$P(2|H) = \frac{1}{6}$
$P(2|H^C) = \frac{1}{8}$
$P(H) = \frac{1}{2}$
$P(H|2) = \frac{\frac{1}{12}}{\frac{4}{48} + \frac{3}{48}}$
$P(H|2) = \frac{4}{7}$

$P(6) = \frac{1}{6}$
$P(6 \cup 6 \cup 6) = 1 - P(6^C)P(6^C)P(6^C)$
$= 1 - \frac{5}{6}^3$
$= 1 - \frac{125}{216}$
$= \frac{91}{216}$

$1 - P(F^C)^2 = 0.64$
$P(F^C)^2 = 0.36$
$P(F^C) = 0.6$
$P(F) = 0.4$
