Experiment : 1.2

Student Name: Virat Samdarshi
UID: 22BCS12648
Branch: CSE
Section/Group: IOT-627-B
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Subject Code: 22CSH-311

1. Aim:

Implement power function in O(logn) time complexity.

2. Objective:

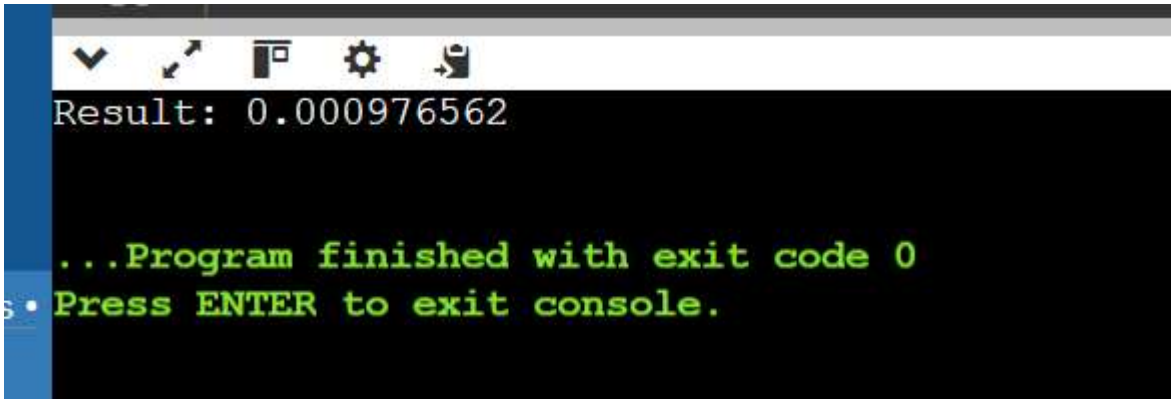
The objective is to compute x^n efficiently with O(log n) time complexity using exponentiation by squaring. This method optimizes performance while correctly handling positive, negative, and zero exponents.

3.Implementation/Code:

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

double power(double x, int n) {
double result = 1.0;
   long long exponent = n;

   if (exponent < 0) {x = 1 / x;
      exponent = -exponent;
   }
   while (exponent > 0) {
      if (exponent % 2 == 1) { result *=
         x;
      }
      x *= x; exponent /= 2;
   }

   return result;
}
```

```
int main() { double x = 2.0;
    int n = -10;
    cout << "Result: " << power(x, n) << endl;

    return 0;
}
```

4.Output



5.Time Complexity

Total time complexity is O(logn).