Experiment 1.2

Aim: *Code implement power function in O(logn) time complexity.*

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

Input/Apparatus Used: *VS CODE*

Procedure/Algorithm:

1. *Start with the base number base and the exponent exp.*
2. *Initialize a variable result to 1 to store the final result.*
3. *While exp is greater than 0, do the following:*
    - *If exp is odd, multiply result by base.*
    - *Sqaure base*
    - *Halve exp by integer division*
4. *Return the value of result as the power of the number.*

Sample Code:

```
#include <iostream>
using namespace std;

int power(int x, unsigned int n)
{
    if (n == 0)
        return 1;

    int temp = power(x, n / 2);

    if (n % 2 == 0)
        return temp * temp;
    else
```

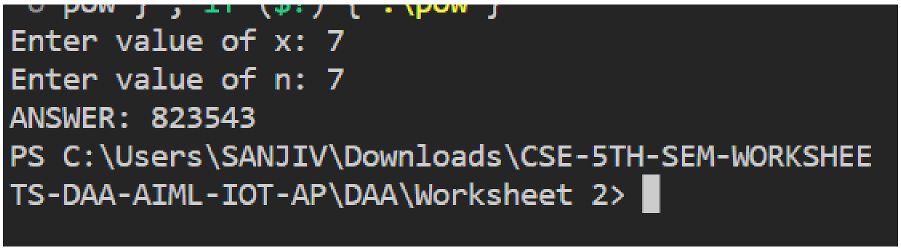
```
        return x * temp * temp;
    }

    int main()
    {
      int x;
      cout << "Enter value of x" << endl;
      cin >> x;

      int n;
      cout << "Enter value of n" << endl;
      cin >> n;

      cout << power(x, n);
      return 0;
   }
```

Observations/Outcome :



```
o pow } ; if ($?) { .\pow }
Enter value of x: 7
Enter value of n: 7
ANSWER: 823543
PS C:\Users\SANJIV\Downloads\CSE-5TH-SEM-WORKSHEE
TS-DAA-AIML-IOT-AP\DAA\Worksheet 2>
```

Time Complexity: O(log n)

Learning Outcome:

- *Understanding Recursive Problem Solving*
- *Applying Mathematical Properties*
- *Practical Implementation of Algorithms*