Efficient program to calculate e^x

The value of Exponential Function e^x can be expressed using following Taylor Series.

```
e^x = 1 + x/1! + x^2/2! + x^3/3! + ......
```

How to efficiently calculate the sum of above series?
The series can be re-written as

```
e^x = 1 + (x/1) (1 + (x/2) (1 + (x/3) (........) ) )
```

Let the sum needs to be calculated for n terms, we can calculate sum using following loop.

```
for (i = n - 1, sum = 1; i > 0; --i )
    sum = 1 + x * sum / i;
```

Following is implementation of the above idea.

```c
// Efficient program to calculate e raise to the power x
#include <stdio.h>

//Returns approximate value of e^x using sum of first n
float exponential(int n, float x)
{
    float sum = 1.0f; // initialize sum of series

    for (int i = n - 1; i > 0; --i )
        sum = 1 + x * sum / i;

    return sum;
}

// Driver program to test above function
int main()
{
    int n = 10;
    float x = 1.0f;
    printf("e^x = %f", exponential(n, x));
    return 0;
}
```

Output:

```
e^x = 2.718282
```