EECS3342 (Z) Winter 2022
Guide to WrittenTest1
When: 11:30 am – 12:00 noon (EST), Tuesday, February 1

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- This written test is **strictly** individual: identified collaborations will be reported to Lassonde for **a breach of academic honesty**.
- You are given **30 minutes** to complete the submission. The time limit is **strict**.
- This written test accounts for 10% of your course grade.
- All questions will be answered on the Section Z eClass site.

1 Rules

- WrittenTest1 will be:
  - ***opened*** for submission at **11:30 am EST** on **Tuesday**, February 1; and
  - ***closed*** for submission at **12:00 noon EST** on the same day.
- Once submitted, you are not allowed to start a new attempt, even before the test is closed.
- There is **not** a 24-hours submission period: if you started your attempt later than the above-mentioned time where the submission is opened, then you would have less than 30 minutes available to complete the test. For example, if you started your attempt at 11:35 am, the test's submission will still be closed at 12:00 noon, meaning that you have 25 minutes remaining to complete the test.

2 Format

- There might be multiple-choice questions:
  - A true or false question
  - A question with a **single** correct answer
  - A question with **multiple** correct answers

    e.g., Say you are given 5 answers for the question: 2 of them are correct (and 3 of them are incorrect). Accordingly, for each correct answer you choose will receive a credit of $\frac{100\%}{2} = 50\%$, whereas for each incorrect answer you choose will receive a penalty of $\frac{-100\%}{3} = -33.3\%$.

    Say you chose one correct answer and one incorrect answer, then you would receive $50\% + (-33.3\%) = 16.7\%$ of the full marks. Also, the minimum mark you can receive is 0 (e.g., when you chose one correct answer and two incorrect answers).

    This mechanism is to ensure that one cannot just receive full/high marks by simply choosing (almost) *all* answers.
- There might be written questions requiring you to, e.g.,:
  - Write texts justifying modelling decisions.
  - Write the valid ASCII characters for mathematical constructs (e.g., `where_is: Employee +-> Location`).

3 Coverage of the Test

– Materials (slides, iPad notes, recordings) related to the following lectures will be covered:

- Review on Math — Pdf [Weeks 1, 2]

  For **mathematical constructs that are covered in the math review lecture**, you will be required to write in their corresponding syntax in ASCII characters (case **sensitive**).

  Here are some examples for you to start with:

  1. Declare a variable of some type.
     e.g., $a \in \mathbb{Z} \pfun \mathbb{N}$ should be written as:
     `a : INT +-> NAT`
     e.g., $a \in \mathbb{N}1 \rightarrowtail \mathit{String}$ should be written as:
     `a : NAT1 >+> String`
  2. Write logical quantifications.
     e.g., $\forall x \bullet (x \in \mathbb{Z} \land 1 \leq x \leq 10) \Rightarrow \neg(x \geq 10)$ should be written as:
     `!x. (x : INT & 1 <= x & x <= 10) => not(x >= 10)`
     e.g., $\exists x \bullet (x \in \mathbb{Z} \land 1 \leq x \leq 10) \land (x \geq 10 \lor x < 0)$ should be written as:
     `#x. (x : INT & 1 <= x & x <= 10) & (x >= 10 or x < 0)`
     Tip. Like in programming, an interval constraint $1 \leq x \leq 10$ has to be decomposed into a conjunction: $1 \leq x \land x \leq 10$.
  3. Write set comprehensions.
     e.g., $\{x \mid x \in \mathbb{N}1 \land x \leq 10\}$ should be written as:
     {`x | x : NAT1 & x <= 10`}
  4. Write ordered pairs.
     e.g., (a, b) should be written as: `(a, b)`
     Note. In the Rodin tool, `a |-> b` is expected, but for the purpose of written tests and exam, writing `(a, b)` makes it easier as it is consistent with the math form shown in lectures.
  5. Write relational/functional operations.
     e.g., $r \rhd \{a, b, c\} = \{(1, a), (2, b)\}$ should be written as:
     `r |> {a, b, c} = {(1, a), (2, b)}`
     e.g., $\mathbb{P}(S) \times \mathbb{P}(T)$ should be written as:
     `POW(S) ** POW(T)`

  Requirement. Make sure that you are familiar with writing the valid ASCII characters for math constructs. Each of such questions in the test, unless otherwise specified, will be **auto-graded**, meaning that mispelling will result in a zero for that question (e.g., spelling **&&** rather than **&** for conjunction).

  For the test, you do **not** need to worry about math constructs that were **not** reviewed in the above-mentioned lecture.

  Tip. You may prepare for yourself a crib sheet summarizing the one-to-one correspondance between those reviewed math concepts (propositions, predicates, relations, sets) and the ASCII characters (see Exercise 5 in your Lab1 instructions PDF).

– Lab1

- Background and exercises in the instructions — Pdf
- Tutorial on Writing Formal Specifications in Rodin — Link

– You may also want to review the relevant Q&A session materials, where we discussed clarifications and extra examples.

4 Example Questions

– Example questions will be made available on the Section Z eClass site (under the `Written Tests` section) ***by early Wednesday, January 26***.

  You can attempt these questions for as many times as you wish, but the submission will be **closed** shortly before the actual test starts.

– Please understand that these questions are:

  - meant for familiarizing yourself with the **format** and **workflow** of the test;
  - **not** meant to cover **all** topics required by the actual test (you are expected to study **all** materials as listed in Section 3); and
  - on the easier side (in the actual test, there will be harder questions testing your understanding of the materials).