

CS 720, Fall 2016
Homework 4

Due Date: October 12

1. Do Baier and Katoen, Exercise 3.17, but replace \mathcal{F} with

$$\mathcal{F}' = (\emptyset, \{\{\beta\}, \{\gamma\}\}, \emptyset).$$

2. Let TS be the transition system in Exercise 3.17. Which of the following fairness assumptions are realizable in TS ? Explain your answers.

- (a) $\mathcal{F}_1 = (\{\{\alpha\}\}, \{\{\alpha, \gamma\}, \{\beta\}\}, \{\{\alpha, \beta\}\})$.
- (b) $\mathcal{F}_2 = (\{\{\alpha\}, \{\beta\}\}, \{\{\gamma\}\}, \emptyset)$.
- (c) $\mathcal{F}_3 = (\{\{\alpha, \beta\}\}, \{\{\alpha\}, \{\beta\}\}, \{\{\gamma\}\})$.

3. Let TS_{pet} be the transition system of the Peterson mutual exclusion algorithm given on page 47 of the text. Label the transitions with the actions $req_1, req_2, enter_1, enter_2$ where req_i means that process i moves from n_i to w_i and $enter_i$ means that process i moves from w_i to c_i . Let E be the LT property “process 1 enters its critical section infinitely often and process 2 enters its critical state infinitely often.” Then, $TS_{pet} \not\models E$. Give a fairness assumption \mathcal{F} such that $TS_{pet} \models_{\mathcal{F}} E$. Make your fairness assumption as weak as possible.
4. Baier and Katoen, Exercise 4.3.