Course Name: DAA Lab **Course Code: 21ITH-311/21CSH-311**

Experiment 1.2

Aim: Develop a program for implementation of power function and determine that complexity should be O(log n) .

Objectives: To implement power function in O(logn) time complexity.

Input/Apparatus Used: In this program , power is divided by 2 in order to get complexity in log.

Procedure/Algorithm:

if(y==0):

return 1;

temp = power(x,y/2); if(y%2==0):

return temp*temp; else

return x*temp*temp;

Sample Code:

```
public class DAAexp2 {
    public static int optimizedPower(int a, int n){
        if(n == 0){
            return 1;
        }
        int halfPower = optimizedPower(a, n/2);
        int halfpowerSq = halfPower * halfPower;

        //n is odd
        if(n %2 != 0){
            halfpowerSq = a * halfpowerSq;
        }
        return halfpowerSq;
    }

    public static void main(String[] args) {
```

```
        int a =2;
        int n =5;
        System.out.println(optimizedPower(a, n));
    }
}
```

Observations/Outcome :

```
32
PS C:\Users\NI$HANT\OneDrive\Documents\
GitHub\DSA-ALPHA>
```

Time Complexity: O(log n)