W6SENG002W Concurrent Programming

FSP Process Analysis & Design Form

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1. FSP Process Attributes

Attribute	Value
Name	PRINTER
Description	This represents the process of the shared printer which initially has 3 papers. One printing task requires one paper. If paper count is 0, printer is again refilled with 3 papers. 2 students and 1 technician get mutually exclusive access to the printer to either print or to refill papers.
Alphabet	alphabet(PRINTER) = {stuAccess, stuRelease, techAccess, techRelease}
Number of States	8
Deadlocks (yes/no)	No
Deadlock Trace(s) (if applicable)	N/A

2. FSP Process Code

FSP Process:

```
const MAX_PAPERS = 3
range PAPER_COUNT = 0..MAX_PAPERS

PRINTER=PRINTER[MAX_PAPERS],
PRINTER[p:PAPER_COUNT] = if(p>0)
                then
                (stuAccess -> stuRelease -> PRINTER[p-1])
                 else
                (techAccess -> techRelease -> PRINTER[MAX_PAPERS]).
```

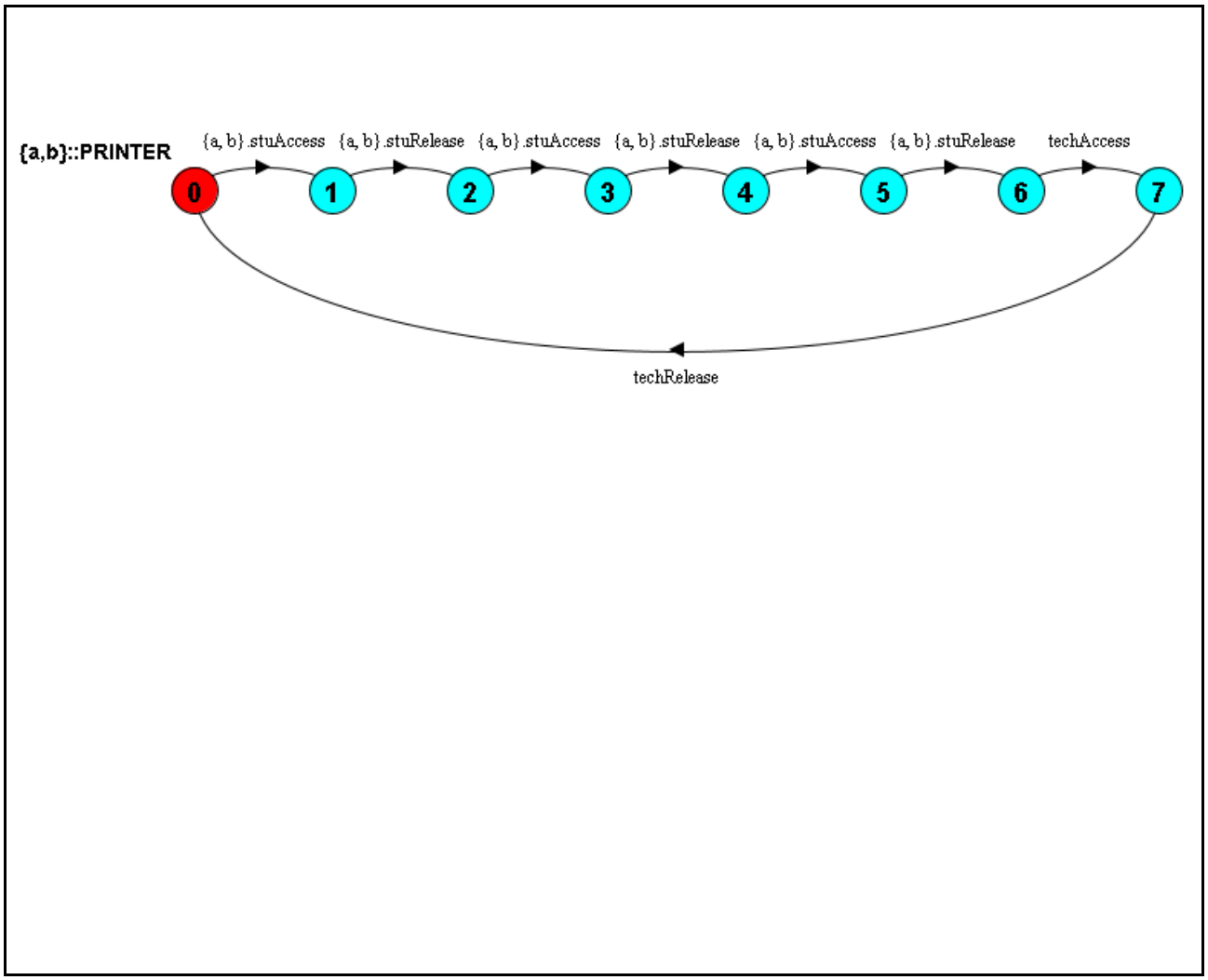
3. Actions Description

A description of what each of the FSP process' actions represents, i.e. is modelling. In addition, indicate if the action is intended to be synchronised (shared) with another process or asynchronous (not shared). (Add rows as necessary.)

Actions	Represents	Synchronous or Asynchronous
stuAccess	Student accessing (locking) the shared printer	Synchronous
stuRelease	Student releasing the shared printer	Synchronous
techAccess	Technician accessing (locking) the shared printer	Synchronous
techRelease	Technician releasing the shared printer	Synchronous

4. FSM/LTS Diagrams of FSP Process

Note that if there are too many states, more than 64, then the LTSA tool will not be able to draw the diagram. In this case draw small diagrams of the most important parts of the complete diagram.



5. LTS States

A description of what each of the FSP process' states represents, i.e. is modelling. If there are a large number of states then you can group similar states together &/or only include the most important ones. For example, identify any states related to mutual exclusion (ME) & the associated critical section (CS), e.g. waiting to enter the CS state, in the CS state(s), left the CS state. (Add rows as necessary.)

State	Represents
0	Starting state. Waiting for a student to access (lock) printer.
1	Waiting until student done printing (execute critical section) and release the printer.
2	After releasing printer, waiting for another student to access (lock) printer.
3	Waiting until student done printing (execute critical section) and release the printer.
4	After releasing printer, waiting for another student to access (lock) printer.
5	Waiting until student done printing (execute critical section) and release the printer.
6	After releasing printer, waiting for technician to access (lock) printer.
7	Waiting until technician is done refilling papers (execute critical section) and release the printer.

6. Trace Tree for FSP Process

The trace tree for the process. Use the conventions given in the lecture notes and add explanatory notes if necessary.