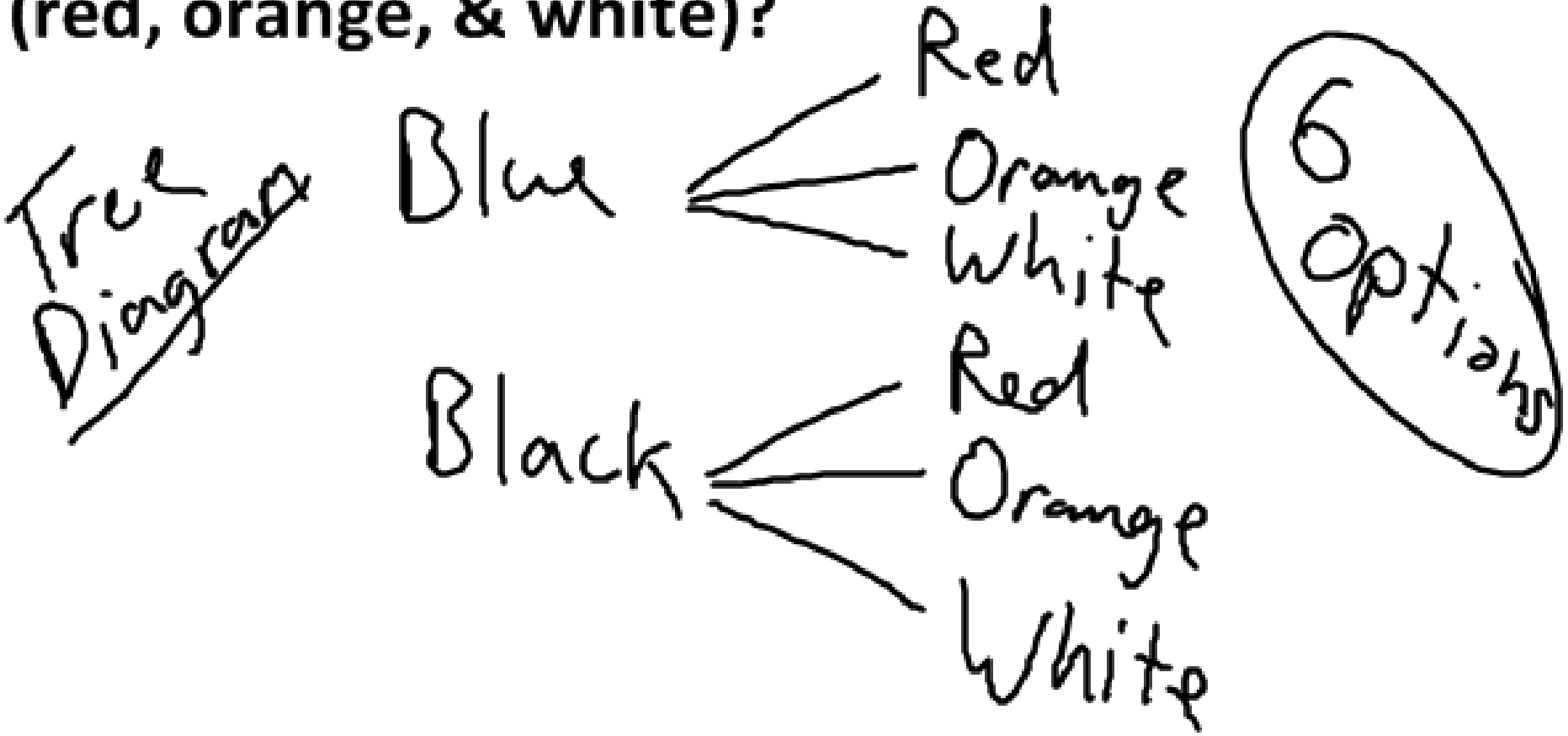
Section 9-1: The Fundamental Counting Principle and Probability

Objectives:

- **Calculate the total number of possibilites when given multiple choices.**
- **Find the probability/chance that a certain event will occur.**

Ex 1:

How many different ways can you dress if you have 2 pairs of pants (blue & black) and 3 shirts (red, orange, & white)?

