Exercise 6.1
Consider the following Kripke structure \( \mathcal{K} = (S, A, \rightarrow, 0, AP, \nu) \), where \( A = \{a, b, c, d, e\} \), \( AP = \{p\} \), \( \nu(6) = \{p\} \), and \( \nu(s) = \emptyset \) if \( s \neq 6 \).

(a) Write down the maximal independence relation \( I \subseteq A \times A \).

(b) Write down the maximal invisibility set \( U \subseteq A \).

(c) Compute a reduction function \( red \) that satisfies the ample set conditions C0–C3. Whenever possible, choose \( red(s) \) such that it is a proper subset of \( en(s) \), for each state \( s \).

(d) Use \( red \) to construct a reduced Kripke structure \( \mathcal{K}' \) that is stuttering equivalent to the original Kripke structure \( \mathcal{K} \).
Exercise 6.2
Consider the following Promela model

```promela
byte g;

active proctype m() {
  byte x;
  m0: x ++;
  m1: x ++;
  m2: g = x;
}

active proctype n() {
  byte y;
  n0: y ++;
  n1: y ++;
  n2: atomic { (g>0) -> g = g - y }
}

active proctype p() {
  p0: atomic { (g>0) -> g -- }
}
```

and the following properties:

a) The value of `g` will eventually become one.

b) The process `n` cannot finish before the process `m` reaches `m1`.

For each property, define a labeled Kripke structure with actions extracted from program statements. Determine the independence relation and the invisibility set, and construct a reduced Kripke structure using the ample sets method.