

Model Checking – Exercise sheet 10

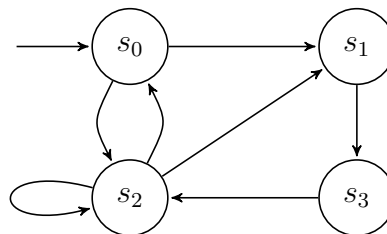
Exercise 10.1

Let $a = a_2a_1a_0$, $b = b_2b_1b_0$, and $c = c_3c_2c_1c_0$ be 3-bit, 3-bit, and 4-bit unsigned integers, respectively.

- (a) Draw a BDD that represents $a + b = c$. Write down your variable ordering.
- (b) Draw a BDD that represents $a = 2 \cdot b$. The BDD should contain every possible value of b such that $2 \cdot b$ is representable using 3 bits. The variable ordering of a and b must be the same as in (a).
- (c) Use the BDDs from (a) and (b) to construct a BDD that represents $3 \cdot b = c$.
- (d) Use the BDD from (c) to construct a BDD that represents $c \bmod 3 = 0$.

Exercise 10.2

Consider the following transition system T :



- (a) Use DDcal to construct a BDD that represents the transition relation of T .
- (b) Use the BDD from (a) to construct a BDD that represents all direct successors of s_0 .
- (c) Construct a BDD that represents $pre(\{s_0, s_2\})$.