Model Checking – Exercise sheet 10

Exercise 10.1

Let $a = a_2 a_1 a_0$, $b = b_2 b_1 b_0$, and $c = c_3 c_2 c_1 c_0$ be 3-bit, 3-bit, and 4-bit unsigned integers, respectively.

1. Draw a BDD that represents $a + b = c$. Write down your variable ordering.

2. 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 (1).

3. Use the BDDs from (1) and (2) to contruct a BDD that represents $3 \cdot b = c$.

4. Use the BDD from (3) to contruct a BDD that represents $c \bmod 3 = 0$.

Exercise 10.2

Consider the following transition system T:
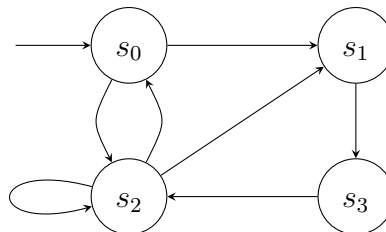
1. Use DDcal to construct a BDD that represents the transition relation of T.

2. Use the BDD from (1) to construct a BDD that represents all direct successors of s_0

3. Construct a BDD that represents $pre(\{s_0, s_2\})$