

## Project

Total marks: 100.

*Out:* March 20

*Due:* April 4 by 23:59

Note: Your report for this assignment should be the result of your own work. Take care to avoid plagiarism (“copying”). You may discuss the problems with other students, but do not take written notes during these discussions, and do not share your written solutions.

In this project, you must develop an Event-B model for the *electronic hotel key system* described in Section 18.2.1 of the Modeling in Event-B textbook. For this project, you can work on your own or work with one partner (a team thus has a maximum of two members).

Start by developing a *users requirements document* following the guidelines advocated by Abrial in the chapter on the bridge controller problem. Then develop a commented and proven correct Event-B model in Rodin for the problem. Follow the instructions in Section 18.2.1 of the textbook regarding the refinement strategy and the properties to be proven.

You must submit your Rodin development (all proof obligations discharged) as well as a written report with a requirements document (including atomic FUN/ENV/EQP/SAF-descriptions):

1. Write out the atomic FUN/ENV/EQP/SAF requirements descriptions (e.g. as we have seen for the Bridge, Mechanical Press, and FTP examples).
2. The Event-B model with all the refinement steps is the mathematical model.
3. Describe where the atomic FUN/ENV/EQP/SAF descriptions are specified in the Event-B mathematical model (e.g. as axioms, theorems, invariants, events etc.).

### Deliverables:

- By March 26 at 17:00, submit a preliminary requirements specification document `prelimReqs.pdf` (approximately 1 page long). Submit it as follows:

```
submit -l 3342 project prelimReqs.pdf
```

This part is worth 10% of the project grade. You will receive prompt feedback on its content.

- By April 4 at 23:59, submit your final project report that includes:
  1. a complete Event-B model for the electronic hotel key system with all proof obligations discharged submitted as a zip file `projectModel.zip`;

2. a written report `projectReport.pdf` that contains (i) the revised requirements document with FUN/ENV/EQP/SAF descriptions, and (ii) a printed version of the Event-B model (use Latex to generate this).

Submit it as follows:

```
submit -l 3342 project projectModel.zip projectReport.pdf
```

## References

D. Jackson. *Software Abstractions: Logic, Language, and Analysis*. MIT Press, 2006. [This is available from York University Libraries as an electronic resource. An electronic hotel key system is discussed in Section 6.2 and Appendix E.]

T. Nipkow. Verifying a Hotel Key Card System. *ICTAC 2006*: 1-14. [Available at [http://link.springer.com/chapter/10.1007%2F11921240\\_1](http://link.springer.com/chapter/10.1007%2F11921240_1); it can be obtained without charge from York University hosts.]