# Last non zero digit of factorial

$D(n!) = \text{Units Digit}\ (2^x \cdot D(x!) \cdot y!)$

x - quotient when n is divided by 5

y - remainder when n is divided by 5

Example:

$D(27!) = UD(2^5 \cdot D(5!) \cdot 2!)$ $\quad 27 = 5 \cdot 5 + 2$ (x = 5, y = 2)

$3\boxed{2} \cdot 1\boxed{2}0 \cdot 2 = 2^3 = 8$

↑ Last non zero digit of 27!

$D(100!) = UD(2^{20} \cdot D(20!) \cdot 0!)$

$D(20!) = UD(2^4 \cdot 4! \cdot 0!) \Rightarrow 1\boxed{6} \cdot 2\boxed{4} \rightarrow 2\boxed{4}$

$UD(2^{20} \cdot 4) = 104857\boxed{6} \cdot 4 = 2\boxed{4}$

↑ Last non zero digit of 100!

$D(33!) = UD(2^6 \cdot D(6!) \cdot 3!)$

$6\boxed{4}$ $\quad 7\boxed{2}0$ $\quad 6 \Rightarrow 4\boxed{8}$

↑ Last non zero digit of 33!