n));
```

So here the algorithm will run upto $0.7853*\sqrt{64}=\lfloor 6.23 \rfloor$=6 steps.

At the end of 6th step we will find a result which has the highest probability value and after the 6th step the probability will decrease. We will find then the result randomly whenever the iterations reaches at step 6.

Here are some result seta of randomized behavior of Grover's Search Algorithm and of course one thing to point out is that the maximum iteration graph always remains constant , though the search result of the desired item is not static.This is because we decided to choose random searching and tried to prove the result that the number of iteration of Grover's Search Algorithm for this particular problem will be always 6.

Here are

Some simulated results to show how the steps will work:

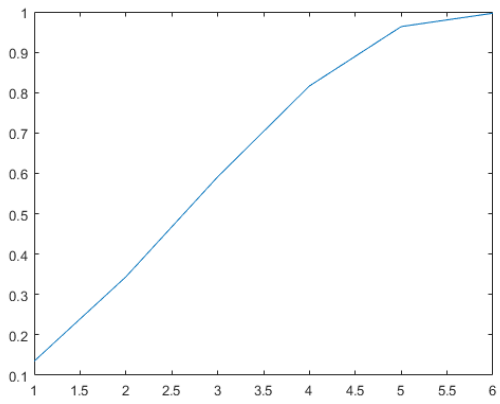

Fig1:Probablity curve

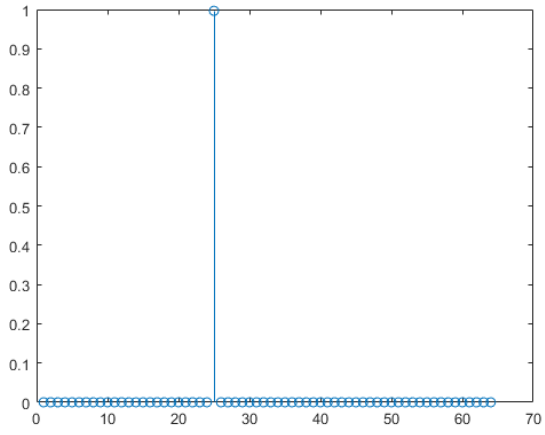

Fig2:Finding randomized no using Grover'sAlgorithm

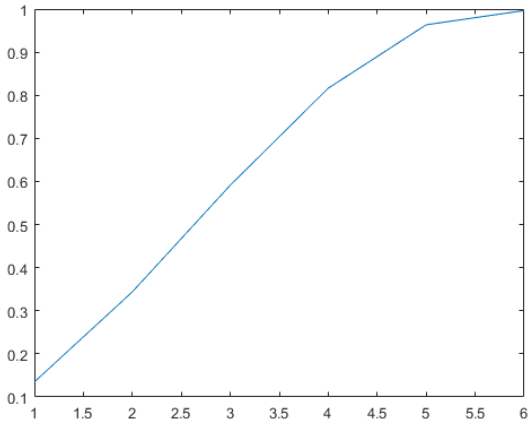

Fig3:Maximum iteration curve (Probablity curve)

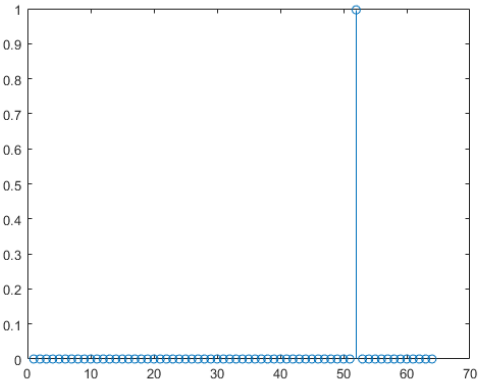

Fig4: Finding randomized no using Grover's Algorithm

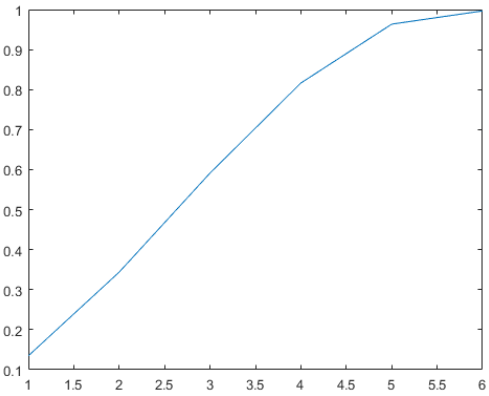

Fig5:Maximum iteration curve (Probablity Curve)

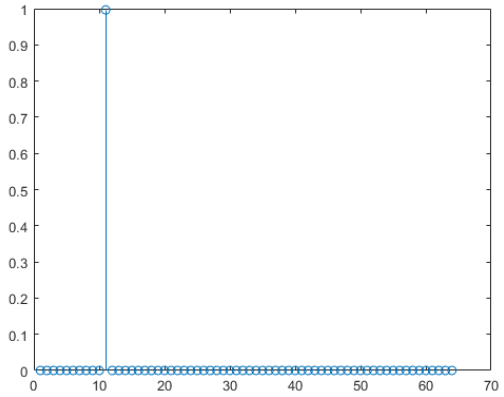

Fig6: Finding randomized no using Grover's Algorithm

Optimality of Grover's search algorithm:

Grover's Search Algorithm is considered as an optimal algorithm in the context of all searching algorithm ,either classical or quantum. It is not directly proved but it is considered as true due to some simulated results. Grover's Algorithm runs in O($\sqrt{n}$) times where it is asymptotically proved that no searching algorithm can perform searching in an unstructured database lower than $\frac{\pi}{4} * \sqrt{n}$ times. But it is worth considering that this is the complexity of Grover's Search Algorithm. By this way indirectly we can prove that Grover's Database Search Algorithm is optimal in nature.