

Advanced Model Checking Summer term 2009

– Series 7 –

Hand in on June 15'th before the exercise class.

Exercise 1

(4 points)

For the given function:

$$F(x_0, \dots, x_{n-1}, a_0, \dots, a_{k-1}) = x_{|a|}$$

where $n = 2^k$, $\forall i \in 0 \dots n-1 : x_i = 0 \vee x_i = 1$, $\forall j \in 0 \dots k-1 : a_j = 0 \vee a_j = 1$ and $|a| = \sum_{j=0}^{k-1} a_j 2^j$, provide two ROBDDs, considering the following two variable orderings:

$$a_0, \dots, a_{k-1}, x_0, \dots, x_{n-1}$$

and

$$a_0, x_0, \dots, a_{k-1}, x_{k-1}, x_k, \dots, x_{n-1}$$

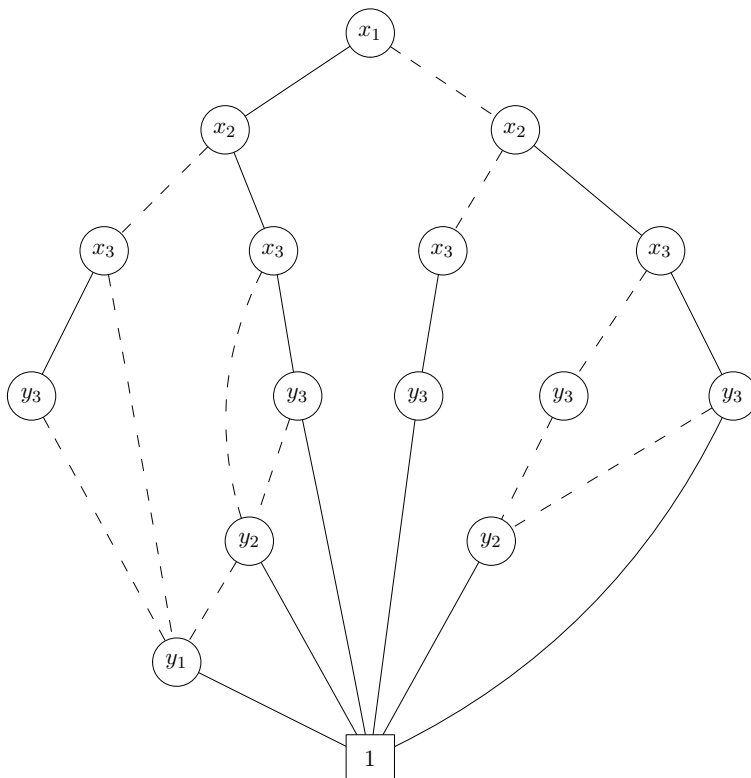
with $k = 3$.

Exercise 2

(3 points)

Given an ROBDD as follows, determine the boolean function $f(x_1, x_2, x_3, y_1, y_2, y_3)$ it represents.

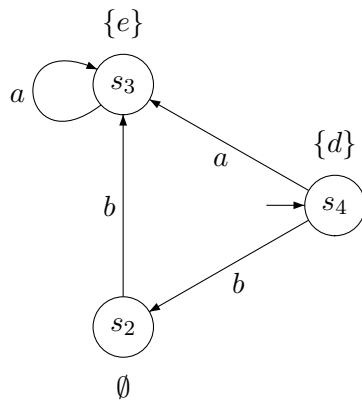
(Hint: first to find a better variable ordering)



Exercise 3

(3 = 1 + 2 points)

Given a transition system TS with actions as follows:



- (a) Define how to obtain switching functions for this case and find a switching function for the above TS;
- (b) Encode the TS by a ROBDD.