6SENG002W Concurrent Programming

FSP Process Analysis & Design Form

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1. FSP Process Attributes

Attribute	Value
Name	PRINTER
Description	A printing system (printer) that can offer print and refill process. The printer can print three documents at once and refill process need to be done when the paper count equal to zero.
Alphabet	{acquireStudent, acquireTechnician, print, refill, releasePrinter}
Number of States	12
Deadlocks (yes/no)	No deadlocks/errors
Deadlock Trace(s) (if applicable)	None

2. FSP Process Code

FSP Process:

```
//maximum number of printings before refill the printer
const PRINT_MAX_COUNT = 3

range PRINT_RANGE = 1..PRINT_MAX_COUNT
//Alphabet Extension
set ALLACTIONS={aquireStudent,aquireTechnician,print,refill,releasePrinter}

PRINTER = PRINT_MACHINE[PRINT_MAX_COUNT],
PRINT_MACHINE[i: 0..PRINT_MAX_COUNT] = (when(i > 0)aquireStudent -> print ->
releasePrinter -> PRINT_MACHINE[i-1] | when(i==0) aquireTechnician -> refill -> releasePrinter -
> PRINT_MACHINE[PRINT_MAX_COUNT]).
```

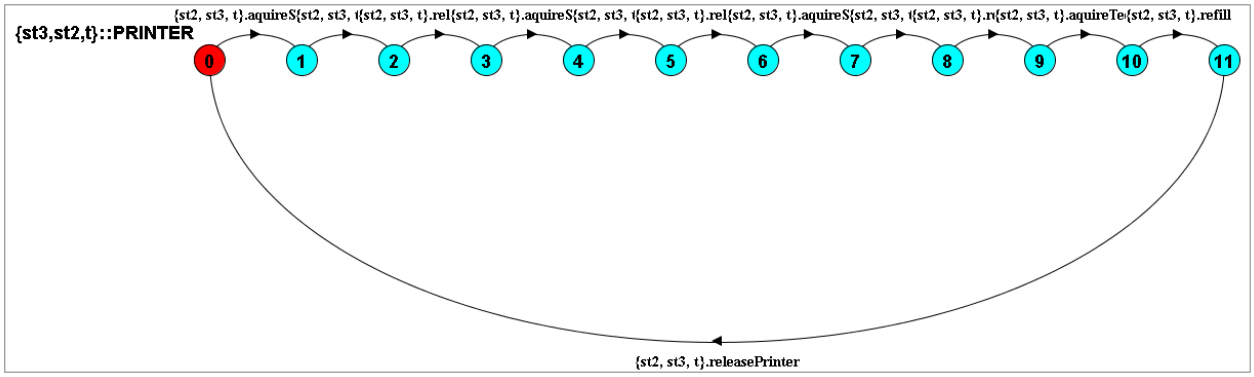
3. Actions Description

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
acquireStudent	This action represent student acquire printer. To acquire printer paper count should be more than zero.	Synchronous
aquireTechnician	This action represent technician acquire printer. To acquire printer paper count should be zero.	Synchronous
print	This action represents students print documents by pressing print button in PRINTER machine.	Synchronous
refill	This action represent technician refill the printer. At once technician can only refill three papers.	Synchronous
releasePrinter	Printer releases the acquired lock of each process.	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	Printer is ready to print the documents. Printer has 3 papers in initial state.
1	Printer has been acquired for printing process.
2	Printer has been printed the first document.
3	Printer released printing process (first document) and it is available for acquisition.
4	Printer has been acquired for printing process.
5	Printer has been printed the second document.
6	Printer released printing process (second document) and it is available for acquisition.
7	Printer has been acquired for printing process.
8	Printer has been printed the third document.
9	Printer released printing process (third document) and it is available for acquisition.
10	Printer has been acquired for refill process. The process will be acquired by the technician.
11	Printer has been refilled with three documents and printer is to be release.

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.