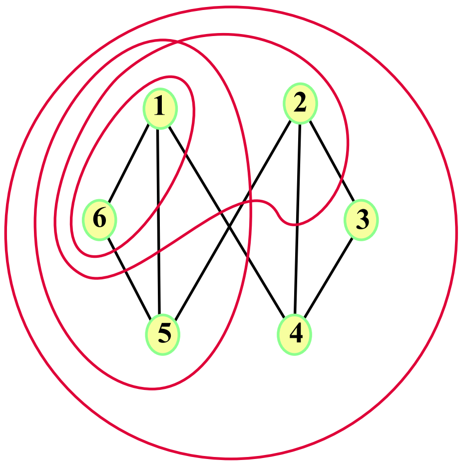
Dr. Forcey, Step 1 Wrong answers!

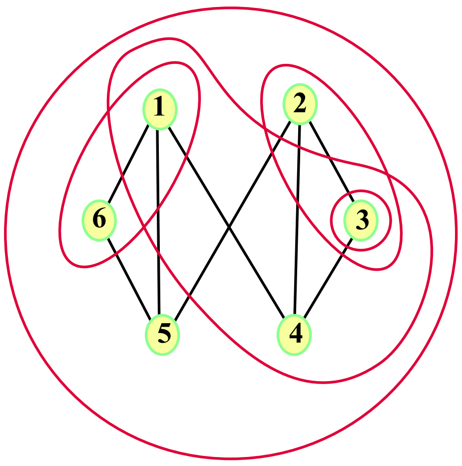
$\mathcal{B}_1$



$\mathcal{B}_1$ = { X, {1, 6}, {1, 5, 6}, {1, 2, 6}}

This one breaks two of the requirements. First, {1,2,6} is not connected in the graph sense since there is no edge from 1 to 2, nor from 6 to 2. Second it breaks the requirement that all edges must be connected as subspaces, since the edge {2,5} has subspace topology {{},{2},{5},{2,5}} which makes it disconnected.

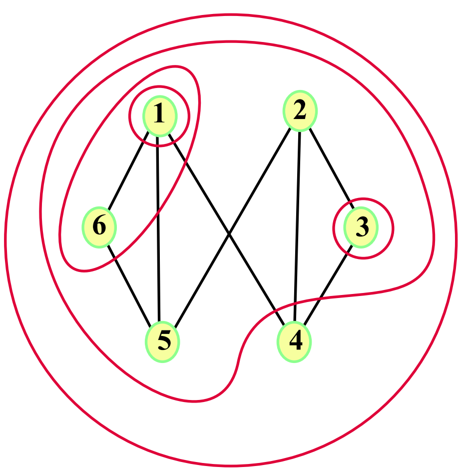
$\mathcal{B}_2$



$\mathcal{B}_2$ = { X, {3}, {1, 6}, {2, 3}, {1, 3, 4}}

This one breaks the requirement that it must be a basis. The rule for a basis is that whenever you look at the intersection of two sets, that intersection must be covered: it must be equal to some union of other basis sets. Here {1,6} $\cap$ {1,3,4} = {1} but {1} is not found in $\mathcal{B}_2$.

$\mathcal{B}_3$

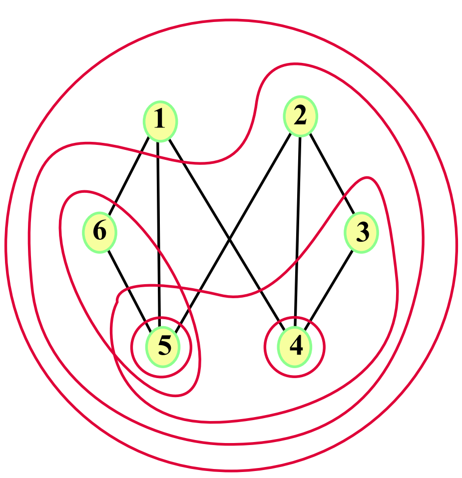


$\mathcal{B}_3$ = { X, {1}, {3}, {1, 6}, {1, 2, 3, 5, 6}}

This one obeys all the rules, but it needs one more set to meet the requirement that it has 6 total sets. Note that once you choose five sets, there will be two ways to possibly finish it.... here {2,3} is one set that can be added without breaking a rule, and {1,5,6} is the other.

As a hint, since these sets are not allowed to overlap like in the first two bases above, any pair of sets will always be either one-inside-the-other (nested) or not connected to each other by a graph edge (far apart).

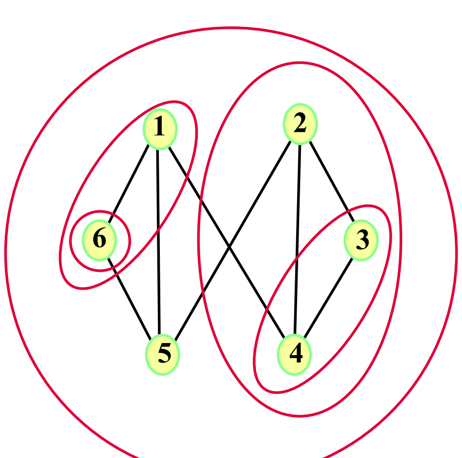
$\mathcal{B}_4$



$\mathcal{B}_4$ = { X, {4}, {5}, {5, 6}, {3, 4, 5}, {2, 3, 4, 5, 6}}

This one has two sets that “overlap:” they intersect but neither is inside the other. Also, {3,4,5} is not connected in the graph sense.

$\mathcal{B}_5$



$\mathcal{B}_5$ = { X, {6}, {1, 6}, {3, 4}, {2, 3, 4}}

This has one too many sets. Also the edge {1,4} is disconnected as a subspace.