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.

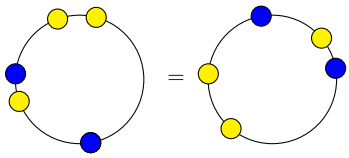

Figure 1: Two views of the same necklace.

(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.