



Welcome to
Mission Critical Systems
EECS 4315

`wiki.eecs.yorku.ca/course/4315/`

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- **Office hours:** Monday and Wednesday, 10:30-11:30 or by appointment

- three quizzes (10% each)
- midterm (10%)
- final exam (10%)
- project (50%)

three quizzes (10% each)

- programming
- during lab
- January 17, January 31, and February 14

midterm (10%)

- written
- during lecture
- February 26

final exam (10%)

- written
- exam period

project (50%)

- January 24: install JPF (5%)
- February 14: draft proposal (2%)
- February 24: proposal (3%)
- March 9: first progress report (5%)
- March 23: second progress report (5%)
- March 30 and April 1: presentation (10%)
- exam period: report (10%)
- exam period: code (10%)

- Lassonde Building, room 1004
- Friday, 10:00-11:00
- three quizzes will be held during the labs

- Students with a documented reason for missing a quiz or the midterm, such as illness, compassionate grounds, etc., will have the weight of the missed quizzes and midterm shifted to an **extra** exam. This extra exam will cover all the material covered in the course.
- During quizzes, the midterm and the final exam, students are expected to do their own work. Looking at someone else's work during a test, talking during a test, using aids not permitted (such as a phone) during a test, and impersonation are all examples of academically dishonest behaviour.

March 13

Until this date you can drop the course without getting a grade for it.

registrar.yorku.ca/enrol/dates/fw19 contains important dates.

"If you put your name on something, then it is your work, unless you explicitly say that it is not."

Examples of academic dishonesty include

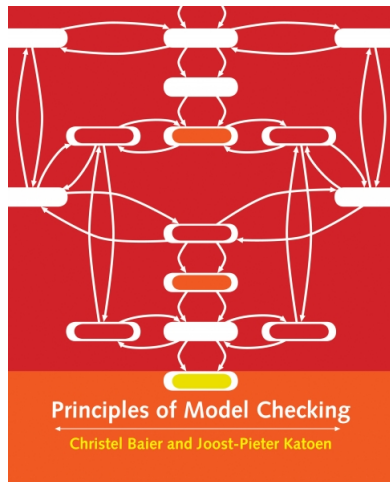
- copying code,
- looking at someone else's work during a quiz,
- talking during a quiz,
- using aids not permitted (such as a phone) during a quiz,
- impersonation.

Read secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/ for more details.

Academic honest behaviour of students increases the value of your degree.

- The instructors will do their best to design quizzes and policies that promote honest behaviour.
- The students are expected to behave honestly.

Christel Baier and Joost-Pieter Katoen. *Principles of Model Checking*. The MIT Press, 2008.



Source: mitpress.mit.edu

- Professor at Technical University Dresden.
- member of the Academia Europaea



Source: www.ae-info.org

- Professor at RWTH Aachen University
- member of the Academia Europaea



Source: www-i2.informatik.rwth-aachen.de

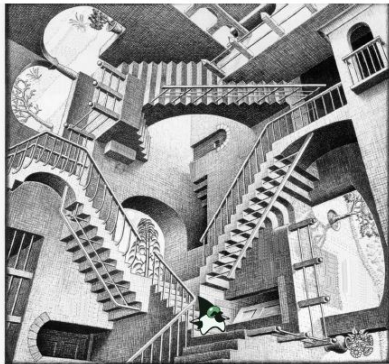
The textbook is required for this course.

Studying only the slides and your lecture notes may **not** be sufficient. There may be questions on quizzes, midterm and final exam about material that is **not** covered in class. Therefore, you should study the textbook.

Although you need to memorize some material, most of the material you have to understand.

Franck van Breugel. *Java PathFinder: a tool to detect bugs in Java code*. 2020.

Java PathFinder: a tool to detect bugs in Java code



Franck van Breugel

Will be posted on the course wiki.

wiki.eecs.yorku.ca/course/4315/

Questions that you want to share with the other students can be posted on the course forum.

forum.eecs.yorku.ca/viewforum.php?f=405

Students are expected to ...

- attend the lectures (3 hours per week)
- attend the lab (1 hour per week)
- prepare for the lab (2 hours per week)
- study the textbook and other reading material, and work on the project (3 hours per week)

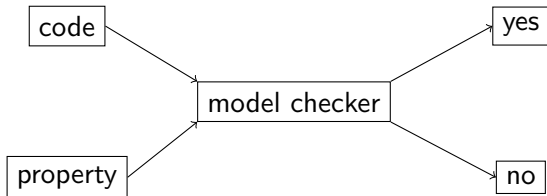
Expected learning outcomes

- The ability to explain the importance of safety-, mission-, business-, and security-critical systems.
- Demonstrated knowledge of the importance of good software engineering practices for critical systems.
- The ability to use rigorous software engineering methods to develop dependable software applications that are accompanied by certification evidence for their safety and correctness.
- Knowledge of the method and tools using deductive approaches (such as theorem proving).
- Knowledge of methods and tools for algorithmic approaches (such as model checking, bounded satisfiability) etc.
- Knowledge of the theory underlying deductive and algorithmic approaches.
- The ability to use industrial strength tools associated with the methods on large systems.

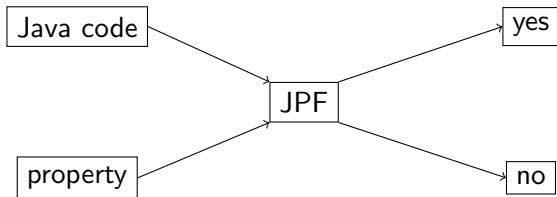
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- model checking
- Java PathFinder
- concurrent programming in Java



Java Pathfinder (JPF)



Properties: uncaught exceptions, deadlocks, data races, ...

In Operating System Fundamentals (EECS 3221), the following topics are covered:

- Threads (multi-thread programming, multi-core systems, thread libraries and implementations).
- Process Synchronization (critical section problem, deadlocks, software and hardware solutions, mutex locks, semaphores, monitors, classic problems).

We will review this material in the context of Java (EECS 3221 uses C), consider other concurrency primitives, and apply model checking to concurrent Java code.