## TOPIC 2: "Graph Theory"

Although this section is titled as graphs, it is not a graph as you know it, it is more like a map or drawing of connections.

A graph allows us to draw the elements of a set of points and see the connection between these elements. These relationships are shown as line segments (called edges).
If there is a relationship between 2 points ( $a$ direct one) they are said to be adjacent.

## Example:



Each of the points (vertices) represents a country. The lines between them (edges) mean that they have a common border.

- Name 2 points that are adjacent
- Name 2 points that are NOT adjacent
- Name a point that is isolated


A point is said to/isolated if it does not have a relationship with any of the other points.

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PATH: They will ask you what the path between two points is. You need to name all of the points you are crossing through to get from one point to the other. Very often there is more than one path!

ORDER: The number of vertices in the graph order $=6$

SET: You would write the whole set of letters or numbers that they are referring to when they ask you for this
Ex: $S=\{a, b, c, d, e, f\}$
DEGREE: When they ask you for the degree of a point, they are just asking you how many edges (lines) are connected to that point.

## Introduction to Graph Theory:

Each of the vertices below represents a person at a party. The edges show you which people know each other already.


For the word problems, they would ask you things like:

- Who knows the most people?
- Who knows the least people?
- How many friends in common do $A$ and $B$ have?

1. There are nine different paths from $A$ to $D$ in the following graph. Find them all.


For example, one path is $A B C D$, as shown:

2. Figure out the ORDER of the above situation.
3. Find the DEGREE of each point in the graph above.

