Model Checking

Ivo Melse s1088677 & Floris Van Kuijen s1155667

March 2025

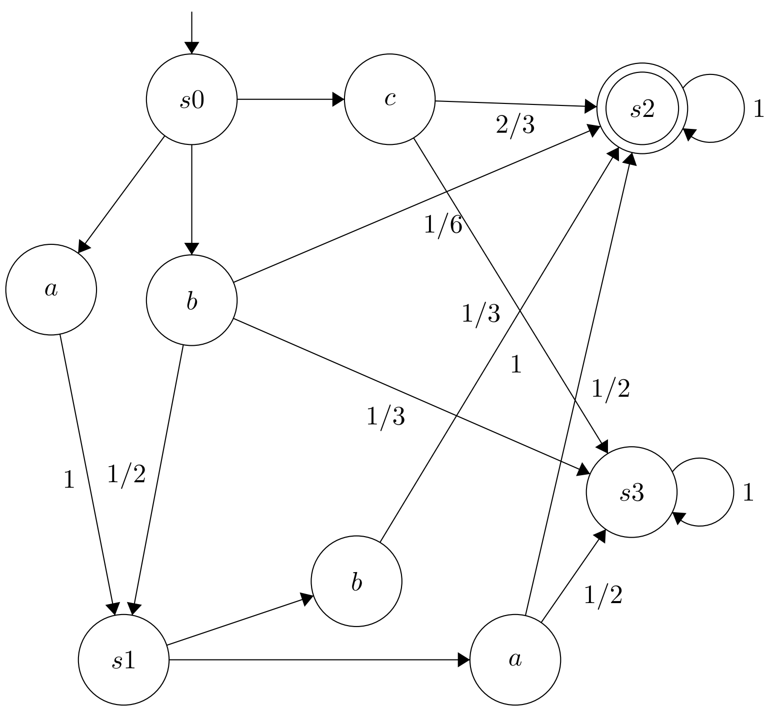
1

1

1. $\frac{1}{2}$
2. $\frac{1}{3}$
3. $\frac{2}{3}$

2

Oops: the transition from s2 after a after s1 should go to s0.



3

$3 \cdot 2 = 6$

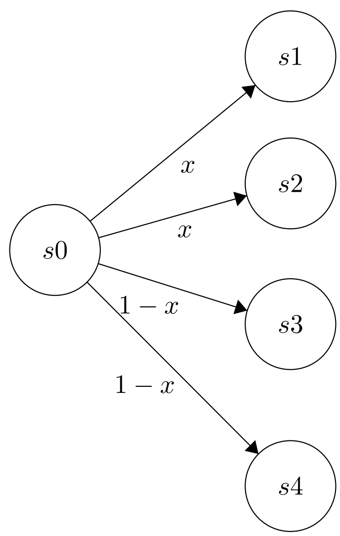
4

In both cases, the qualitative reachability set $R_{\min} = R_{\max} = \{s_0, s_1, s_2\}$.
Now we solve linear programming for both cases.

- max: $x_0 = 1, x_1 = 1, x_2 = 1, x_3 = 0$. Then $P_{\max}(\Diamond s_2) = \frac{2}{3}$.
- min: $x_0 = \frac{1}{2}, x_1 = \frac{1}{2}, x_2 = 1, x_3 = 0$. Then $P_{\min}(\Diamond s_2) = \frac{1}{3}$.

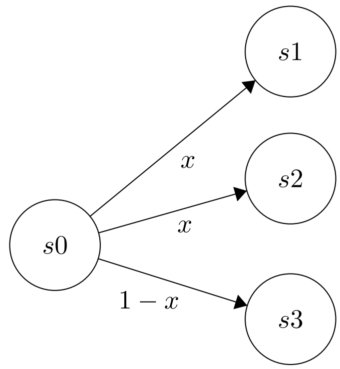
2

1



If you sum all the transitions, the result will always be at least 2.

2



The only well-defined value for x is 0.

3

1

Use your imagination.

2

- R_1: $\frac{81}{200}$
- R_2: $\frac{4}{18}$
- R_3: $\frac{27}{100}$

4

1

$(1-x)x^2$

2

$\frac{\frac{1}{2}x^2}{1-\frac{5}{4}x-\frac{3}{4}x^2-\frac{1}{4}x^3}$