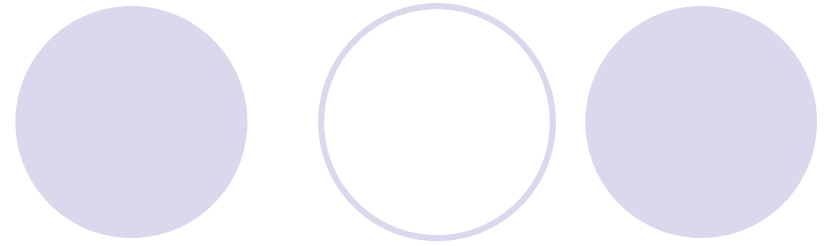# Exercise: The dining Philosophers

(to be solved during class)

The dining philosophers problem

- A problem often used in the design of concurrent languages

- Some philosophers sit around a circular table to eat spaghetti.

- Philosophers may be thinking or eating.

- Each philosopher needs a left fork and a right fork to eat.

- The forks are taken one by one and are of exclusive use.

- When a philosopher finishes eating, he leaves both forks.

Exercise (1/2)

- Create a meta-model for the problem.
- Create a graph grammar representing the behaviour just described.

- Can deadlock occur?

Exercise (2/2)

- Modify the meta-model to include a Waiter.

- When wanting to eat, philosophers ask the Waiter for permission.

- The Waiter *locks* the forks upon request, if possible.

- When the philosopher starts eating, the fork locks are removed.

- Can deadlock occur now?