

Compulsory assignment 3

INF4140, Fall term 2012

Final delivery date

Friday November 23 at 18:00

How to deliver

- Your solution should be delivered online (<https://devilry.ifi.uio.no/>).
- Program examples should be commented in order to make them understandable for the group teacher or lecturer.

Who delivers

Everyone is required to deliver a solution. You may work alone or together with one other student. (Notice that you are not allowed to work together with more than one student.) In this case the two of you should deliver the same solution. **The solution must be marked with name and email address of the contributing students.**

Evaluation

This assignment is graded *pass* or *fail*.

You must pass this assignment in order to take the final exam.

Please read the Departemental guidelines for written assignments!

see <http://www.ifi.uio.no/studier/skjemaer/oblig-retningslinjer.pdf>

or http://www.ifi.uio.no/studier/skjemaer/oblig-retningslinjer_eng.pdf

Dining philosophers implemented with message-passing

Consider an approach to the dining philosophers based on asynchronous message passing.

1. You can assume that there are N philosophers around a table, and one fork between each pair of philosophers (ref. fig. 4.6, p. 165 in Andrews). Implement a solution where both philosophers and forks are represented as processes. A philosopher picks up the forks next to himself by sending a request to the neighbour-fork-processes, asking for access to the fork. When a philosopher is finished eating, the forks are released by passing a message to the two fork-processes. Let each fork listen to a (private) single channel `request` and each philosopher listen to a (private) single channel `reply`. Is your solution “fair”? Is there a possibility for deadlock? Explain your answer.
2. An alternative solution to the dining philosophers can be acquired by letting the forks become a shared resource for all the philosophers. This can be achieved by letting the forks be handed out by a butler process. Implement a fair and deadlockfree solution where the philosophers requests the forks from a butler. You may assume that there is N philosophers and M forks. You may also assume that a philosopher who gains access to the forks always will release them. Explain why your solution is fair and deadlockfree.