

Some Number Problems

Find a number ABCDEFGHIJ such that A is the count of how many 0's are in the number, B is the number of 1's, and so on.

$1!=1$, $2!=2$, $3!=6$, $4!=24$, $5!=120$, $6!=720$, etc. Every factorial larger than $4!$ ends in zero. How many zeros are there at the end of $n!$?

$1/3 = .333\overline{3}$, $1/7 = .142857\overline{142857}$, $1/11 = .09\overline{09}$, $1/13 = .076923\overline{076923}$. The period of $1/3$ is 1. The period of $1/7$ is 6. The period of $1/11$ is 2. The period of $1/13$ is 6. What is the maximum period that $1/n$ can have?