

Midterm Exam

ARTIFICIAL INTELLIGENCE

Class: KSTN 2004

Questions: 3 – Total mark: 10 – Time: 60 minutes

Open book

Question 1 (4 marks):

Consider the map consisting of four regions in Figure 1. Each region can be painted using either Red, Green, or Blue color. The task is to paint the regions so that no pair of adjacent regions have the same color.

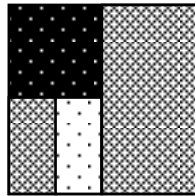


Figure 1

Apply Steepest-Ascent Hill Climbing to search for a solution, starting with all the four regions painted in Red. In each step, only one region can be re-painted. You can use any heuristic (evaluation) function that you see appropriate.

Question 2 (5 marks):

Consider the following statements:

- If pushable objects are blue, then nonpushable ones are green.
- All objects are either blue or green but not both.
- If there is a nonpushable object, the all pushable ones are blue.
- Object *O1* is pushable.
- Object *O2* is not pushable

- Convert these statements to formulas in first-order predicate logic.
- Convert the preceding formulas to clause form.
- Use resolution refutation to prove that there is a green object.

Question 3 (1 mark):

Represent the conceptual graph in Figure 2 by a formula in first-order predicate logic. Express the meaning of this conceptual graph in English.

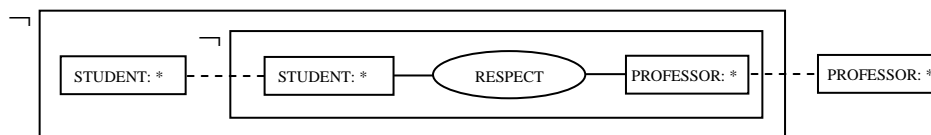


Figure 2

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