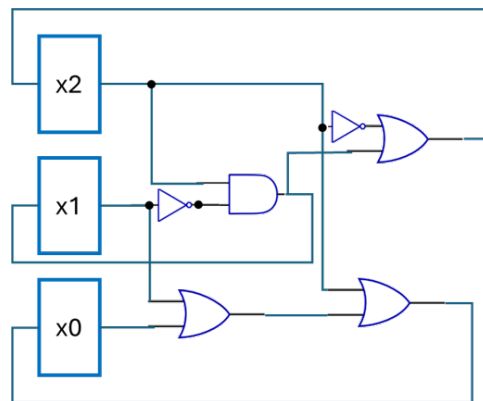


# Model Checking (SS 2025) Homework 2

Deadline: **18 March 2025, 9:00 am**  
Submit your solution through TeachCenter

Consider the synchronous circuit  $C$  from last week's exercise. (The initial value of the state variable  $x_0$  is `true`. The initial values of  $x_1$  and  $x_2$  are unknown.)



**Task 1. [100 points]** We want to use BMC to check whether  $x_0$  is always `true`.

- 3.1 Will BMC find a counterexample? If so, what is the smallest  $k$  such that BMC finds a counterexample. [ **20 points** ]
- 3.2 Write the BMC formula for  $k = 2$ . (You can use  $S_0$  and  $R$  in your formula. [ **40 points** ]
- 3.3 Is the formula satisfiable? Explain. [ **40 points** ]