

CIS 716 Homework 3

1. Design a controller for the robot in the second project using the subsumption architecture approach.

You should (i) draw out a diagram showing the interaction between modules (where modules are things like “look for ball”, “move to ball”, “calculate correct direction to my goal” and “calculate correct direction to opponents goal”, and so on.) and (ii) write out a description of this program in NQC that shows how the interaction between these modules will be handled.

(50 points)

2. The monkey-and-bananas problem is faced by a monkey in a laboratory with some bananas hanging out of reach from the ceiling. A box is available that will enable the monkey to reach the bananas if he climbs on it. Initially the monkey is at *A*, the bananas are at *B*, and the box is at *C*. The monkey and box have height *Low*, but if the monkey climbs onto the box he will have height *High*, the same as the bananas.

The actions available to the monkey include *Go* from one place to another, *Push* an object from one place to another, *ClimbUp* onto or *ClimbDown* from an object, and *Grasp* or *UnGrasp* an object. If the monkey is in the same place as an object, and at the same height, *Grasp* results in the monkey holding the object.

- (a) Write down the initial state description.
- (b) Write down STRIPS-style descriptions of the six actions.
- (c) Write down a goal in which the monkey is at *C*, holding the banana, and the box is at *A*.
- (d) Use the POP algorithm (explaining how it works) to find a plan that achieves the above goal.

(50 points)