

PROBLEM 4: TERMINAL ZEROS OF $\lfloor e \times 10^6 \rfloor!$
UNDERGRADUATE PROBLEM SOLVING CONTEST
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Definitions: $\lfloor x \rfloor$ is the greatest integer less than or equal to x . For example, $\lfloor 5.9 \rfloor = 5$, $\lfloor 5.1 \rfloor = 5$, and $\lfloor 5 \rfloor = 5$. We say an integer has k *terminal zeros* if its last k digits are 0. For example, 300 has two terminal zeros. We use the standard notation for the factorial; $n! = n \times (n - 1) \times \cdots \times 2 \times 1$.

Primary Question: Explain your methods and determine the number of terminal zeros in

$$\lfloor e \times 10^6 \rfloor!$$

Tie Breaker: Write an algorithm to determine the number of terminal zeros in $n!$ for any integer n . (You need not code the algorithm in any programming language. You may simply write the algorithm in an understandable psuedocode.)

A correct solution to the primary question is a fully correct solution. The tie breaker will only be used in deciding the overall winner. In the spirit of the UPSC, you should not search the internet or look the solution up in a book.