EQ: How are weighted tree diagrams constructed?

WHAT IS IT?

Strategy used to draw out different possible outcomes

WHEN DO WE USE IT?

When there is more than one choice to make

DEFINITIONS:

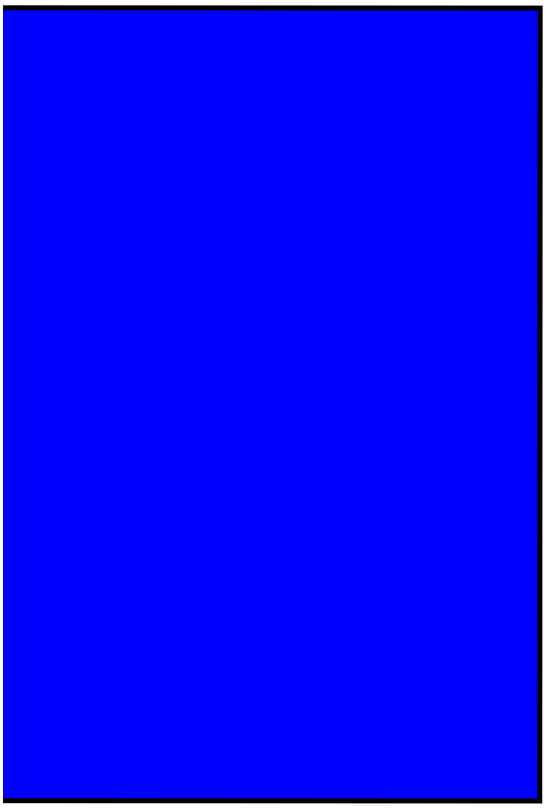
Sample Space -possible outcomes

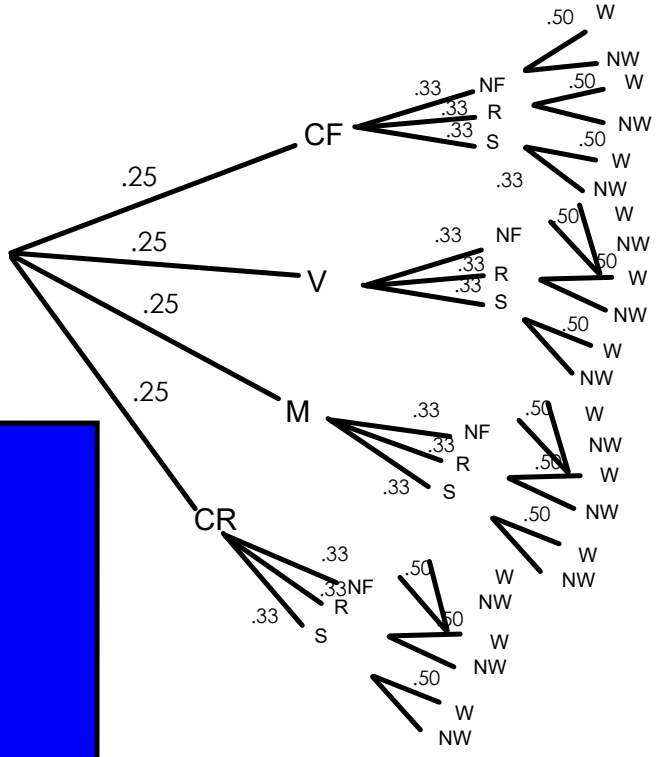
Branches - Starting point for your possible choices

Leaves - sample events

You have a coupon for a free Frappuccino at Starbucks. There are some specific rules for the coupon. You can only order one of four flavors, Coffee, Vanilla, Mocha or Caramel. You can choose nonfat, regular or soy based milk and you can have a whipped cream topping or no whipped cream topping.

