

# MULTI-STAGE EVENTS

name:

## Remember:

For any event  $E$ , the probability of its occurrence, denoted by  $P(E)$ , is defined as:

$$P(E) = \frac{\text{Number of outcomes favourable to the event}}{\text{Total number of possible outcomes}}$$

If an event  $E$  is *certain to happen*, the probability of its happening is 1.

If an event  $E$  is *impossible*, the probability of its happening is 0.

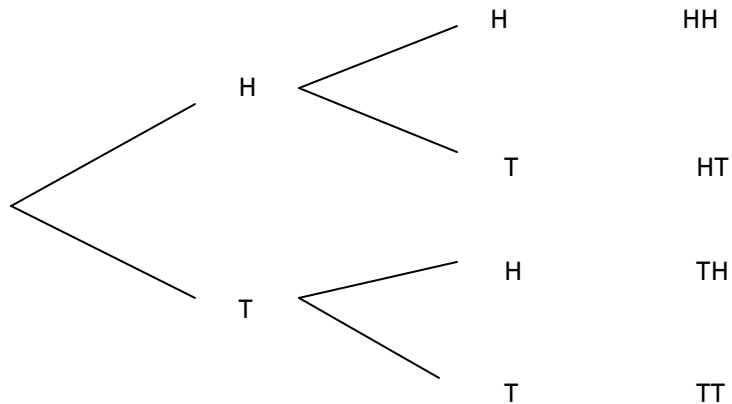
Thus the probability of any event  $E$  is always lies between 0 and 1.

$$0 \leq P(E) \leq 1$$

## Tree Diagrams

Tree diagrams can be a helpful way of organizing outcomes in an experiment that has more than one stage in order to identify probabilities.

For example, tossing a coin twice:





2. A hat contains 8 purple and 2 green discs. Two discs are selected, without replacement, from the hat.

(a) Draw a tree diagram to represent this situation.

(b) Determine the probability that

(i) they are both green

(ii) the first is purple and the second is green

(iii) they are identical in color

3. A family consists of three children. Draw a tree diagram showing all possible outcomes and their probabilities.

4. There are two bowls each containing three different types of lollies: strawberry, mint and apple. One lolly is selected from each bowl. Draw a tree diagram to show the sample space.

5. School captains are to be selected for the Senior School. One female and one male captain will be selected. The candidates are as follows:

FEMALE: Amelie, Bethany, Cate

MALE: Derek, Ethan, Fabio

Draw a tree diagram that shows all the possible choices for two school captains.

6. A committee is to be formed with a treasurer and a president. The nominees are: Alice, Betty, Cindy and Denise. Draw a tree diagram that shows all the possible selections of treasurer and president if each person can only hold one position.