6SENG002W Concurrent Programming

FSP Process Analysis & Design Form

Name	Bombuwalage Gayashan Kalhara Bombuwala
Student ID	W15829590
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1. FSP Process Attributes

Attribute	Value
Name	PRINTER
Description	A printing machine which can be used to print documents.
Alphabet	{ acquire, empty, print[1], print[2], print[3], release }
Number of States	17
Deadlocks (yes/no)	No deadlocks/errors
Deadlock Trace(s)	None

2. FSP Process Code

FSP Process:

```
const MIN_SHEET_COUNT   =       1
const MAX_SHEET_COUNT   =       3
range DOC_COUNT         =       MIN_SHEET_COUNT ..
MAX_SHEET_COUNT
range SHEET_STACK       =       0 .. MAX_SHEET_COUNT

PRINTER(SHEETS_AVAILABLE    = MAX_SHEET_COUNT) =
PRINTER_AVAILABLE[MAX_SHEET_COUNT],
PRINTER_AVAILABLE[sheets_available: SHEET_STACK] =
(
when(sheets_available > 0)acquire -> print[DOC_COUNT] -> release ->
PRINTER_AVAILABLE[sheets_available - 1] |
when(sheets_available == 0)empty -> release ->
PRINTER_AVAILABLE[MAX_SHEET_COUNT]
).
```

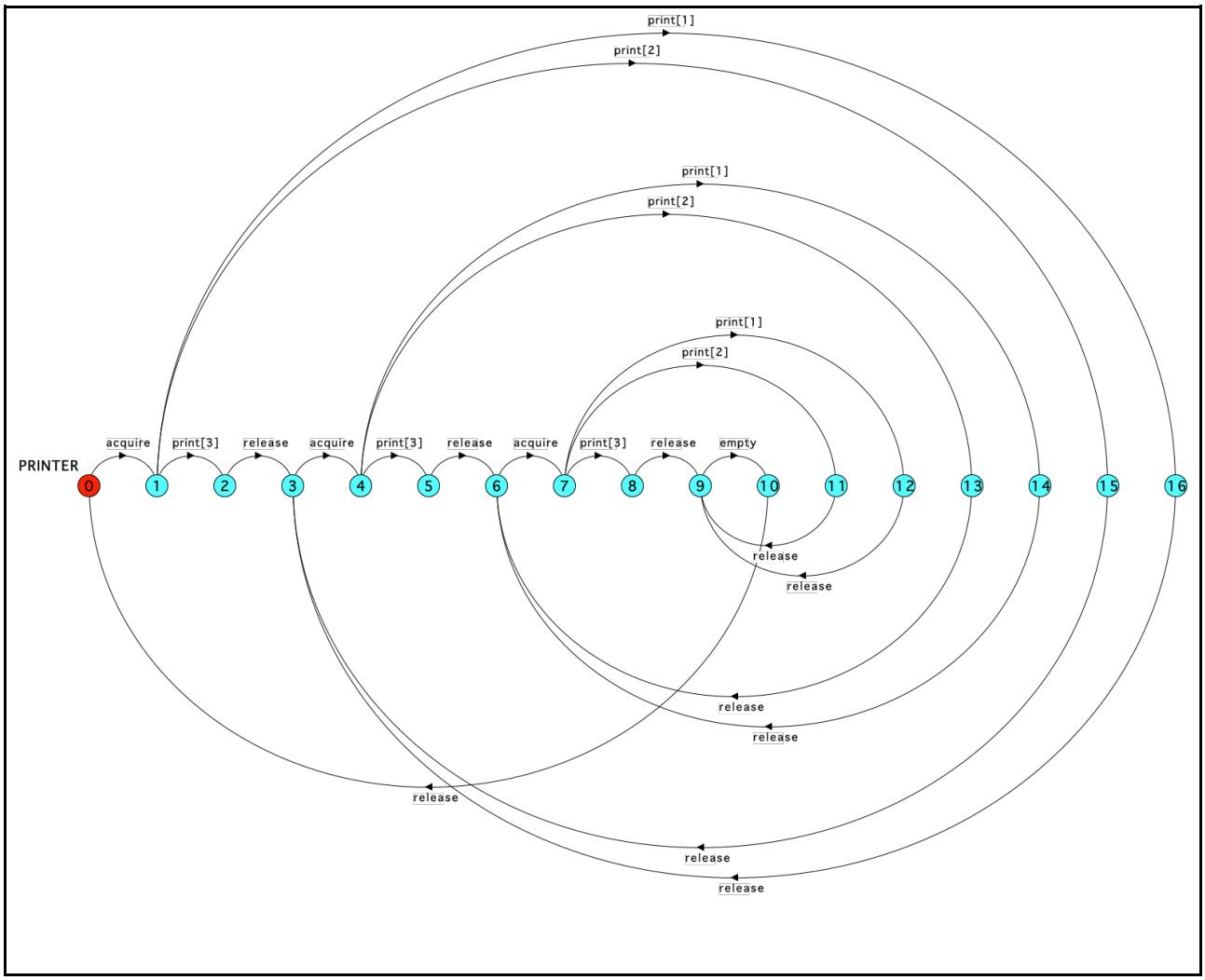
3. Actions Description

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
acquire	Acquiring the printer by a student to print a document or to by a technician to refill the printer	Asynchronous
print[1]	Printing a document which has ID = 1	Asynchronous
print[2]	Printing a document which has ID = 2	Asynchronous
print[3]	Printing a document which has ID = 3	Asynchronous
empty	Notifying the technician that the printer ran out of documents	Asynchronous
release	Releasing the printer by a student after printing a document or by a technician after refilling the printer	Asynchronous

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.



