Concurrency Theory

1: Introduction

Fabrizio Montesi

<fmontesi@imada.sdu.dk>

SDU

Course Participants

- Who are you?

- What is your study programme?

- What would you like to do in the future?

- Why did you register for this course?

Topic

- Concurrency Theory:
  The study of systems where multiple tasks run at the same time.

- Focus is on:

  - Models for the unambiguous definition of concurrent systems.

  - Definition of interesting properties (e.g., "no participant gets stuck").

  - Reasoning techniques for proving interesting properties.

Course Structure

- Frontal Lectures.

- Online material.

- Exercises.

- Peer grading.

Course Material

- These slides.

- Online lectures notes.

Expected Learning Outcomes

- Represent concurrent systems in the abstract models covered in the course.

- Identify and formalise typical useful properties of concurrent systems.

- Prove properties of concurrent systems.

- Prove general properties of formal models for concurrency.

The General Objective

- Understand and reason about bleeding-edge techniques for concurrency.

- Many of these are already influencing the development of modern programming languages (Go, Jolie, Scala, …).

- Strong mutual influence with mathematical logic and category theory.

Evaluation and Assignment

- Written exam with exercises based on the content of the course.

- Written obligatory assignment during the course, based on exercises solved during the course (more details will be communicated through Blackboard).