6. (a) Define the terms causal link and clobbering in the context of partial order plans. [4]

(b) Show how a partial-order regression planner works by deriving a plan for the Blocks World problem described below. The available operators are as follows.

$Action(PutOnTable(b),$
$Precond : On(b, x) \wedge Clear(b),$
$Effect : On(b, Table) \wedge Clear(x) \wedge \neg On(b, x))$

$Action(PutOn(b, x),$
$Precond : On(b, z) \wedge Clear(b) \wedge Clear(x),$
$Effect : \neg On(b, z) \wedge \neg Clear(x) \wedge Clear(z) \wedge On(b, x))$

The initial state for the problem is
$On(C, A) \wedge On(A, Table) \wedge On(B, Table) \wedge Clear(B) \wedge Clear(C)$
and the goal state that your plan must achieve is
$On(A, B) \wedge On(B, C) \wedge On(C, Table) \wedge Clear(A).$ [5]

(c) Describe what is meant by conditional planning, and why it is useful. [4]

(d) Suppose you have been asked to design a system for the control of a heating system.

i. Describe how you would use a genetic algorithm to identify the best set of parameters for the system, including in your answer an explanation of crossover and mutation. [6]

ii. Describe how you could use hill-climbing instead of a genetic algorithm, and explain how you would try to prevent your algorithm getting stuck in a local optima. [4]

iii. Would there be any advantage to using A* to find the best set of parameters? Explain your reasoning. [2]