



## Your Mission:

**Color the entire map of South America.  
This may seem simple but there are  
some restrictions.**

- 1. No country may touch another country of the same color.**
- 2. You will be charged each time you use a color to fill in a country – regardless of size.**
- 3. You must color the map as cheaply as possible.**

<b>Color</b>	<b>Cost Per Country</b>
<b>Red</b>	<b>\$100</b>
<b>Blue</b>	<b>\$200</b>
<b>Green</b>	<b>\$300</b>
<b>Orange</b>	<b>\$400</b>
<b>Yellow</b>	<b>\$500</b>
<b>Brown</b>	<b>\$600</b>
<b>Black</b>	<b>\$700</b>
<b>Purple</b>	<b>\$800</b>

## Steps

1. Construct a graph which represents a region on a map ( Let the states be your vertices and the borders be your edges).
2. Assign a color to a vertex.
3. No adjacent vertices may have the same color.



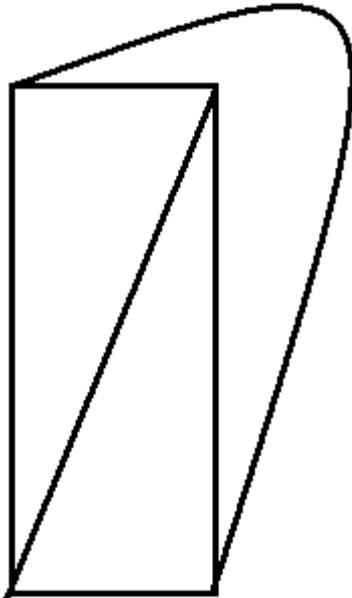
Draw a graph below that represents the southeastern United States and find a proper coloring arrangement for NC, SC, GA, TE, ALA, MS.

# Chromatic number

Chromatic Number – The minimum number of colors needed to color the graph.

What is the chromatic number of the graph of the Southeastern states above? **3**

What is the chromatic number of the graph below?



**4**

4 Color Theorem: No more than 4 colors are required to color the regions of a map so that no two adjacent regions have the same color.

# Transportation Dilemma

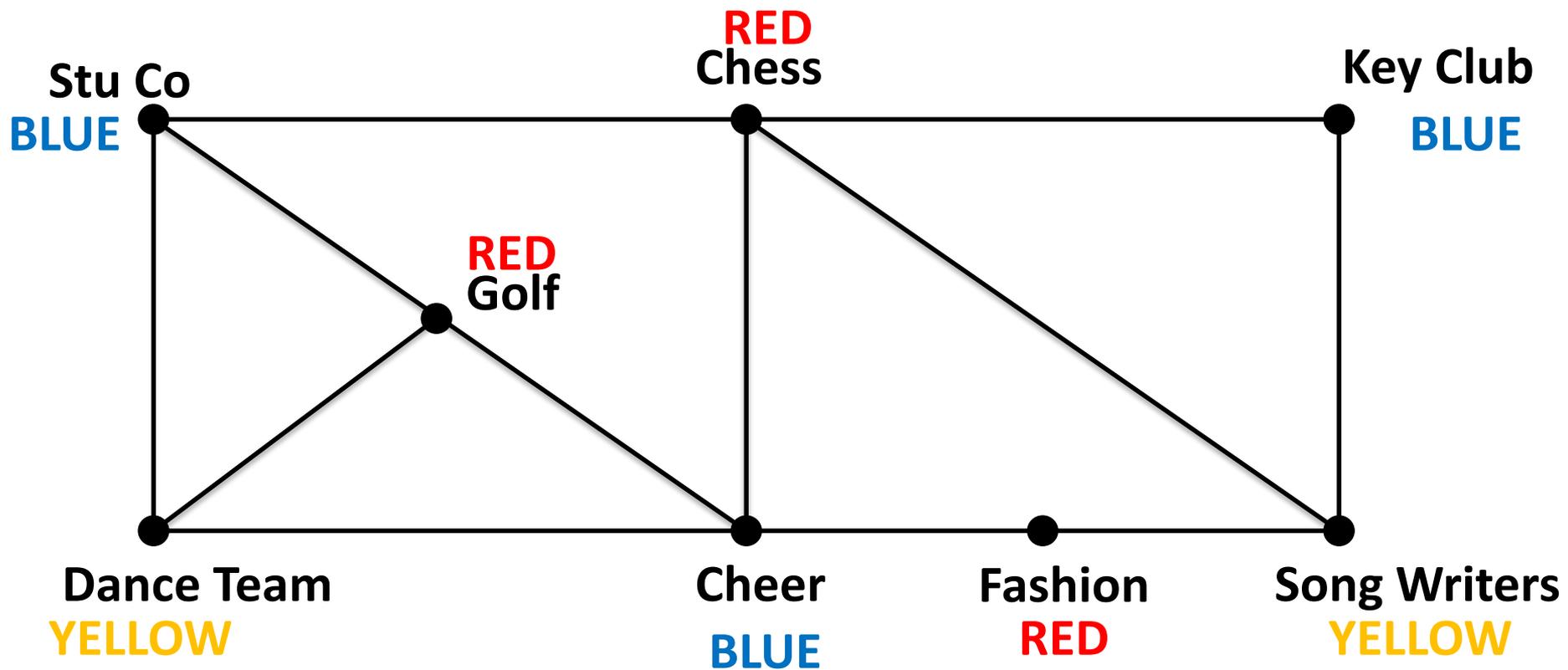
- You are planning a trip to Elitch Gardens for your eight friends. There are several people who, for various reasons, cannot ride in the same car.
- Determine the minimum number of cars necessary to transport everyone to the park. Assume that the seating capacity of the cars is not a problem, and you can ride in any car.
- How do you think graph theory can help us?!

# Scheduling

*The students at Panther Creek are very involved and usually can be found on many different clubs or teams. All of the clubs/teams need to take pictures on Monday. Life Touch wants to schedule as few pictures sessions as possible and still allow members to go to all of their picture sessions.*

<b>Club/Team:</b>	<b>Has members in common with:</b>
Student Council	Chess Club, Golf Team, Dance team
Chess Club	Key Club, Song Writers Club
Key Club	Song Writers Club
Song Writers Club	Fashion Club
Fashion Club	Cheerleading
Cheerleading	Chess Club, Golf Team
Dance Team	Cheerleading, Golf Team

**Note: Info is not duplicated in the chart**



**Time 1 (BLUE): Stu Co, Cheer, Key Club**

**Time 2 (RED): Golf, Chess, Fashion**

**Time 3 (YELLOW): Dance Team, Song Writers**