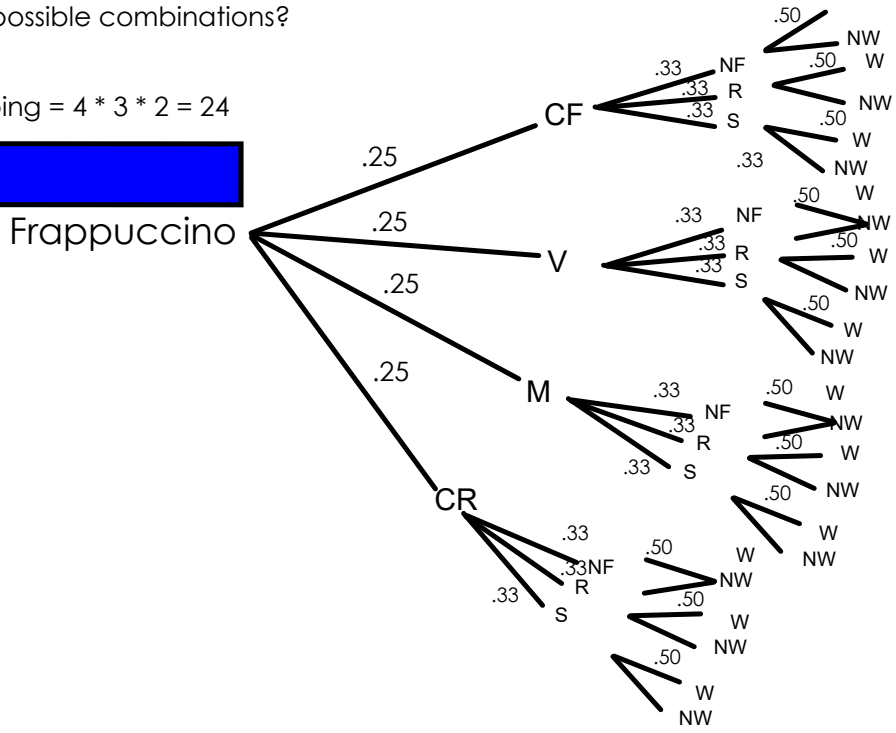
Create a tree diagram:





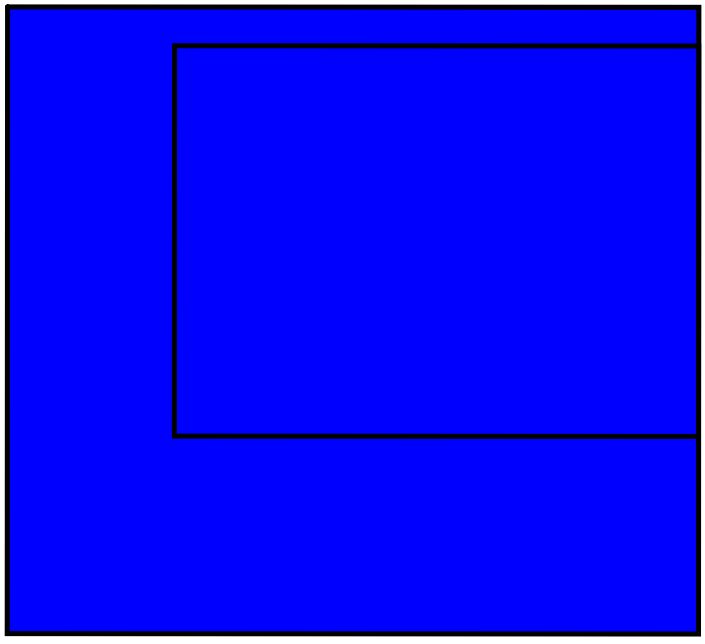
What is the sample space (possible combinations?

flavor of coffee * milk * topping = 4 * 3 * 2 = 24



Let's list the sample events:

CF,NF,W	V,NF,W	M,NF,W	CR,NF,W
CF,NF,NW	V,NF,NW	M,NF,NW	CR,NF,NW
CF,R,W	V,R,W	M,R,W	CR,R,W
CF,R, NW	V,R,NW	M,R, NW	CR,R,NW
CF,S,W	V,S,W	M,S,W	CR,S,W
CF,S,NW	V,S,NW	M,S,NW	CR,S,NW



[redacted]ng

and, with = multiply

or = add

Vanilla Frappuccino with nonfat milk and whipped topping?

P(V,NF,W)= .25*.33*.50 = .04125 = 4.125%

.25 • .33 · .50 = 0.041 = 4.1%

What's the probability of someone randomly selecting a Mocha frappuccino?

P(M) = .25 = 25%

[redacted]

What's the probability of someone randomly selecting Vanilla or Mocha frappuccino?

