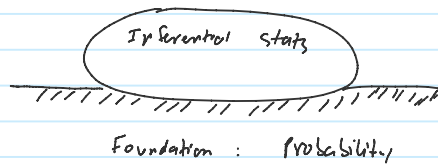
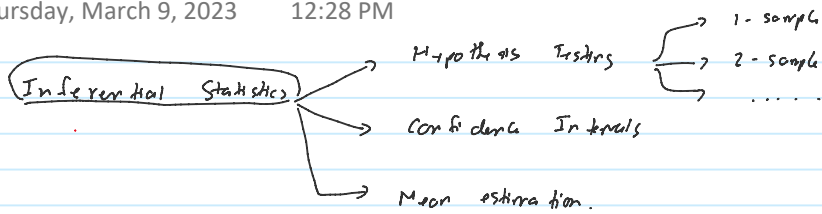


# Sample Spaces and Probabilities

Thursday, March 9, 2023 12:28 PM



## ① Sample spaces and Probability

### Example 1

Tossing a coin (Experiment)

All possible outcomes: Head and Tail (sample space of the experiment)

### Example 2

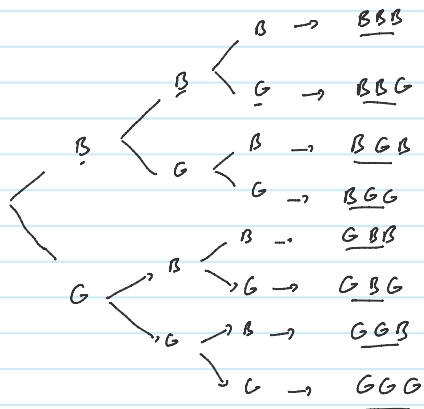
Experiment: Rolling a die

Sample space: 1, 2, 3, 4, 5, 6

### Example 3:

Find the sample space for the gender of the children if a family has three children. Use B for boy and G for girl.

Sample space:



Sample space: BBB, BBG, BGB, BGG, GBB, GBG, GGB, GGG

## ② Probability

consider an experiment of rolling a die:

1 . . . . 2

Consider an experiment of rolling a die:

Sample space  $\{1, 2, 3, 4, 5, 6\}$

Assume that the die is fair. Then the chances of

getting 1, 2, ..., or 6 are all the same ( $1/6$ ).

Find the chance / prob of getting an even number?

We count the even outcomes:  $\{2, 4, 6\}$ . We 3 outcomes

are even:

Thus, the chance of getting even number:

$$\frac{\text{number of even outcomes}}{\text{number of possible outcomes}} = \frac{3}{6} = \frac{1}{2}$$

(\*) Drawing a card from a deck:

Possible outcomes: 52

outcomes that are less than 10:  $9 \times 4 \text{ suits} = 36 \text{ (outcomes)}$

The prob. of getting a card that less than 10 is

$$\frac{36}{52} = \frac{9}{13}$$

4. If a family has three children, find the probability that

- two of the three children are girls.
- At least one boy

SS:

BBB, BBG, BGB, BGB, GBB, GBG, GBB, GGG

Two of three are G:  $\frac{3}{8}$

BBB, BBG, BGB, BGB, GBB, GBG, GBB, GGG

At least 1 boy:  $7/8$

6. **Rolling a Die.** If a die is rolled one time, find these probabilities

- Getting a 2
- Getting a number greater than 6