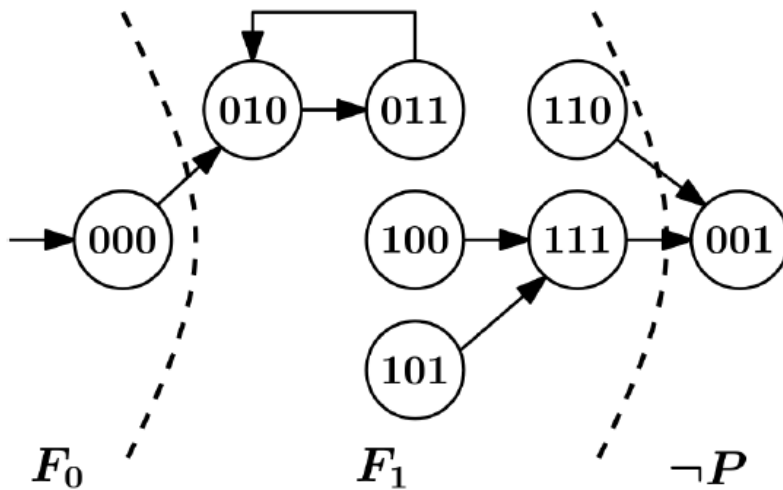


Model Checking (SS 2025) Homework 4

Deadline: **1 April 2025, 9:00 am**
 Submit your solution through TeachCenter

Consider the following Kripke structure K , with states $(x_1, x_2, x_3) \in \{0, 1\}^3$ and atomic proposition P .



Task 1. [40 points] Use the “first version” of PDR to prove that P is always true, but stop after two iterations, when you have frames F_0, \dots, F_3 . Clearly indicate the steps and the frames at the end of each iteration.

Is the property verified at the end? Why (not)?

Task 2. [40 points] Perform the same task using “naive generalization” during the removal of bad states, as shown in class. Again, stop after two iterations and indicate the steps and the frames at the end of each iteration.

Is the property verified at the end? Why (not)?

Task 2. [20 points] Are the following statements true? Justify your answer.

- 2.1 The set $\neg x_1$ is inductive. [5 points]
- 2.2 The set $\neg x_3$ is inductive. [5 points]
- 2.3 The set $\neg x_2$ is inductive relative to $\neg x_1$. [5 points]
- 2.4 The set $\neg x_3$ is inductive relative to $\neg x_1$. [5 points]