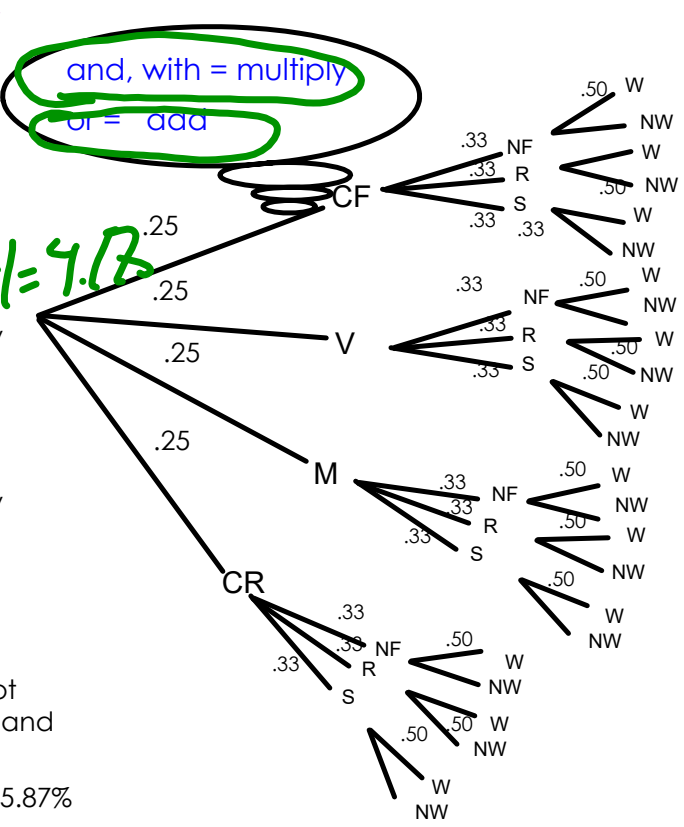
P(M or V) = .25 + .25 = 50%

[redacted]

What's the probability of someone randomly not selecting Vanilla Frappuccino with regular milk and whipped cream topping?

1 - P(V, R, W) = 1 - (.25 *.33 * .50) = 1 - .04125 = 95.87%

[redacted]



"Not" statements -

1. Find probability of event occurring
2. Subtract the value from 1

if decimal

What's the probability of someone randomly not selecting Vanilla Frappuccino?

1 - P(Vanilla) = 1 - (.25) = 75%

What's the probability of someone randomly not selecting Vanilla Frappuccino with regular milk and whipped cream topping?

1 - P(V, R, W) = 1 - (.25 *.33 * .50) = 1 - .04125 = 95.87%

1 - (.25 · .33 · .50)

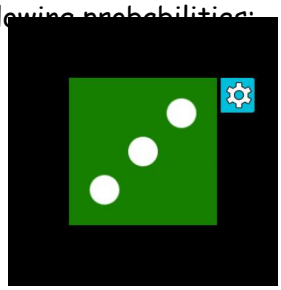
What's the probability of someone randomly not selecting Caramel Frappuccino with nonfat milk or regular milk and whipped topping?

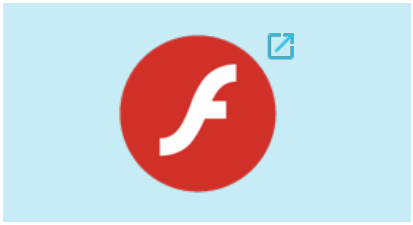
1 - P(V, R, W) = 1 - (.25 *.33)

$1-(.25\cdot(.33+.33)\times.50)=$ 91.75%

Flavor		

You have two events - rolling a dice and flipping a coin. Let's find the following probabilities:





Post it check

What does this look like modeled in a tree diagram?

What's the probability of rolling a 4 or 5 on the dice and then the coin landing on tails?

$(.167 + .167) \times .50 = 16.7\%$

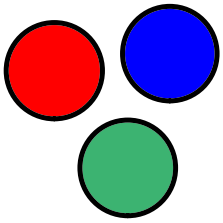
What is the probability that the flipped coin will not land on tails and the rolled dice will land on 3?

$1 - (.50 \cdot .167) = 91.6\%$

What's the probability that the flipped coin will land on tails and the rolled dice will land on 2 or 5?

What's the probability of someone randomly not selecting a sandwich with wheat bread, ham or turkey, and Muenster cheese?

If a ball is drawn (replaced after each draw) and there are three trials, what is the sample space?



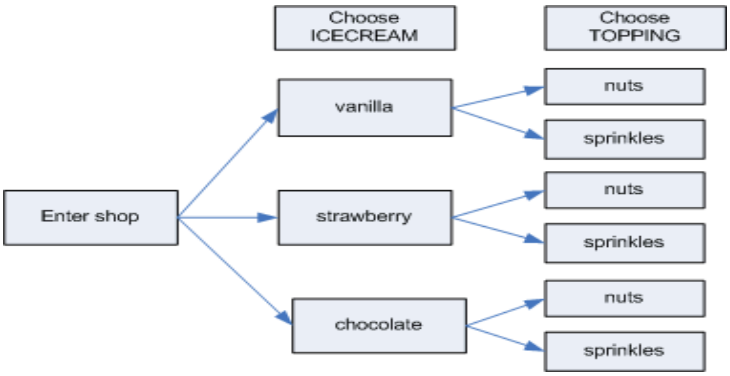
Sample Space=

_____ _____ _____

If you have 2 pair of pants, 4 shirts, and 3 sweaters, what is the sample space?

