Exercise 12.1 (Cumulative and Preferential Consequences, 4)
For each of the following statements (a)–(d), provide a (different!) example of a set of conditionals $K$ and a plausible consequence $\varphi \not\models \psi$ satisfying the given property (prove that your answer is correct by giving derivations and/or counterexamples as appropriate). If the property cannot hold for any set $K$ and formulae $\varphi$ and $\psi$, prove this.

(a) $K$ implies $\varphi \not\models \psi$ in system $C$ and in system $P$.
(b) $K$ implies $\varphi \not\models \psi$ in system $C$, but not in system $P$.
(c) $K$ implies $\varphi \not\models \psi$ in system $P$, but not in system $C$.
(d) $K$ does not imply $\varphi \not\models \psi$ in either system $C$ or system $P$.

Exercise 12.2 (Answer Sets, 2)
Find an answer set for the program $\Pi_n$ consisting of the following $n$ rules

$$p_i \leftarrow \neg p_{i+1}.$$ (1 ≤ $i < n$)

where $n$ is a natural number.

Exercise 12.3 (Answer Set Programming and Defaults, 6)
Reconsider the following knowledge base from exercise 9.3 (slightly condensed):

By default, students are not lazy. But computer science students are typically intelligent, and intelligent students are usually lazy. Anne and Bob study computer science. Using Default Reasoning, the conclusion Anne and Bob are lazy follows credulously. Your task:

- Model the knowledge base as an Answer Set Program. Make use of the two versions of negation provided by the ASP language. Use clingo\(^1\) to output all answer sets of your program.\(^2\)

- Choose one of the answer sets and check that it is indeed an answer set according to the definition from the lecture.

- Show that the answer sets correspond to the extensions of the default theoretical formalization.

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\(^1\)http://potassco.sourceforge.net/
\(^2\)Run ./clingo 0 <yourfile>