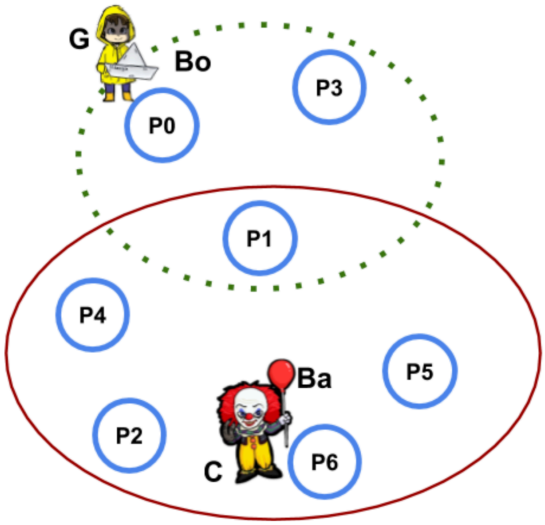
Exercise 1 (8 points)

Group A. A clown C and Georgie G are tired of playing with their toys and they want to exchange them. G wants to play with the balloon Ba while, C wants to play with the boat Bo. Unfortunately, they are both very shy and they never want to be at the same place Pi. Hence, they have to find a common place (for example $P1$) where to drop and collect objects (they can drop an object in a place and move into another place). G and C cannot hold two objects at the same time. The environment is depicted in the figure, G can only move in places within the dotted line; while C can only move within the continuous line. Places within the same set are all connected (i.e. $\{P0, P1, P3\}$ for the dotted set and $\{P1, P2, P4, P5, P6\}$ for the other). The figure shows the initial state where G holds Bo and he is at $P0$, and C holds Ba and he is at $P6$. The goal state is represented by G at $P3$ holding Ba and C at $P5$ holding Bo.



(a) Define the problem and the domain file in PDDL

(b) Show one possible sequence of actions to a goal state including all the states in the sequence

(c) Draw the first 3 steps of the tree generated by forward search assuming a perfect heuristic (a heuristic choosing the move in the plan given above). Show all the actions applicable at each of the traversed states, and the state reached.