Prob 11: In a set of dominoes, all those in which one square has no spots are discarded. Can the remaining dominoes be arranged in a chain?

Ans) If we take out all the dominoes which contain atleast 1 zero, then the no. of occurences of 1 to 6 will be reduced from 8 to 7 each. Suppose the initial square is $a \in \{1, 2, \ldots, 6\}$.

∴ By Prob 10, the last square must take the value a.

∴ There are 5 a's in between, which by the constraint is impossible.

Prob 6: Katya and her friends stand in a circle. It turns out that both neighbors of each child are of the same gender. If there are five boys in the circle, how many girls are there?

Ans). Suppose all the 5 boys are standing consecutively. The boys at both of the ends have neighbors of diff genders. So, this arrangement is not possible.

. Suppose 3 of the boys are standing consecutively. Even then, the boys at both of the ends have neighbors of diff genders each. So, this arrangement is not possible.

. The reasoning is exactly similar to if we have 5 or 3 girls standing consecutively.

∴ The only possible arrangement is:

B G B G B
G B G B G

Prob 8: Can a 5×5 square checkerboard be covered by 1×2 dominoes?

Ans) There are 25 squares in such a checkerboard. If we keep using the 1×2 dominoes intelligently, we can cover a maximum 24 squares using 12 such dominoes. 1 square will be left out, ∴ such a covering is impossible.