Vectors Introduction

Note Title 9/7/2011

To get into 2-Dimensional motion, we need to use Vectors

WHAT IS A VECTOR?

a vector is a measurement that uses both amount and direction.

Easy Example: velocity

Others: acceleration, displacement, Force

By adding direction, more information is communicated. However, sometimes adding a direction is not possible...

SCALAR:

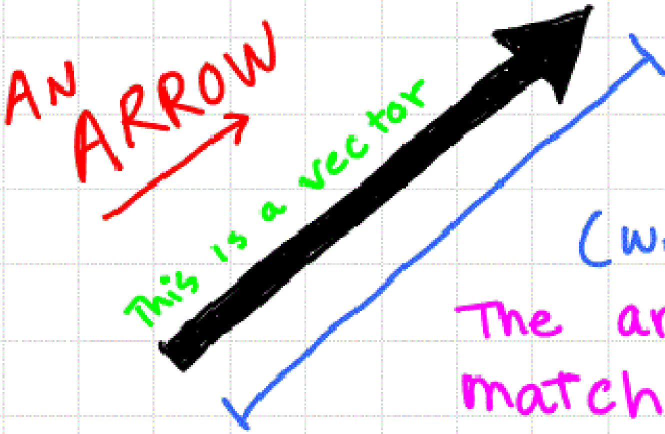
a measurement with only amount

Examples: Time, Temperature, Items

2 cars 3 apples

* It would not make sense to include direction with these measurements!

Since we will use VECTORS so often, we need an easy way to draw them on paper...



The length will indicate the amount (we will make a scale)

The arrow's direction will match the vector's direction

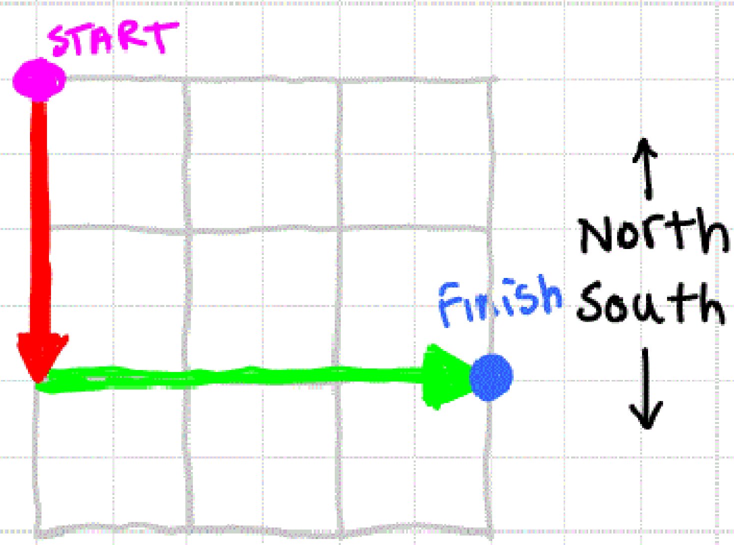
Sometimes you will describe an action with 2 vectors. In these cases, the vectors should not be viewed as individuals, but parts of a larger idea. Example:

Directions

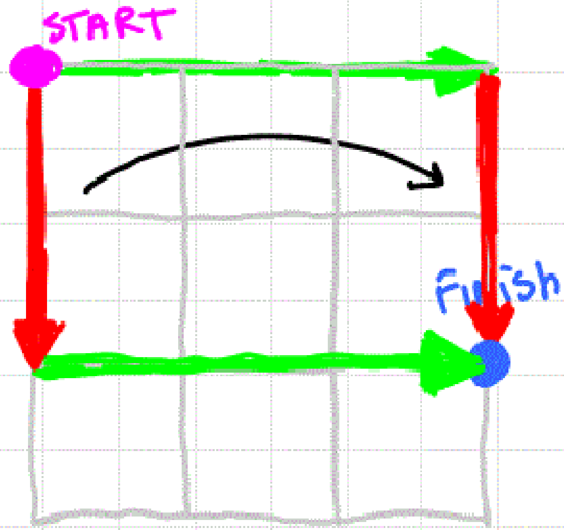
2 blocks South

3 blocks East

* here, only the finish position is important. Do not focus on the parts that got you there

