6SENG002W Concurrent Programming

FSP Process Composition Analysis & Design Form

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1. FSP Composition Process Attributes

Attribute	Value
Name	PRINTING_SYSTEM
Description	Models a Shared Printer, two students and a technician.
Alphabet (Use LTSA's compressed notation, if alphabet is large.)	{{std1, std2}. {complete, print, refill, release, student_aquire, technician_aquire}, tech.{print, refill, release, student_aquire, technician_aquire, waiting}}
Sub-processes (List them)	STUDENT PRINTER TECHNICIAN
Number of States	79
Deadlocks (yes/no)	No
Deadlock Trace(s)	N/A

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 sub-processes.)

FSP Program:
const MAX_SHEETS = 3 range PAPER_RANGE = 0..MAX_SHEETS set PRINTING_ACTIONS = {student_aquire, technician_aquire, print, refill, release} ||PRINTING_SYSTEM = (std1: STUDENT (3) || std2: STUDENT (2) || tech: TECHNICIAN || {std1, std2, tech} :: PRINTER).

3. Combined Sub-processes

(Add rows as necessary.)

Process	Description
STUDENT	Represents a student that has a documented to be printed.
PRINTER	Represents a printer that can be acquired and print documents.
TECHNICIAN	Represents a technician that has to refill the printer when the printer run of papers.

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. (Add rows as necessary.)

Synchronous Actions	**Synchronised by Sub-Processes (List)**
std1.student_aquire, std2.student_aquire, std1.print, std2.print, std1.release, std2.release	STUDENT, PRINTER
tech.technician_aquire, tech.technician_release, tech.technician_refill	TECHNICIAN, PRINTER

Blocked Synchronous Actions	**Synchronising Sub-Processes (List)**	**Blocking Sub-Processes**
std1.student_aquire, std2.student_aquire, std1.print, std2.print, std1.release, std2.release	STUDENT, PRINTER	TECHNICIAN
tech.technician_aquire, tech.technician_release, tech.technician_refill	TECHNICIAN, PRINTER	STUDENT

Sub-Process	**Asynchronous Actions (List)**
waiting	TECHNICIAN

5. Parallel Composition Structure Diagram

The structure diagram for the parallel composition.