_____ _____ _____

You go to Bruster's Ice cream and want to get a waffle cone with toppings:

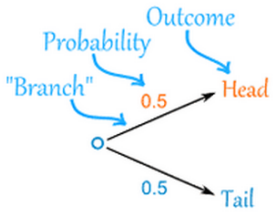


What's the Probability of getting a scoop of vanilla ice cream with sprinkles?

What is probability that chocolate ice cream will be randomly selected?

What's the probability of randomly selecting chocolate ice cream with nuts?

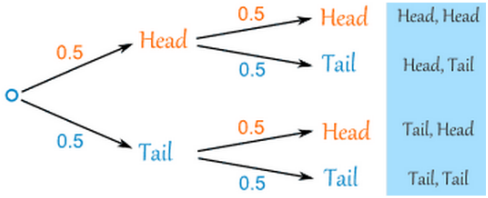
Here is a tree diagram for the toss of a coin:



There are two "branches" (Heads and Tails)

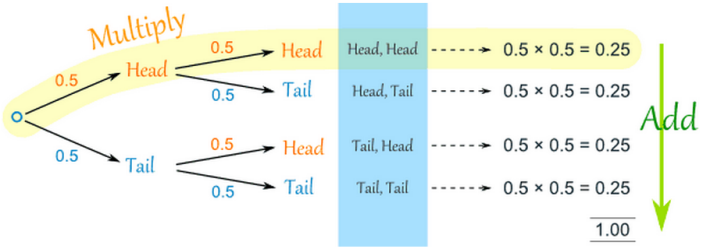
- The probability of each branch is written on the branch
- The outcome is written at the end of the branch

We can extend the tree diagram to two tosses of a coin:



How do we calculate the overall probabilities?

- We **multiply** probabilities **along the branches**
- We **add** probabilities down **columns**



Now we can see such things as:

- The probability of "Head, Head" is 0.5×0.5 = **0.25**
- All probabilities add to **1.0** (which is always a good check)
- The probability of getting at least one Head from two tosses is 0.25+0.25+0.25 = **0.75**
- ... and more

You are standing in line waiting to order a pizza at Papa Johns. Answer the following questions...

What's the Probability of the customer in front of you ordering a thin crust pizza?

What is probability that the person orders a pizza with pepperoni, mushrooms, and garlic dipping sauce?

What's the probability of not ordering a pizza with sausage and onions?

Crust

Original

Thin

Dipping Sauce

Garlic

Marinara

Meat

Pepperoni

Bacon

Grilled Chicken

Sausage

Beef

Canadian Bacon

Spicy Italian Sausage

Anchovies

Veggies

Pineapple

Black Olives

Roma Tomatoes

Jalapeño Peppers

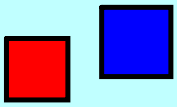
Mushrooms

Green Peppers

Onions

Banana Peppers

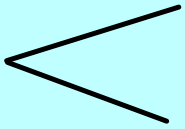
TREE DIAGRAMS



The following situation can be represented by a tree diagram.

Peter has ten coloured cubes in a bag. Three of the cubes are red and 7 are blue. He removes a cube at random from the bag and notes the colour before replacing it. He then chooses a second cube at random. Record the information in a tree diagram.

First Choice Second Choice



What's the probability of choosing a red and a blue cube?

What's the probability of **not** choosing 2 red cubes?

Probability of something **not** occuring...

What's the sample space? What are sample events?

What's the probability of not the spinner landing on green and the coin landing on tails?

What's the probability of not landing on heads and an even number?

1. There are two identically-shaped bottles. One bottle contains 2 green balls and 1 red ball. The other contains 2 red balls. One ball is randomly selected from the first bottle and then one is randomly selected from the second. Draw a tree diagram to justify your answer.

a. P(green ball on first draw)?

b. P(two red balls)?

T.O.T.D.:

Write 4 - 5 sentences to compare and contrast finding probability using the Venn and Tree Diagram (must be checked before last 5 minutes of class for credit)