Concurrency
Monitor – Hand-in assignment 2

Using Monitors and Conditions

July 16, 2019

Learning objective

The purpose of this assignment is that you learn the basics of programming with the monitor form the concurrency package of Java. You will need to create multiple conditions and keep track of shared resources.

Assignment

We are going to build a resource management system for SuperPrint.com. SuperPrint.com is a printing company that leases Indigo printers via the internet for a short time to customers. The customers can upload their printing work to a printer. The printer prints it and SuperPrint.com sends these prints (folded stapled and cut If needed) to the customers via a fast courier.

SuperPrint.com has 30 Indigo printers at their disposal.
SuperPrint.com has two types of customers: BigBoys and LittleFish.
BigBoys are big companies who want to use all the printing capacity at once, ergo they produce a lot of printed material, like specialty folders from a special marketing campaign.
LittleFish can only access one printer at a time.
Needles to say BigBoys are preferred customers as they bring in a lot of revenue at once.
The also get preferential treatment. As soon as a BigBoys announces that it needs the printing capacity no LittleFish are allowed to start using a printer.

They will have to wait until the big fish has finished printing. The LittleFish who are printing at that time can of course finish their jobs.
To keep things fair and not starve LittleFish of printing capacity after three consecutive BigBoys have claimed the printing capacity all the LittleFish who have been waiting *up until that moment* are allowed to start using the printers. BigBoys will have to wait, but **also** of course LittleFish who might arrive after this event and want to use a printer. When all the waiting LittleFish have finished printing, the newly arrived LittleFish or BigBoys customers can start printing.

Model and implement with a monitor from the concurrent package the access controller to the printers. The BigBoys and LittleFish register with the access controller as wanting to use the facilities and if there is room, they may start printing. When they are finished they report again to the access controller that they are finished printing. The printing does not need to be modeled, you can simply use a timeout to simulate the time it takes to print cut and fold the materials.

Test your program and make sure that different scenarios can be handled by it, scenarios might be:
Only BigBoys want to print
Only LittleFish want to print…
But of course there can be others, be creative.

To be handed in on Blackboard:

1. A report containing the approach of your problem.
   Specify in your design which threads you need, how the monitor is built and which synchronization points (Conditions) you need to ensure that the threads communicate correctly with each other.

   Please also indicate the way in which you have tested your program and what you have observed, to make plausible that your solution is adequate.

   The report should adhere the report scan HBO-ICT.

2. A zip file, in which your IntelliJ project. Your IntelliJ project has been given the name <***LastNameStudent1*><*LastNameStudent2*>Assignment1. Please note: you should use this exact name and NOTHING else!!**

3. Deadline: see blackboard