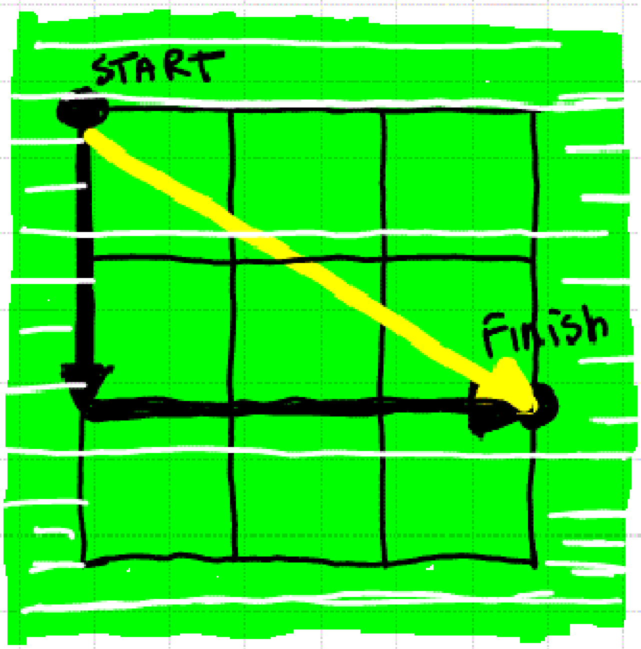


Notice that the order of the directions was not important.



You may add vectors in any order and still get the same result.

the vectors did not change when they were moved.
as long as they are the same length and direction, they are the same vector.



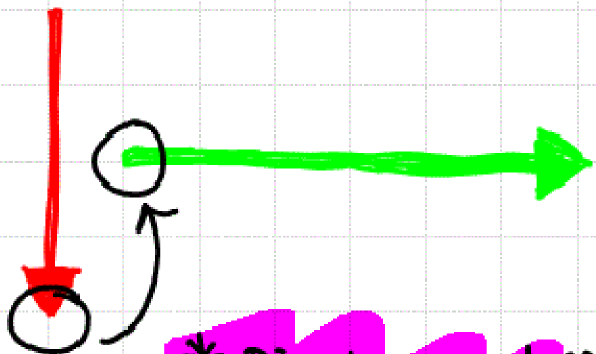
If our directions were on a football field, we could come up with a much simpler solution to get from start to finish (yellow line)

What we have done is our first Form of vector addition. OR

Vector A + Vector B = Vector C

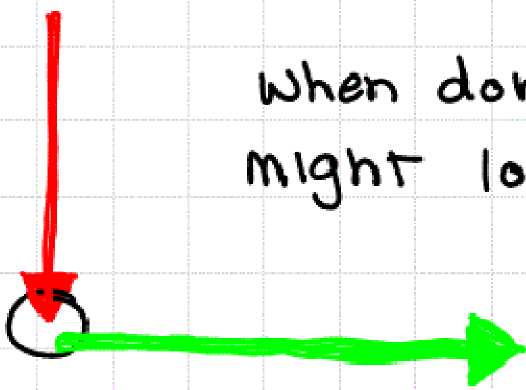
$$\vec{A} + \vec{B} = \vec{C}$$

For the above scenario, we used the head to tail technique.



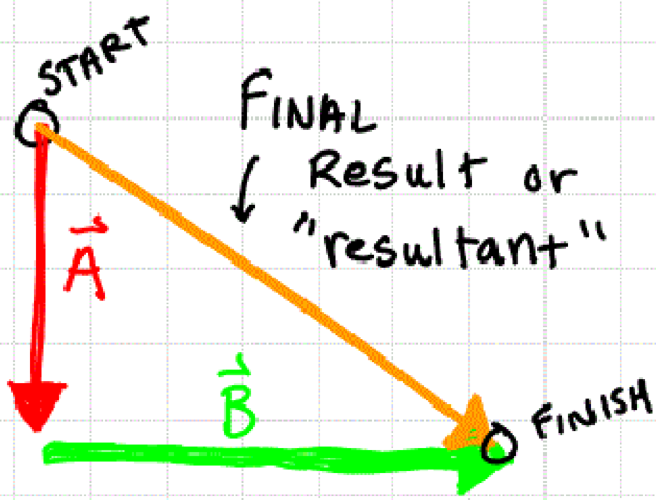
Pick the head of one vector, and put it against the tail of the other

*** Direction and size must be maintained!**



When done correctly, it might look like this.

To Finish, a new vector is drawn that starts at the first tail, and ends at the second head.



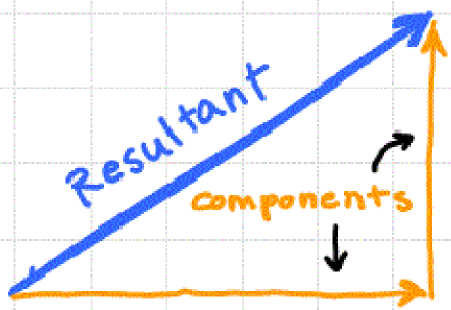
The orange vector is the solution of

$\vec{A} + \vec{B}$ = answer

Some other points:

Components: vectors that were combined

Resultant: the result of adding vectors



Components will be most often expressed in 90° (Y) direction and 0° (x) direction

Multiplication