PROBLEM 1. As a fan of the Lord of the Ring trilogy of movies, you decide to watch them in every possible order.

- (i) In how many orders can you watch the three movies?
- (ii) If you watch one of the movies each night, what is the least number of nights you would need to see them in every possible order?

PROBLEM 2. A *binary necklace* is a collection of blue and yellow beads strung along a circle. We count to necklaces as being the same if one can be obtained from the other by sliding the beads. Thus, the two necklaces in Figure 1 are the same. However, when you are comparing necklaces to see if they are the same, you are *not* allowed to flip them over.

- (i) For n = 0, 1, 2, 3, 4, count the number of binary necklaces with n blue beads and n + 1 yellow beads.
- (ii) When you are satisfied with your answers, go to the Online Encyclopedia of Integer Sequences (oeis.org) and search for your sequence.

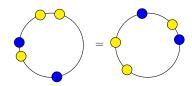


Figure 1: Two views of the same necklace.