COMP24412
Academic Session: 2018-19

Lab Exercise 2: More Prolog and First-Order Reasoning
Marking Scheme

Please run `submit` or see in COMPjudge for a list of the expected files.

There are 20 marks available for this exercise with 18 marks for the work and 2 for the response. They are marked together because of the connected nature of the modelling exercises.

As in the first exercise, we will follow a scheme where an excellent mark obtains 100% of marks, a good mark obtains 80% of marks, an adequate mark obtains 60% of marks and an attempt obtains 40% of marks.

Recall that marking is *offline* and there will be an opportunity to respond allowing you to gain extra marks or make up marks you missed in your original submission.

- **2A: Part 1**. *(3 marks)*

  - An *excellent* solution has two Prolog programs that correctly compute the solution making use of the `clpfd` library. The solution should be well-designed and not targeted at this single problem. There is a good understanding of the complexity of the search process (may be checked during response).

  - A *good* solution with correct answers and reasonable understanding.

  - An *adequate* solution may solve the problem without using the given library or may have some small errors but with the correct general approach.

- **2A: Part 2**. *(4 marks)*

  - An *excellent* solution provides answers for all points along with reasonable justification, which may be defended or revised in the response period. The answer should show a good appreciation of the limits of Prolog and first-order logic. There should be the ability to reflect on the different ways the same idea can be modelled.

  - A *good* solution will provide correct (adequately justified) answers for most points and demonstrate good understanding of how to model different aspects.

  - An *adequate* solution will provide correct (adequately justified) answers for the majority (more than half) of points

- **2B: Parts 1 and 2**. *(4 marks)*

- An *excellent* solution provides all of the requested answers and critically reflects on these in terms of how Vampire works. There may be evidence of further questions and exploration prompted by the lab manual. Answers relate back to the material taught in lectures.

- A *good* solution provides sensible answers to the requested answers using the correct terminology from the lectures.

- An *adequate* solution provides the required answers but will be brief.

- **2A: Part 3**. *(4 marks)*

  - An *excellent* solution will have tackled a challenging domain and gone beyond the kinds of relationships we have already seen in the course. The given requirements will be met or deviation from them will be adequately justified. The investigation into the relation with query languages for relational databases demonstrates deep understanding. It may be that parts of the original Prolog model cannot map across to first-order logic, in which case this will be explained clearly.

  - A *good* solution provides a reasonably complex model in Prolog and first-order logic and the investigation for Step 2 is beyond simply stating some definitions.

  - An *adequate* solution makes an attempt at some non-trivial modelling (as per the requirements) and states some simple definitions relating Prolog to relational query languages.

- **2B: Part 3**. *(3 marks)*

  - An *excellent* solution will have made a good attempt to translate the first-order logic formulation into TPTP. There may be some small mistakes that can be fixed during the response. Non-trivial queries are given. Vampire may be able to answer these are not. There is understanding as to why Vampire might not be able to answer some queries. There is the ability to reflect on how Vampire does solve the queries it can solve, demonstrating understanding of how Vampire works (may be checked during response).

  - A *good* solution will have made a solid attempt to translate to TPTP but there may be some larger issues that cannot be immediately fixed. Non-trivial queries are used and can be justified/explained. They will be able to reflect on how/why things don't work during response.

  - An *adequate* solution will have made a reasonable attempt to translate to TPTP and pose some queries.