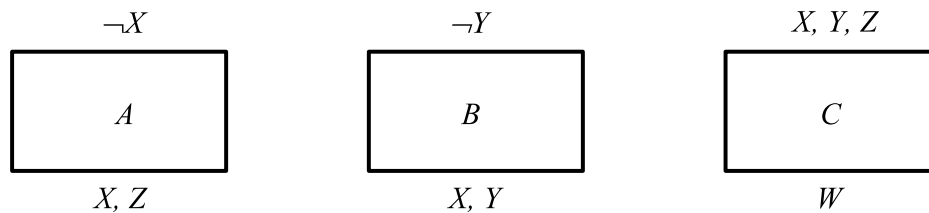


2008 Paper 7 Question 6

Artificial Intelligence II

We have a simple, propositionalised planning problem and we suspect that we might be able to solve it using the *GraphPlan* algorithm. The problem is as follows.

Action *A* has preconditions $\{\neg X\}$ and effects $\{X, Z\}$, action *B* has preconditions $\{\neg Y\}$ and effects $\{X, Y\}$, and action *C* has preconditions $\{X, Y, Z\}$ and effects $\{W\}$. The start state for the problem is $\{\neg W, \neg X, \neg Y, \neg Z\}$ and the goal is $\{W\}$.



- Labelling the start state as level S_0 and the first action level as A_0 , draw the planning graph for this problem up to and including level S_2 . Use an entire sheet of paper for this diagram. [5 marks]
- Describe each of the five kinds of *mutex link* that can appear in a planning graph, and add an example of each to the diagram drawn in part (a), clearly labelling it to show which kind of mutex link it is. [10 marks]
- What is the *level cost* of a literal in a planning graph? Explain why this measure of cost might perform poorly as a measure of how hard the literal is to achieve. [2 marks]
- Will GraphPlan be able to extract a working plan from the diagram you have drawn in parts (a) and (b)? Explain your answer. You may if you wish add further mutex links to your diagram at this stage. [3 marks]