# Exercise 1 - Wheel (10 points)

We have an inner wheel and an outer wheel with N=7 sides, as in the pictures below. The inner wheel can rotate over any integer number of 'positions' (that is, over an angle that is a multiple of 360/N degrees). The outer wheel remains at its position when the inner wheel rotates.

If we to put the numbers from 1 to 7 on the sides of the inner wheel in the following manner:

A hexagon with numbers

Description automatically generated with low confidence

then this particular pattern has a special property: no matter how often the inner wheel is rotated, there is always at least one side where the number on the inner wheel is the same as on the outer wheel, like this:

A blue hexagon with red and black numbers

Description automatically generated with low confidenceA picture containing circle, screenshot, symmetry, design

Description automatically generated

(You can check for yourself that this is true for all N=7 rotations.)

Let Z3 find a similar placement of the numbers 1 up to 5 on a similar wheel with N = 5, like this: A picture containing circle, screenshot, design

Description automatically generated

(Note that it's not allowed to place more than one number on the same position.)