Exercise 13.1:
Consider the following program:

1: if (y > 0) then skip else halt;
2: x := 2*y;
3: z := y;
4: if (x <= z) then goto 6;
5: exit
6: error

(1) Describe the formulae for:
- initiation condition \( \text{Init} \)
- Error condition \( \phi_{\text{err}} \)
- The single statement transition relations in \( \mathcal{R} \)
- The program transition relation \( \rho_{\mathcal{R}} \)

(2) Compute \( \text{post}^i(\text{Init}, \rho_{\mathcal{R}}) \) for \( i = 1, 2, 3, 4, 5, 6 \).

Can you determine a natural number \( n \) with \( \bigvee_{i=0}^{n} \text{post}^i(\text{Init}, \rho_{\mathcal{R}}) = \bigvee_{i=0}^{n+1} \text{post}^i(\text{Init}, \rho_{\mathcal{R}}) \)?

(3) Use the results in (2) to characterize \( \phi_{\text{reach}} \).

(4) Show that no error state is reachable from the initial state.

Please submit your solution until Tuesday, February 1, 2022 at 17:00. Please do not forget to write your name on your solution.

Submission possibilities:

- Under Homework 13 in OLAT;
- By e-mail to sofronie@uni-koblenz.de with the keyword “Homework FSV” in the subject.