Design

Program being designed: Predator – Prey ecosystem model

Files Needed: Critter, Ant, Doodlebug, and Main

Critter Class:

- Parent class of Ant and Doodlebug
- Move()
- Breed()
- Die()
- Eat()

Ant Class:

- Child of Critter
- Move()
    - Can't move on top of anything
- Breed()
    - Set to a counter of 3 and breed every 3rd move
    - Leaves an ant behind after the next move
- Die()
    - Dies after 10 moves
- Eat()
    - Does nothing for ant

Doodlebug Class:

- Child of Critter
- Move()
    - Can't move onto other doodlebug
    - Can move on top of ant
- Breed()
    - Set to a counter of 8 and breed every 8th move
    - Leaves a doodlebug behind
- Die()
    - Dies after three moves if it hasn't eaten
- Eat()
    - Reset the death counter when it moves onto an ant

Main Class:

- Creates a 2d [20][20] array
    - Needs to NULL it
    - Then add Ants and Doodlebugs
- Calls the various functions
- Prints the array after each loop

Testing:

I tested throughout the creation of the program to make sure each function worked properly before moving on.

First I tested that the array could be seen out and was showing the proper number of each critter.

This was achieved by changing the value of the starting amount so that it was clear the proper amount was out

Then I tested that the movement was working properly

- I did this by starting with one ant to make sure it was moving randomly
- Then I tested by adding 150 to see how they would interact when hitting each other.
- I then added doodlebugs
  - I tested the movement of doodlebugs onto ants.

I then tested the death

- I simply ran through the program to make sure that the critters died properly

I tested breeding by making 10 ants and making sure they properly bred

I then tested doodlebugs by adding 5 doodlebugs and made sure they would breed at the proper turn.

Reflection:

This program took a lot of planning before the code writing could begin. It was very difficult to make sure that everything was as object oriented as possible. I had to determine how to communicate with the array without making a friend class or public variables. It took me a lot of planning to get through this assignment, but by the time I finished it I had learned a lot.