**Yuan Gao z5239220 Q1**

Given positive integers M and n compute using only many multiplications.

We can take the divide and conquer method to solve it.

For instance,

can be divided to

At the same time，

The binary of 75 is 1001011



Therefore,

We can calculate by binary number

There is C++ code:

1. **long** **long** myPow(**int** M, **int** n){
2. /\*set result \*/
3. **long** **long** res = 1;
4. **while**(n > 0){
5. /\*Bit operation, if the last bit is 1
6. do the res \*= M\*/
7. **if**((n & 1)){
8. res \*= M;
9. }
10. M \*= M;
11. /\*right shifted one time\*/
12. n = n >> 1;
13. }
14. **return** res;
15. }

Because stored the last product in a while loop, the time complexity is