

## 1 Assignment

Suppose you have 7 cups, face down on a table. At each move, you may turn over exactly 4 cups (if the cup is up, you turn it down; if the cup is down, you turn it up). Prove that it is impossible to achieve a state where all 7 cups are face up with any finite number of such moves.

*Hint: Think about the possible states you can achieve, in particular, their parity (even or oddness). Please try to write the most beautiful, simple, clear proof that you can.*