

We concluded last time with a definition of conditional prob:

$$P_{X|Y}(x|y) = P_{XY}(x,y) / P_Y(y) \quad \text{where } P_Y(y) > 0$$

For each fixed y , $P_{X|Y}(\cdot|y)$ is a probability mass function on X .

CONDITIONAL EXPECTATION

$$\underbrace{E[X|Y=y]}_+ = \sum_x x P_{X|Y}(x|y) = \text{expected value of } X \text{ knowing that } \{Y=y\}.$$

