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Problem 2

Hot Day → 0.2 (1), 0.4 (2), 0.4 (3)

Cold day → 0.5, 0.4, 0.1

If today is hot → 0.6 chance tomorrow is hot

If today is cold → 0.5 chance to move is cold

0.8 chance first day is hot

$$Pr(B|A) = \frac{pr(A|B)\,pr(B)}{pr(A)} = \frac{0.128 \cdot 0.8}{0.11} = \boxed{0.93}$$

B = day 1 hot
A = Observation of 3 & 1 ice creams.

$$pr(A|B) = (0.4)(0.2 \cdot 0.6 + 0.4 \cdot 0.5) = 0.128$$

$$Pr(B) = 0.8$$

$$pr(A) = (0.8 \cdot 0.4)(0.2 \cdot 0.1)(0.6 \cdot 0.5 + 0.5 \cdot 0.2) = 0.11$$