

SHUBHAM GUPTA
180749
HW-12

classmate
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no = 4, prob that it ends up in $\{1, 2, 3\}$

$$\begin{array}{c}
 4 \xrightarrow{1/2} 3 \xrightarrow{1/3} 2 \\
 \uparrow \quad \nwarrow \\
 1/4 \quad 1/3
 \end{array}$$
 ends up in $\{1, 2, 3\}$

$$P = \left(1 + \frac{1}{4} + \frac{1}{4^2} + \dots\right) \times \frac{1}{2} \times \left(1 \times \frac{1}{2} \times \frac{1}{3} + \left(\frac{1}{2} \times \frac{1}{3}\right)^2 + \dots\right) \times \frac{1}{3}$$

$$= \frac{1}{1-0.25} \times \frac{1}{2} \times \frac{1}{3} \times \frac{1}{1-\frac{1}{6}}$$

$$= \frac{4}{3} \times \frac{1}{2} \times \frac{6}{5} \times \frac{1}{3}$$

$$= \frac{4}{15} \quad \underline{\underline{\text{Ans}}}$$