

6SENG002W Concurrent Programming

FSP Process Composition Analysis & Design Form

Name	M.Ravidu Shehan Perera
Student ID	W1699671 (IIT No: 2017486)
Date	28/12/2020

1. FSP Composition Process Attributes

Attribute	Value
Name	PRINTING_SYSTEM
Description	This Process consists for Printer which deals with two students and a technician
Alphabet (Use LTSA's compressed notation, if alphabet is large.)	{std1.print, std2.print, std1.printLock, std2.printLock, std1.refill, std2.refill, std1.refillLock, std2.refillLock, std1.release, std2.release, tech.print, tech.printLock, tech.refill, tech.refillLock, tech.release, tech.wait}
Sub-processes (List them.)	PRINTER, STUDENT, TECHNICIAN
Number of States	55
Deadlocks (yes/no)	No
Deadlock Trace(s) (If applicable)	No deadlock

2. FSP "main" Program Code

The code for the parallel composition of all of the sub-processes and the definitions of any constants, ranges & process labelling sets used. (Do not include the code for the other sub-processes.)

FSP Program:

```
const MAX_SHEETS = 3
set PRINTER_ACTIONS = {printLock, print, refillLock, refill, release}
set Users = {std1 , std2, tech}

||PRINTING_SYSTEM = (std1: STUDENT(3) || std2: STUDENT(2) || tech:
TECHNICIAN || Users:: PRINTER).
```

3. Combined Sub-processes

(Add rows as necessary.)

Process	Description
PRINTER	Represent a shared printer machine which hold maximum 3 sheets at a given time to print a documents.
STUDENT	Represent a student who wants to print the documents
TECHNICIAN	Represent a technician who checks whether printer is out of papers and refill it to use without any error.

4. Analysis of Combined Process Actions

- **Synchronous** actions are performed by at least two sub-process in the combination.
- **Blocked Synchronous** actions cannot be performed, since at least one of the sub-processes cannot perform them, because they were added to their alphabet using alphabet extension.
- **Asynchronous** actions are preformed independently by a single sub-process.

Group actions together if appropriate, for example if they include indexes, e.g. in [0], in [1], ..., in[5] as in[1..5].

(Add rows, as necessary.)

Synchronous Actions	Synchronised by Sub-Processes (List)
std1.printLock, std1.print, std1.release	STUDENT, PRINTER
std2.printLock, std2.print, std2.release	STUDENT, PRINTER
tech.release, tech.refill, tech.refillLock	TECHNICIAN, PRINTER

Blocked synchronous Actions	Synchronising Sub-Process	Blocking Sub-process
std1.refillLock, std1.refill	STUDENT, TECHNICIAN	STUDENT
Std2.refillLock, std2.refill	STUDENT, TECHNICIAN	STUDENT
tech.print,tech.printLock	TECHNICIAN, PRINTER	TECHNICIAN

Sub-Process	Asynchronous Actions (List)
TECHNICIAN	tech.wait
STUDENT	None
PRINT	None

5. Parallel Composition Structure Diagram

The structure diagram for the parallel composition.

