6SENG002W Concurrent Programming

FSP Process Analysis & Design Form

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1. FSP Process Attributes

Attribute	Value
Name	PRINTER
Description	It is a printer which gives access to print documents
Alphabet	{acquirePrinter, acquireRefill, print, refill, release}
Number of States	12
Deadlocks (yes/no)	No
Deadlock Trace(s) (if applicable)	N/A – No deadlock

2. FSP Process Code

FSP Process:

```
const MAX_PAPERSHEETS = 3 // Maximum count of sheets in a printer
const MIN_PAPERSHEETS = 1 // Min count of sheets in a printer
const MIN_DOCUMENT = 1 // Min Document count

//common printer actions
set ACTIONS_PRINTER = { acquirePrintDoc, print, acquireRefill, refill, release }

//printer process
PRINTER( PAPER_COUNT = MAX_PAPERSHEETS )= PRINTER[PAPER_COUNT],
PRINTER [d : 0.. MAX_PAPERSHEETS]=
                                if ( d >= MIN_PAPERSHEETS )
                                then ( acquirePrintDoc-> print -> releasePrinter -> PRINTER[d-1] )
                                else ( acquireRefill -> refill -> releaseRefill ->
PRINTER[MAX_PAPERSHEETS]
) / { release/releaseRefill , release/releasePrinter } .
```

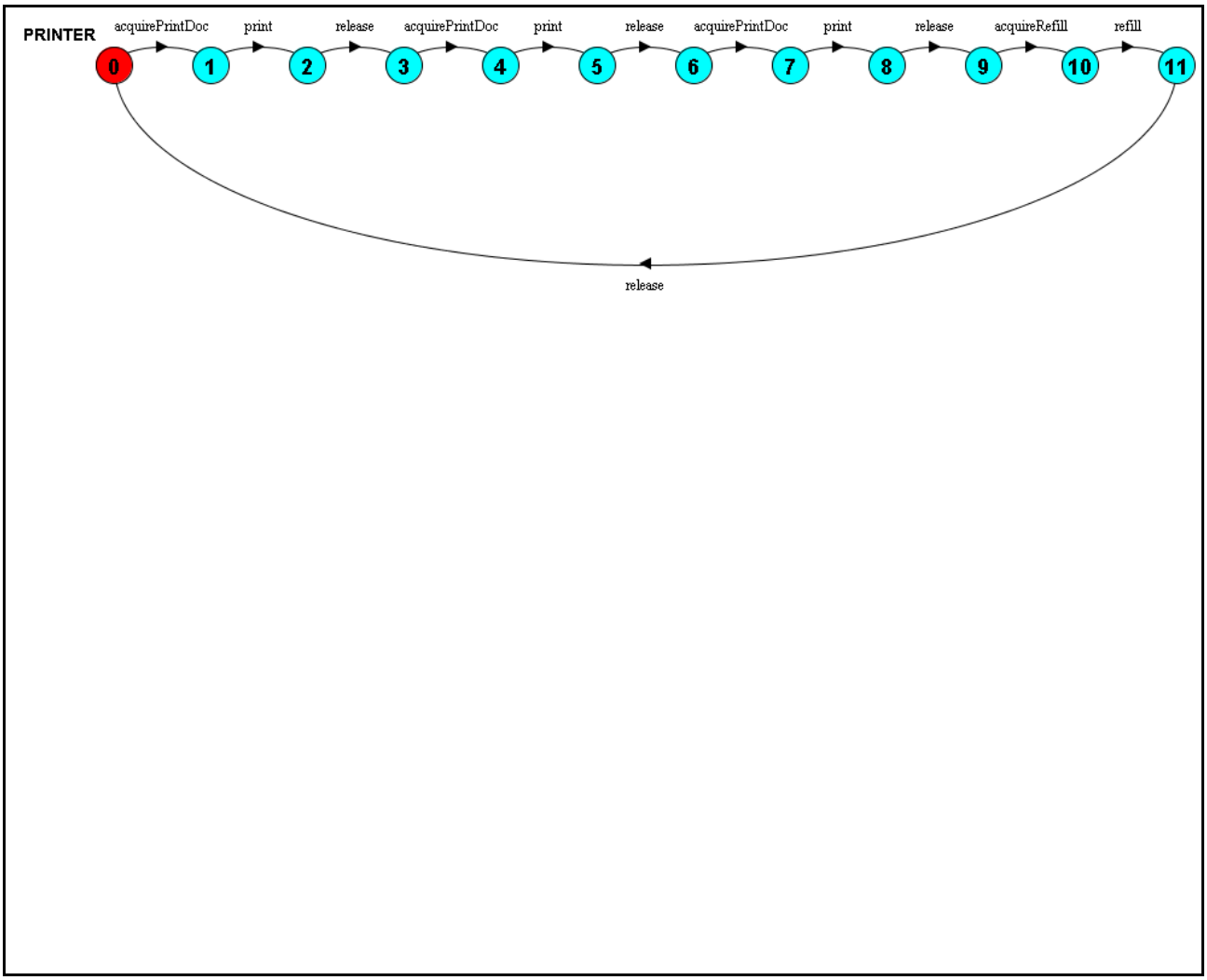
3. Actions Description

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
acquirePrintDoc	Getting the access/acquiring of the printer to print a document	**Synchronous**
acquireRefill	Getting the access/acquiring of the printer to refill with the specified number of sheets of paper	**Synchronous**
print	Printing a document	**Synchronous**
refill	Refilling the printer with the specified number of sheets(three sheets)	**Synchronous**
release	Releasing the printer after the documents are printed and completed or during refilling of papers	**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.



