



Concurrency Theory WS 2017/2018

— Series 2 —

Hand in until October 27 before the exercise class.

Exercise 1 (CCS and LTS's)

(3+2 Points)

- (a) Decide whether the following CCS process definitions induce infinite LTS's and whether their trace languages are regular. Justify your answers.
- i) $B = (B \parallel B) + a.nil$
 - ii) $D = a.(D \parallel b.nil)$
 - iii) $B = (B \parallel B) \setminus \{a\} + a.nil$
- (b) Prove or disprove: If a CCS process C is defined as $C = P$ where $C \parallel P'$ occurs as a subterm in P^1 , then $LTS(C)$ is infinite.

Exercise 2 (Equivalence of HML Formulae)

(1+1 Points)

Let $A = \langle a \rangle \langle \langle b \rangle tt \vee \langle c \rangle ff$ and $B = [a] \langle \langle b \rangle tt \wedge [c] ff$ be HML formulae.

- (a) Give a CCS expression (or LTS) for which A holds but not B !
- (b) Give a CCS expression (or LTS) for which B holds but not A !

Exercise 3 (Minimal LTS for HML Formulae)

(2 Points)

Let F be a label and $A = \langle a \rangle F$ and $B = [a]F$ be HML formulae.
Give minimal LTS L_1, L_2, L_3 and L_4 such that

- (a) $L_1 \models A$ and $L_1 \models B$,
- (b) $L_2 \models A$ and $L_2 \not\models B$,
- (c) $L_3 \not\models A$ and $L_3 \models B$ and
- (d) $L_4 \not\models A$ and $L_4 \not\models B$.

¹ P and P' are process expressions.