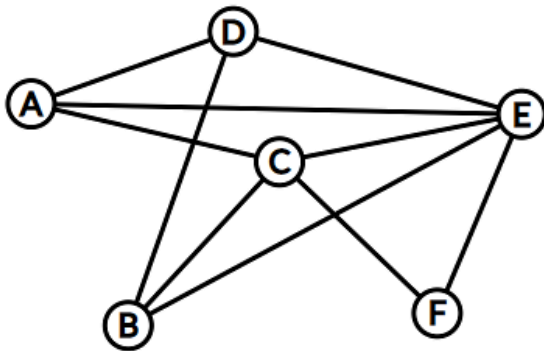


**Check Your Understanding**  
**Graph Theory – Chromatic Number**

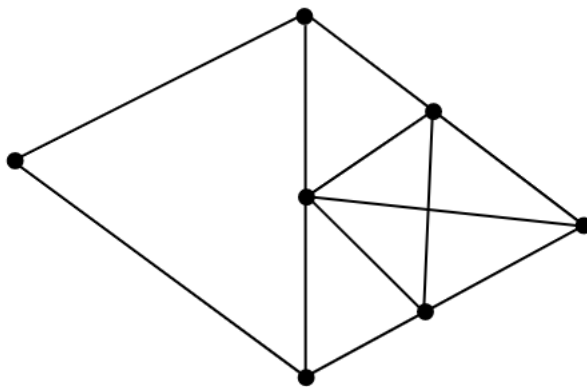
The table below identifies some key concepts from this unit. Complete each question, check your answers, and get help as needed.

Key Concepts	Basic Questions	Intermediate Questions	Advanced Questions
Chromatic Number	1	2, 3	4, 5

- 1) Find the chromatic number of the graph below.



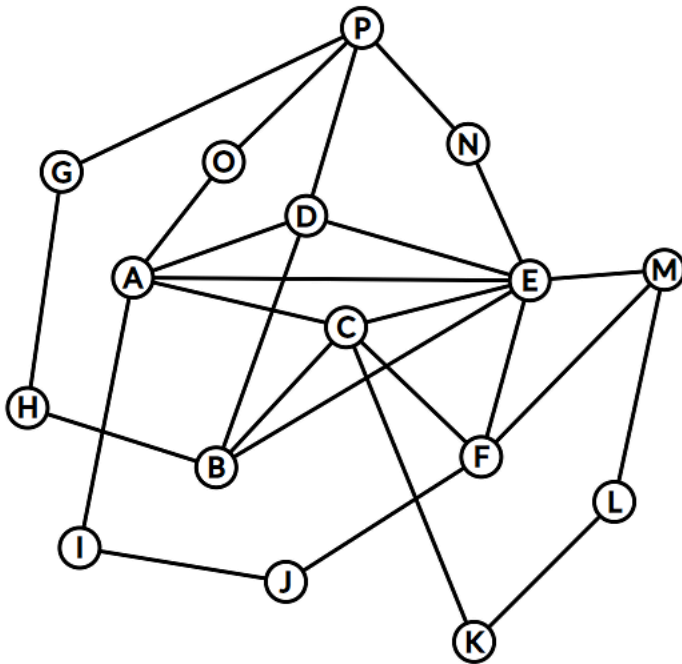
- 2) Your graduation class has decided to have a “Blast-Off to the Future” dance. They have created a flashing sign for the entrance to the dance hall, as shown in the diagram below.



The vertices represent the light bulbs and the edges represent the wires connecting them. No two consecutive connected light bulbs are the same color.

**What is the fewest number of different colors used on the students’ flashing sign?**

3) What is the chromatic number of the graph below?



4) Dr. James has a small class of 15 students (initials A-O). She wants students to complete a group project. Every student must be working with at least one other student, and no groups should have students who do not work well together.

Student	Incompatible with...
A	B, C, N, O, G, I
B	A, N, O, G, I
C	A, N, O, G, I
D	E, F, H
E	D, J, L
F	D, H, K, M, N
G	A, B, C, N, O, I
H	D, K, M, F
I	A, B, C, N, O, G
J	E, K, L, M
K	H, J, L, M, F
L	E, J, K
M	H, J, K, F
N	A, B, C, O, G, I, F
O	A, B, C, N, G, I

What is the fewest number of groups Dr. James could create?

- 5) Below is a map of Brazil. Create a graph to determine the fewest number of colors you need to color the map such that areas sharing borders are different colors. After you use a graph to determine this, color your map.



**Answer Key**

1) 3

2) 4

3) 3

4) 6

5) 4