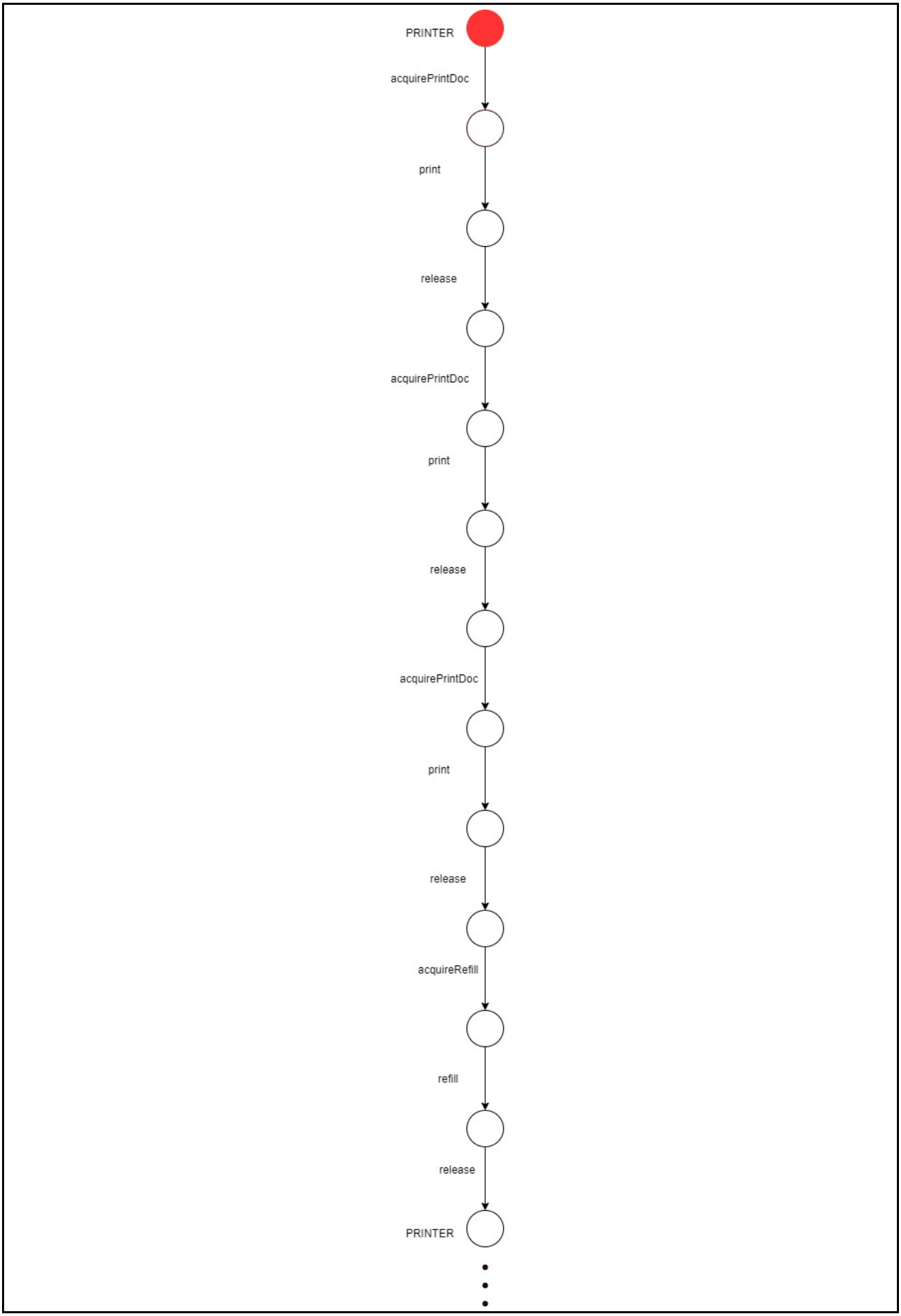
5. LTS States

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
Q0	The printer containing 3 sheets of paper is ready to be used .
Q1	The printer is acquired by a process for printing the first document.
Q2	The printer has printed the first document and is being ready to be released
Q3	After printing the first sheet, The printer has been released, the printer at this state has 2 sheets remaining and is ready to print the remaining two sheets
Q4	The printer is acquired by a process for printing the second document.
Q5	The printer has printed the second document and is being ready to be released
Q6	After printing the second sheet, The printer has been released, the printer at this state has 1 sheet remaining and is ready to print the remaining two sheets
Q7	The printer is acquired by a process for printing the third document.
Q8	The printer has printed the third document and is being ready to be released
Q9	After printing the last sheet, The printer has been released, the printer at this state has 0 sheets remaining and is ready to be refilled.
Q10	The printer has been acquired for refilling
Q11	The printer is waiting to be released, the printer has been refilled with 3 sheets of paper

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.


PRINTER
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