

You will submit your solution to this assignment to the Curator System (as HW3). Your solution must be either a plain text file (e.g., NotePad) or a MS Word document; submissions in other formats will not be graded.

Carefully analyze the specification for the GIS system project and produce a preliminary, high-level design. To be more specific:

- Apply some of the techniques discussed in class (Abbott & Booch, Coad & Yourdon, etc.) to identify a collection of potential objects/classes that could play a role in the system.
- Winnow that collection to exclude those candidates that you decide do not play a useful role in the system or that are too low-level to be included in a high-level design (e.g., purely internal types such as tree nodes).
- For each remaining class, prepare a formal description (see below) of the class.
- Identify the relationships that will exist between the objects/classes in the system.
- If a relationship involves communication, indicate the nature of the communication (direction, objects that are exchanged).

A formal class description will include a descriptive name for the class, a one-sentence description of the purpose of the class within the system, brief descriptions of the attributes objects of the class will have, and brief descriptions of the responsibilities objects of the class will have. A class description should not look like language code! Here's an example of a description of a class that might play a role in a very different system:

```

Class
    VenusFlytrap
Purpose
    to represent a plant that is capable of responding aggressively to an
    attacking insect
Attributes
    unique identifier of the object
    current energy level
    location of the object within the ecosystem
Responsibilities
    report object identifier
    report current energy level
    update current energy level in response to a tick of the system clock
    respond to an attack
  
```

Common class relationships include:

- | | |
|--------------------|--|
| <i>association</i> | (knows-a relationship) an object knows about another object (by holding a pointer or reference to it) and exploits that to make use of the other object, but the two objects are logically independent |
| <i>aggregation</i> | (has-a relationship) an object possesses another object as an integrated component (typically a data member, but not always) and makes use of that other object; the objects have no independent existence in the sense that the "outer" object never exists without the "internal" object and the "internal" object is not directly accessible outside the "outer" object |
| <i>inheritance</i> | (is-a relationship) a objects of one class (the sub-type) possess all the attributes and responsibilities of another class (the super-type), possibly with modifications to the meanings of some responsibilities, and objects of the sub-type may have additional attributes and/or responsibilities |

I don't think it's likely you'll find any high-level inheritance relationships in this assignment, but there should be examples of both the other relationships.

For each relationship you identify, state which classes are involved and the direction of the relationship. If the relationship is exploited for communication, describe the nature of the communication (what information is exchanged and what purpose that plays within the overall system).

For example, in the system involving the VenusFlytrap class, we might find the following relationship:

Classes involved:

VenusFlytrap and Bug

Direction of relationship:

bi-directional

Purpose of relationship:

to enable modeling the interaction that occurs when a Bug attacks a VenusFlytrap

Communication:

The Bug will invoke a VenusFlytrap method to initiate the attack, passing the a reference to the Bug and the amount of energy demanded to the VenusFlytrap.

The VenusFlytrap will respond by using the Bug's reference to claim all the Bug's energy, destroying the Bug.