EECS3342 (Section Z) Winter 2023
Guide to Written Test 1
When: 11:35 – 12:15, Thursday, February 16
Where: William Small Centre (WSC) 106/108

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Last Updated: February 8, 2023

- You **must** take the written test **in-person**: any remote attempt will be marked zero automatically.
- All questions will be answered on the Section Z eClass site.
- You will be **solely** responsible for any **loss of time or marks** due to any of the following failing:
  - You have a working EECS account to login into a WSC lab machine.
  - You have a working PPY account to login into the eClass site (subject to Duo Mobile verification).

  You are expected to have verified that you are able to complete the EECS and PPY logins prior to the test. Just find a time gap in WSC and visit there to try your logins.
- This written test is **strictly** individual: identified collaborations will be reported to Lassonde for **a breach of academic honesty**.
- You are given **40 minutes** to complete the submission. The time limit is **strict**.
- This written test accounts for 10% of your course grade.
- Unlike the assignments (and the later programming tests), there will be **no** starter project for you to download and import.

1 Rules

- Upon your arrival, please wait **outside** WSC 106/108 (D4/15 on the Keele Campus Map).
  - The test will take place only in these two rooms.
  - Once the rooms are set up for the test, you will be allowed for entry ($\approx$ 11:30).
- You may **only** bring to your seat:
  - **A valid photo ID** (e.g., YU card, driver license, health card, passport)
    Without a valid photo ID upon checks, you will be denied to continue with the test.
  - Stationary (e.g., pen, pencil, eraser)
  - Sketch paper (blank on both sides).
    You will be asked to return the sketch paper at the end of the test.
  - Water bottle
  - Mobile device (for Duo Mobile verification only)
    During the test, always put the device face-down.
- All other personal belongings should be placed in front of the lab room.

- As soon as you are seated, login into a machine (using your EECS account), and then use a web browser (e.g., Firefox) to login into the Section Z eClass site (using your PPY account).
  - First complete the quiz on ***academic integrity*** ($\approx$ 1 minute).
  - The written test will be ***opened*** for submission at **11:35 AM**.
  - This is a **closed-book** test: use of any internet resources or notes is forbidden.
  - You are **forbidden** to use the Rodin IDE during the test.
  - The written test will be ***closed*** for submission at **12:15 PM**.
- In principle, there will be **no** questions allowed during the test.
  - TAs will **not** answer questions.
  - If really necessary, Jackie will respond to your question, but you may just be advised to read the question(s) again more carefully.

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

  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**). Refer to the document (assigned as reading by Lab1) summarizing the math language of Event-B **here**.

  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

– This written test will **not** cover:

- Lecture materials related to the bridge controller (starting on Monday, February 6)
- Lab2

4 Example Questions

– Example questions will be made available on the Section Z eClass site (under the `Written Tests` section) ***by the end of Friday, February 10***.

  You can attempt these questions for as many times as you wish, but the submission will be **closed** a couple of hours 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).