

§4.3 CALCULATING PROBABILITIES USING SIMPLE EVENTS

Def:

PROBABILITY OF AN EVENT A , $P(A)$, IS A MEASURE OF OUR BELIEF THAT THE EVENT A WILL OCCUR.

IF EXPERIMENT PERFORMED n TIMES, AND WE COUNT FREQUENCY THAT A OCCURS, THEN

$$\text{RELATIVE FREQUENCY OF } A = \frac{\text{FREQUENCY OF } A}{n}$$

$$\text{AND } P(A) = \lim_{n \rightarrow \infty} \frac{\text{FREQUENCY OF } A}{n}$$

e.g. ROLLING DIE.

REQUIREMENTS FOR SIMPLE-EVENT PROBABILITIES

1. EACH PROBABILITY MUST BE BETWEEN 0 & 1
2. SUM OF PROBABILITIES OF ALL SIMPLE EVENTS IN S MUST EQUAL 1

Def: $P(A) =$ SUM OF PROBABILITIES OF SIMPLE EVENTS CONTAINED IN A .

ex. FIND PROBABILITY OF OBSERVING AT LEAST 2 HEADS IN 3 TOSSES OF A FAIR COIN.

ex. PROPORTIONS OF STUDENTS

| | |
|----------------|----------------------|
| 20% FRESHMEN | PROB OF F or S = 60% |
| 30% SOPHOMORES | |
| 40% JUNIORS | |
| 10% SENIORS | |

ex. Jar contains 4 marbles:

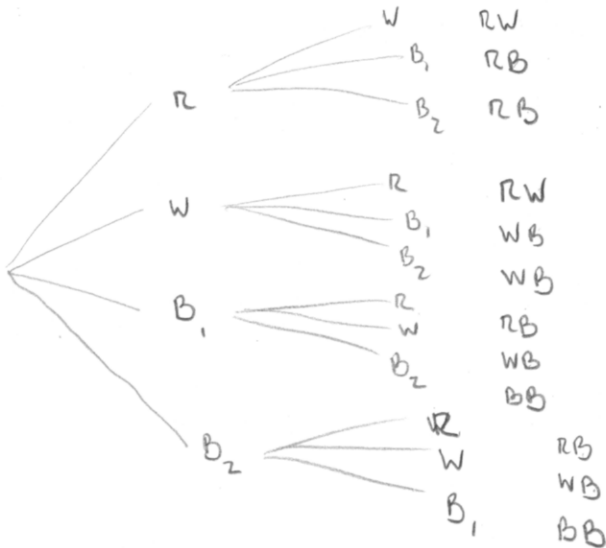
- 1 red
- 1 white
- 2 blue

You choose 2 marbles.

What is the probability ...

2 blues? $\frac{2}{12} = \frac{1}{6}$

No red? $\frac{6}{12} = \frac{1}{2}$



How to calculate prob of event

- 1 LIST ALL SIMPLE EVENTS IN SAMPLE SPACE
- 2 ASSIGN APPROPRIATE PROB. TO EACH SIMPLE EVENT
- 3 DETERMINE WHICH SIMPLE EVENTS RESULT IN THE EVENT OF INTEREST
- 4 SUM PROB OF THESE SIMPLE EVENTS.