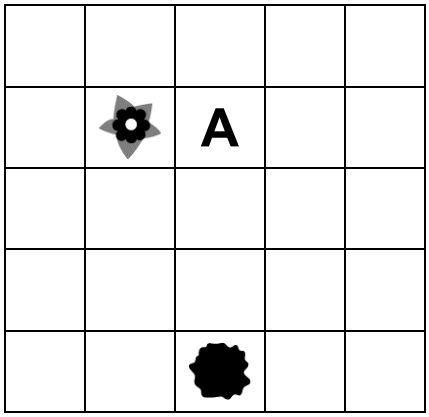
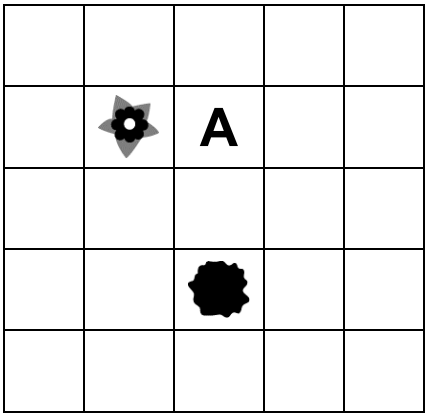
2. This question involves reasoning about the GridWorld case study. Reference materials are provided in the Appendix.

   An attractive critter is a critter that processes other actors by attempting to relocate all of the other actors in the grid, including other attractive critters. The attractive critter attempts to move each other actor one grid cell closer to itself in the direction specified by `getDirectionToward`. An actor is relocated only if the location into which it would be relocated is empty. If an actor cannot be moved, it is left in its original position. After trying to move all other actors, the attractive critter moves like a critter.

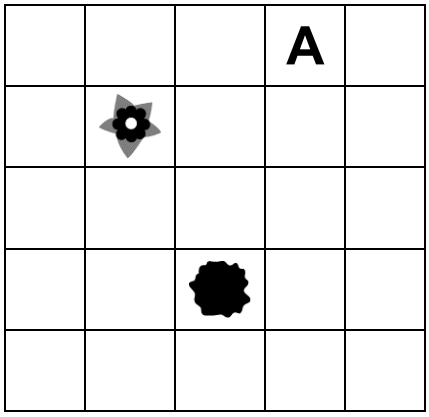
   The following series of figures represents an example of how the attractive critter affects the other actors in the grid.



An attractive critter (indicated by the letter A) is in location (1, 2), a flower is in location (1, 1), and a rock is in location (4, 2).



When the attractive critter acts, the rock will be relocated to location (3, 2) because that location is one grid cell closer to the attractive critter and is empty. The flower will not be relocated because the grid cell that is one location closer to the attractive critter is already occupied.



After attempting to relocate all the other actors in the grid, the attractive critter then moves like a critter. In this example, the attractive critter moves to location (0, 3).

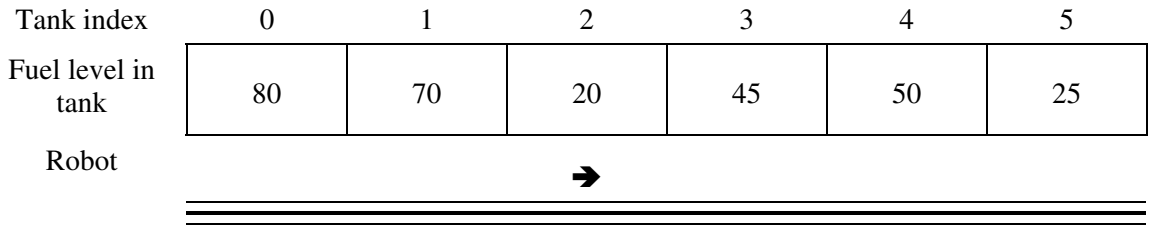
The order in which the actors in the grid are processed is not specified, making it possible to get different results from the same grid of actors.

Write the complete `AttractiveCritter` class, including all instance variables and required methods. Do NOT override the `act` method. Remember that your design must not violate the postconditions of the methods of the `Critter` class and that updating an object's instance variable changes the state of that object.

3. A fuel depot has a number of fuel tanks arranged in a line and a robot that moves a filling mechanism back and forth along the line so that the tanks can be filled. A fuel tank is specified by the `FuelTank` interface below.

```
public interface FuelTank
{
  /** @return an integer value that ranges from 0 (empty) to 100 (full) */
  int getFuelLevel();
}
```

A fuel depot keeps track of the fuel tanks and the robot. The following figure represents the tanks and the robot in a fuel depot. The robot, indicated by the arrow, is currently at index 2 and is facing to the right.



The state of the robot includes the index of its location and the direction in which it is facing (to the right or to the left). This information is specified in the `FuelRobot` interface as shown in the following declaration.

```
public interface FuelRobot
{
  /** @return the index of the current location of the robot */
  int getCurrentIndex();


  /** Determine whether the robot is currently facing to the right
   *  @return true  if the robot is facing to the right (toward tanks with larger indexes)
   *          false if the robot is facing to the left (toward tanks with smaller indexes)
   */
  boolean isFacingRight();


  /** Changes the current direction of the robot */
  void changeDirection();


  /** Moves the robot in its current direction by the number of locations specified.
   *  @param numLocs the number of locations to move. A value of 1 moves
   *                 the robot to the next location in the current direction.
   *          Precondition: numLocs > 0
   */
  void moveForward(int numLocs);
}
```