PGT Exam Performance Feedback
2015/2016 Semester 2

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Comments   Most students chose the answer questions 1 and 2 and either question 3 or question 4. Answers were often less detailed and thorough for the thrid question students answered, which could be an indication that too much time was spend answering the first two questions.

Overall, the marks profile (see below) indicates very good performancein the exam, with few students failing.

Marks profile

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90-100
80- 89 *
70- 79 ******
60- 69 ***********
50- 59 ****
40- 49 *
30- 39 **
20- 29
10- 19
 0-  9
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Average exam mark: 61.7%

Question 1

1.a Several students struggled with the definition of well-foundness and properties preserved by the lexicographic combination of orderings.

2.b Most students answered this correctly. Some students introduced definitions for literals which are not needed.

2.c Some students struggled to answer this question and wrote definitions of validity and equivalence instead of explaining how these properties can be expressed in terms of unsatisfiability.

3.d Mostly answered correctly.

Question 2

2.a Some students struggled to express properties in propositional logic correctly and some tried to use overly complicated formulas.

2.b Many students answered this question well. Some applied backjumping incorrectly and some did not explain lemma learning.

2.c Many answered correctly but some had problems with the semantics of LTL.

Question 3

a) No perfect answers. Typical mistakes: not following the quantifiersby the correct connective. In most cases it is natural to use the existential quantifier with conjunction and the universal quantifier with implication. Just one student noticed that for I the order of the arguments of F needed to be reversed.

b) i. Quality of answers were generally good. Common mistake to only give three steps for the transformation of clausal form. Often either the CNF transformation step or the clausify step was forgotten.
   Ii. Most could give a reason but did not say why.

c) Quality of answers varied quite a lot. Marks were lost for not first negating the problem, mistakes in the transformation to clauses and not using the resolution method or making mistakes in applying resolution.

d) This posed surprisingly many problems. Despite the unification rules being fncluded in the definition sheet, few applied the rules correctly. (This may be because students were running out of time?)The question asked to give both the most general unifier computed and the unified atom. The latter was often overlooked. Some gave the substituted variables instead of the unified atom.

e) Most mistakes occurred in answers to iii. And iv, the non-ground clauses. To show that a non-ground clause is false in an interpretation it is enough to show the clause is false in the interpretation for one instantiation of the variables x and y (i.e. One binding/piars of values for x and y). To show a non-ground is true in an interpretation one

needs to show the clause is true for all possible instantiations of the variables using the terms in the Herbrand universe. In this case there were 4 possibilities.

Question 4

a) Generally answered very well.

   i. Perfect answers.

   Ii. Common mistakes: Not extending the interpretation in the first step. Overlooking that a clause may be true in the current interpretation if it contians a negated atom and the atom does not belong to the interpretation. Some did not seem to know the model construction method.

   Iii. Mostly correct.

b) i. Nearly everyone had correct answers.

   Ii. With a few exceptions, answers were disappointing. Few realsied that factoring needed to be applied twice. Since few had a correct derivation, B was badly asnwered, perhaps again an indication that time ran out.

c) Most could state an advantage of ordered resolution but since (b)ii.Was answered badly, the examples were mostly unconvincing or absent.