Conditional Probability

(another definition)

$$P(A|B) = \frac{P(AB)}{P(B)}$$

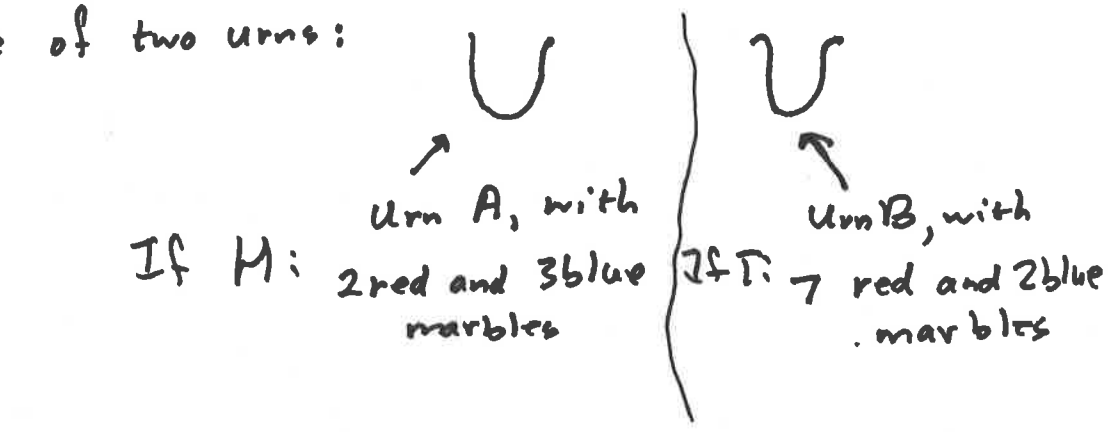
("AB" means "A∩B.")

Two experiments –

① Flip a coin; then roll a die.

Sample space: $\Omega = \{H, T\} \times \{1, 2, 3, 4, 5, 6\}$.

② Flip a coin; then choose a marble at random from one of two urns:



$$P(E|F) = \frac{P(EF)}{P(F)}$$ Def.

$$P(EF) = P(F)P(E|F)$$ "Mult. rule"

$$P(EFG) = P(E)P(F|E)P(G|EF)$$
$$\vdots$$
"chain rules"

If $B_1, \ldots, B_n$ are mutually exclusive events and $A \subseteq B_1 \cup \ldots \cup B_n$ then

$$P(A) = P(B_1)P(A|B_1) + \ldots + P(B_n)P(A|B_n).$$

"law of conditional probability"

Two Useful Techniques

TREE DIAGRAMS.

Venn Diagrams.

Homework:

2.1, 2.2, 2.4, 2.5, 2.7, 2.12;

2.17 - 2.22, 2.29.