Extra Credit: Conditional Probability

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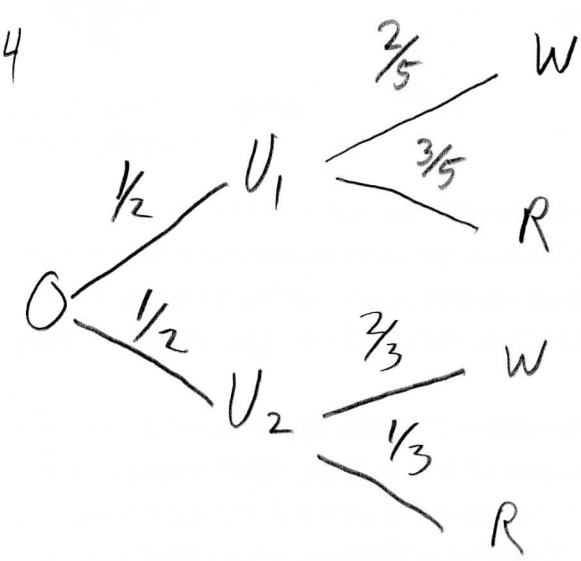

$\frac{1}{2}\left(\frac{2}{5}\right) = \frac{2}{10} = P(U_1 \cap W)$

$\frac{1}{2}\left(\frac{3}{5}\right) = \frac{3}{10} = P(U_1 \cap R)$

$\frac{1}{2}\left(\frac{2}{3}\right) = \frac{2}{6} = P(U_2 \cap W)$

$\frac{1}{2}\left(\frac{1}{3}\right) = \frac{1}{6} = P(U_2 \cap R)$

A) $P(R|U_1) = \frac{3}{5}$

B) $P(R|U_2) = \frac{1}{3}$

C) $P(U_2|W) = \frac{P(U_2 \cap W)}{P(W)} = \frac{\frac{2}{6}}{\frac{2}{10} + \frac{2}{6}} = \frac{2}{6}\left(\frac{1}{\frac{6}{30} + \frac{10}{30}}\right) = \frac{2}{6}\left(\frac{1}{\frac{16}{30}}\right)$

$= \frac{1}{3}\left(\frac{30}{16}\right) = \frac{10}{16} = \frac{5}{8}$

D) $P(U_1|R) = \frac{P(U_1 \cap R)}{P(R)} = \frac{\frac{3}{10}}{\frac{3}{10} + \frac{1}{6}} = \frac{\frac{3}{10}}{\frac{9}{30} + \frac{5}{30}} = \frac{\frac{3}{10}}{\frac{14}{30}}$

$= \frac{3}{10}\left(\frac{30}{14}\right) = \frac{9}{14}$