

2011 Paper 7 Question 2

Artificial Intelligence II

Consider the following propositional planning problem.

Start state: $\neg A, \neg B, \neg C, D$.

Goal: $A, B, C, \neg D$.

Actions:

- Action 1 has preconditions A, B, C and effect $\neg D$.
 - Action 2 has preconditions $\neg A, \neg B$ and effects A and B .
 - Action 3 has preconditions $\neg B, \neg C$ and effects B and C .
 - Action 4 has precondition B and effect $\neg B$.
- (a) Using an entire sheet of paper, draw the planning graph as far as state level S_3 , where the start state is at state level S_0 and the first action level is A_0 . Do not add any mutex links at this point. [5 marks]
- (b) Describe each of the five kinds of *mutex link* that can be incorporated in a planning graph. Add one example of each to the graph you produced in part (a). Clearly label the links to make clear which type they are. [10 marks]
- (c) At which level in the planning graph will all goals first be present simultaneously? Will the GraphPlan algorithm be able to extract a working plan without extending it beyond this level? Explain your answer, adding further mutex links to your diagram if necessary. [5 marks]