**Design these Mr. Marques Bugs!**

Design the following bugs using the GridWorld appendixes. Do them ON PAPER first! Then type them up and see if they work. Use the “Quick Reference” for help.

**Design at least these 3:**

(1) NSEWbug:

A NSEWbug chooses only locations that are North, South, East, or West of it to move to. It then selects one of these locations and moves there. When it does, it faces the direction in which it moved. If it can’t move then it turns 90 degrees in a random direction.

(2) FlowerBug:

A FlowerBug is a bug that collects all the Rocks around it and turns them into Flowers of the same color. It then moves like a regular bug.

(3) BattleBug:

A BattleBug gathers all its surrounding adjacent Actors and if any are a bug of a different color then it chooses one and only one to do battle with. A battle is done via a random number (1-10) such that the battle is won if a bug’s number is 6 or higher. If he wins then he replaces the location of the losing bug, in essence squashing it. If lose, then the other bug replaces/squashes him.

**Extra for Experts:**

(4) WarpBug:

A WarpBug surveys all the Actors around it and if there is a Critter it then ‘warps’ itself by picking a random row & col on the board to move to. It checks this location by surveying all the Actors around it and if there is a Critter it then ‘warps’ again. It will do this repeatedly until it either finds a ‘safe’ spot, no Critters around the location, or has warped 5 times. Thus, on the 6th attempt it simply gives up and removes itself from the grid. If there are no Critters around it in the beginning then it moves like a regular Bug.

(5) PushAwayBug:

A PushAwayBug moves by forcing every other Actor on the Grid space away from it, if possible, either horizontally, vertically, or diagonally. Then it moves like a regular Bug.