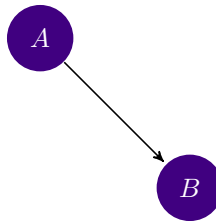


King Chickens, Part 1

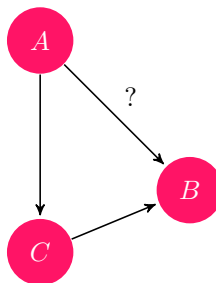
Daniel Rui

We will begin today and the next few weeks with a small speech about chickens. Chickens, like many other animals, have a social hierarchy. There are the strong chickens who peck the weak chickens, and the weak chickens who get pecked by the strong chickens. We shall denote chicken A, who pecks all of the other chickens, either directly, or via another chicken, a **king chicken**. Every chicken must have a relationship with another chicken; either it is pecked by the other chicken or it pecks the other chicken.

If chicken A directly pecks chicken B, we write it like below. In this case, chicken A is a king chicken.



If chicken A indirectly pecks chicken B, chicken A has to peck a mediator chicken that pecks chicken B. We write it like below. In this case, chicken A is a king chicken, because it directly pecks chicken C and indirectly pecks chicken B via chicken C.



However, if, for example, chicken A pecks chicken B pecks chicken C pecks chicken D, and chicken D is neither directly or indirectly pecked by chicken A, then chicken A is NOT a king chicken. Let me emphasize that between every pair of chickens, there MUST be a arrow, pointing either to or from one of the two chickens.

1. How many king chickens can there be when there is 1 chicken? What about 2? 3? 4? 5?
What about 6?
2. For each chicken in a flock, count the number of other chickens which that particular chicken pecks directly.
3. **Challenge:** Give an intuition/explanation as to why the chicken who pecks the most chickens directly is a king chicken.