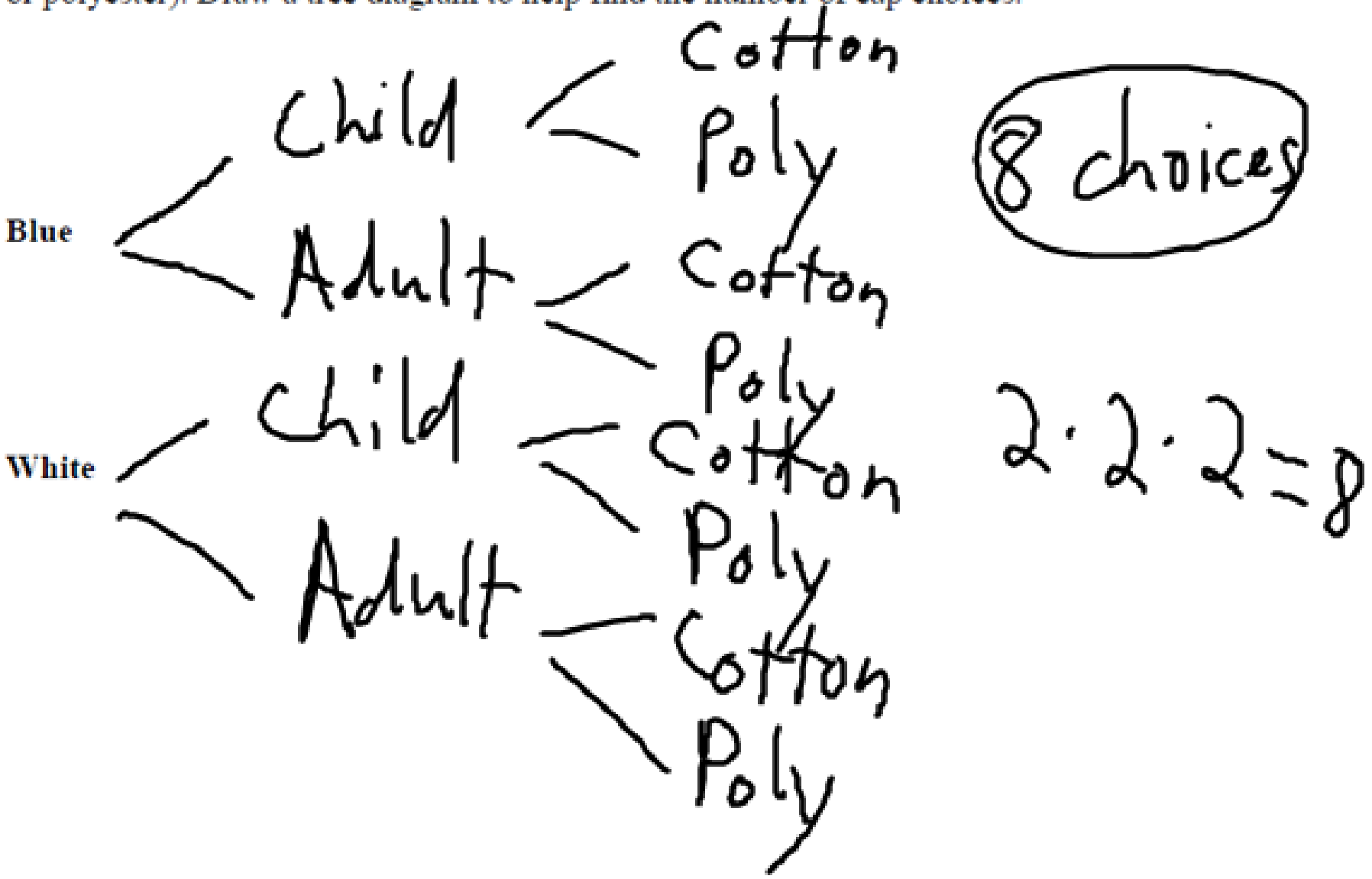


The Fundamental Counting Principle:

A method to calculate all the possible combinations when given multiple choices.

** **Multiplying the number of choices will give you the total # of combinations.**

1. A school team sells caps in two colors (blue or white), two sizes (child or adult), and two fabrics (cotton or polyester). Draw a tree diagram to help find the number of cap choices.



3. Julie has finally narrowed her clothing choices for the big party down to 3 skirts, 2 tops, and 4 pairs of shoes. How many different outfits could she form from these choices?

$3 \cdot 2 \cdot 4 = 24$

4. Utah license plates have 3 numbers followed by 3 letters. How many different license plates of this type can be issued in Utah?

$10 \cdot 10 \cdot 10 \cdot 26 \cdot 26 \cdot 26 = 17{,}576{,}000$

5. How many different 7-digit telephone numbers can be assigned if the first digit cannot be either a "1" or a "0" and the numbers can't be repeated?

$8 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 = 483{,}840$

Probability:

The chance that an event will happen.

$$P(\text{event}) = \frac{\#\text{ of favorable outcomes}}{\#\text{ of possible outcomes}}$$

** "Complement" means "Not"

Find each probability for one roll of a die. Write your answer as a simplified fraction.

6. P(5) = $\frac{1}{6}$

7. P(7) = $\frac{0}{6} = 0$

8. P(not 1, 3, 4, or 5) = $\frac{2}{6} = \frac{1}{3}$

9. P(2 or 4) = $\frac{2}{6} = \frac{1}{3}$

$\frac{2}{3} = 66.7\%$