

# Exercise Sheet 3

(20 Points)

Thursday, November 23, 2017

**Note:** This exercise lasts for two weeks. Please perform part A this week and part B next week on 30.11.2017.

## Part A:

### 3.1 Shared Printer (10 points)

A shared printer in a factory prints labels on 3 different products or items. Three production lines output items every 100, 200 and 300 milliseconds respectively. Once an item is produced, the corresponding production line sends a signal to the printer that a new item is ready for printing. Furthermore, it sends the text to be printed. The printer prints the text on the correct item once it is available. Implement the necessary tasks to manage the three production and the shared printer. Show the output of the printer.

## Part B:

### 3.2 Priority Queues (10 points)

Implement a priority queue based on the normal queue in FreeRTOS. The elements of the priority queue have associated priorities. Furthermore, implement the following basic operations:

- Send: Send an item to the queue.
- ReceiveHigh: Receive the item with the highest priority.
- ReceiveLow: Receive the item with the lowest priority.
- PeekHigh: Receive the item with the highest priority without removing it from the queue.
- Delete: Delete the queue.