CIS 15 Spring 2010, Assignment VI

Instructions

- This is the assignment for Unit VI.

- It is worth 10 points.

- **It is due on Sunday May 23rd** and must be submitted by email (as below).

- **Follow these emailing instructions:**

  1. Create a mail message addressed to **parsons@sci.brooklyn.cuny.edu** with the subject line **cis15 hw6**.

  2. Write your name, that is the name under which you registered for the course, in the email. When I get an email from deathmetal@aol.com or pinkprincess@yahoo.com, I can usually guess whose program it is, but that is not as good as *knowing* whose program it is.

  3. Attach ONLY the files I tell you to send me (see below).

  4. Failure to follow these instructions will result in points being taken away from your grade. The number of points will be in proportion to the extent to which you did not follow instructions . . . (which can make it a lot harder for me to grade your work)

Program description

- For this assignment you will write a small simulation.

- This document specifies the homework in even less detail than the last one. I describe what I want you to do without really saying how I want you to do it — you will have to figure out the *how* for yourselves. When I mark the homework, you will get more credit the closer your code is to the programming style that I have used in the sample code I have given you, the same style that earlier homeworks have spelled out in detail.

- Since some of the points will be gained by adding specific things into your code, read through these instructions fully before starting to write your code.

What the program does

You will write a program that simulates a small ecosystem.

1. Your code should contain (at least) three kinds of object — `plants` and two kinds of bug, `aphids` and `ladybugs`.

2. `plants` have a position, and they stay at that position.

3. All bugs have a position, and a level of energy.

4. `aphids` move around, and when they are in the same place as a plant, they eat, gaining energy.

5. When their energy gets above a certain level, a new `aphid` is born and the energy level of the parent drops.

6. `ladybugs` also move around, and when they are in the same place as an `aphid`, they eat the `aphid`. The `ladybug` gains energy, and the `aphid` dies and is deleted from the simulation.

Things to make and do

1. You should draw a UML diagram that describes all the classes in your program and the relationship between them.

2. At the end of your program it should print out the contents of a "high score" list that reports the bugs with the highest energy values.

3. Your code should include an example of operator overloading.

4. Your code should include an example of inheritance between classes, and composition, where one class contains a member that is an object of another class.

5. Your code should use a class from the Standard Template Library.

6. For extra credit produce a nice graphical display in the terminal window that shows where all the various plants and bugs are.

Submission

If you wrote your program as separate `.cpp` and `.h` files, use ZIP to create a single file **hw6.zip** and send this to me along with a Word document that includes the UML diagram.

If you wrote your program as a single file send that to me along with a Word document that includes the UML diagram.

Marking rubric

This assignment is worth 10 points. The breakdown is as follows:

- Program that works as described in "what the program does" and includes all the classes described there.
  (4 points)

- A UML diagram that describes all the classes in your program.
  (2 points)

- A "high score" list that displays the three bugs with the highest energy level at the end of the simulation.
  (1 point)

- An example of operator overloading (you will need to put a comment to point our where this is in your program).
  (1 point)

- An example of inheritance
  (0.5 points)

- An example of composition
  (0.5 points)

- The use of a class from the Standard Template Library.
  (1 point)

- Graphical display
  (1 extra credit point)