10 is the product of 2 and 5. In n!, we need to know how many 2 and 5, and the number of zeros is the minimum of the number of 2 and the number of 5.

Since multiple of 2 is more than multiple of 5, the number of zeros is dominant by the number of 5.

Here we expand

2147483647!

=2 \* 3 \* ...\* 5 ... \*10 ... 15\* ... \* 25 ... \* 50 ... \* 125 ... \* 250...

=2 \* 3 \* ...\* 5 ... \* (5^1\*2)...(5^1\*3)...\*(5^2\*1)...\*(5^2\*2)...\*(5^3\*1)...\*(5^3\*2)... (Equation 1)

We just count the number of 5 in Equation 1.

Multiple of 5 provides one 5, multiple of 25 provides two 5 and so on.

Note the duplication: multiple of 25 is also multiple of 5, so multiple of 25 only provides one extra 5.

Here is the basic solution:

return n/5 + n/25 + n/125 + n/625 + n/3125+...;

You can easily rewrite it to a loop.