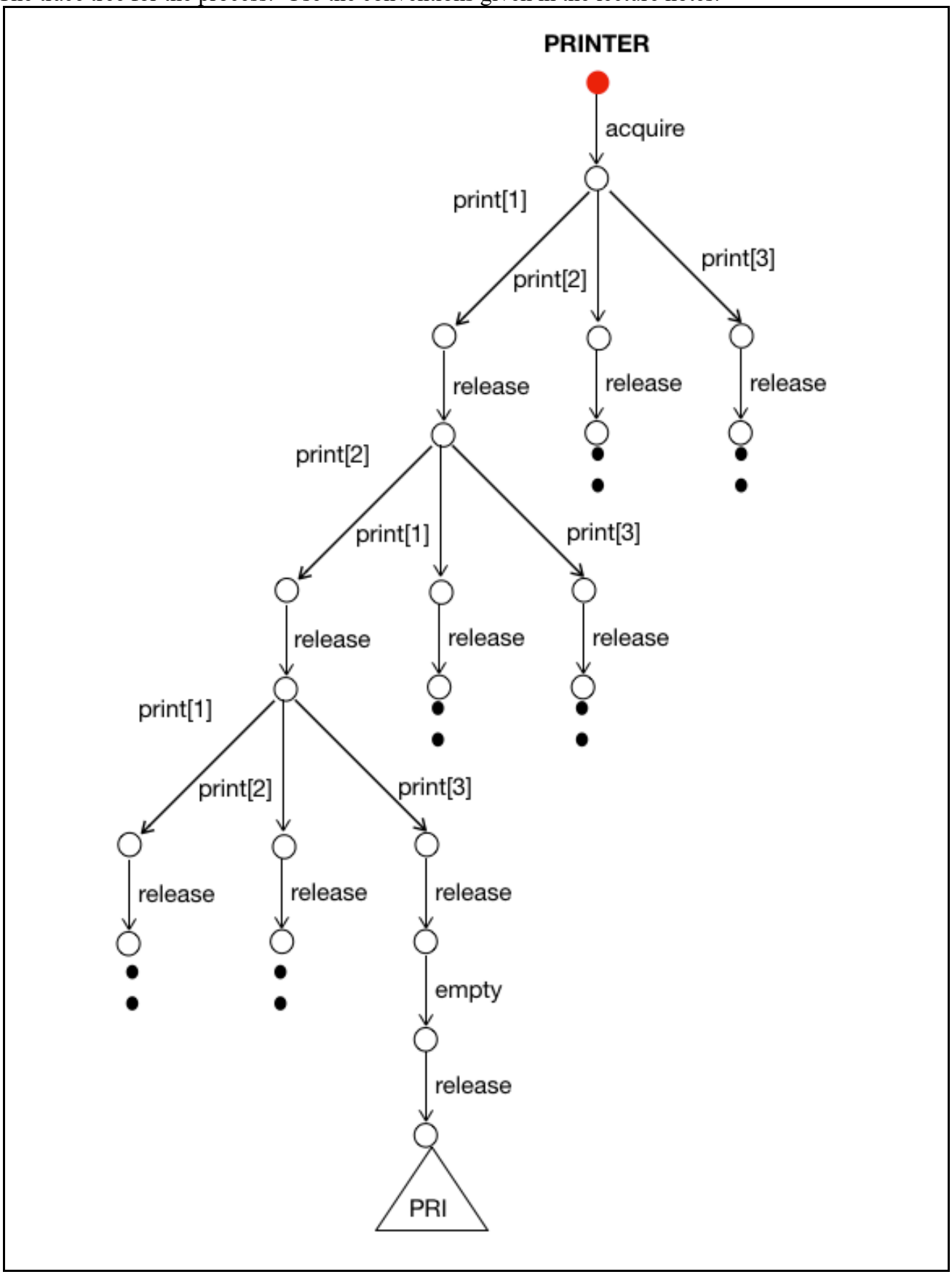
5. LTS States

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.)

States	Represents
0	Printer is available to be acquired by either a student or a technician
1	Printer is acquired by a student
2	A document with ID = 3 has been printed
3	Printer is released by a student after printing a document
4	Printer is acquired by a student
5	A document with ID = 3 has been printed
6	Printer is released by a student after printing a document
7	Printer is acquired by a student
8	A document with ID = 3 has been printed
9	Printer is released by a student after printing a document
10	Printer has run out of paper and acquired by a technician to refill it
11	A document with ID = 2 has been printed
12	A document with ID = 1 has been printed
13	A document with ID = 2 has been printed
14	A document with ID = 1 has been printed
15	A document with ID = 2 has been printed
16	A document with ID = 1 has been printed

6. Trace Tree for FSP Process

The trace tree for the process. Use the conventions given in the lecture notes.



7. Structure Diagram

The structure diagram for the process. Use the conventions given in the lecture notes.