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### **Terrain Properties:**

Terrain is made up of rectangles and heights. I'm not planning on doing any sort of checking on if it's a valid terrain.

```
<terrain name = "TEXT" x = # y = # terrain_type = #type>  
  <contour x = # y = # z = # height = # terrain_type = [See Below] fertility = #>  
  <contour x = # y = # z = # height = # terrain_type = [See Below] fertility = #>  
  ...  
</terrain>
```

Terrain is made up of contours, which are rectangular three-dimensional objects that have a length, width, height and position. This is a simplified version of the world description methods used in our robo-world simulator from software engineering.

The terrain type is going to be specified by several pre-defined terrain types. The goal here is to see if certain types of animals congregate in one type of terrain or another. Each terrain type will have a different type of vegetation and plant growth rates.

### **Terrain Types:**

<u>Name</u>	<u>Vegetation Nutrients</u>	<u>Vegetation Density</u>	<u>Growth Rate</u>
Desert	5	0.10	0.10
Swamp	10	0.25	0.20
Mountains	15	0.50	0.30
Plains	20	0.75	0.50
Forest	25	1.00	0.70

A brief explanation, nutrients are the “calories” provided by a given square of food. Density is a ratio of food per point on the map. Growth rate is the chance that a square will regenerate food in a “day.” These terrain types provide a foundation for our “contours.”

The “fertility” adjustment for a contour gives the creator of a given area of land to adjust the above values. The value that we receive here will be a percentage that is then used to multiply the normal values.

## Species Properties:

A species is made up of some basic values that then create the “standard” for each species. Each individual creature will then deviate from these within tolerances.

<species	
name = “TEXT”	Name of Species
class = [See Below]	[See Below]
home = [Terrain Type]	Home base terrain type
height = #	I’m using the standard of height, width and depth would be in centimeters. This will dictate how much damage can be taken.
width = #	
depth = #	
weight = #	Weight is calories provided if eaten, this also represents how much food is “stored.”
daily_food_usage = #	This is the animal’s caloric daily needs
attack = #	Attack damage rating
defend = #	Defense abilities
defend_attack = #	Damage done to attackers
walk_speed = #	Speed when walking
walk_calorie_usage = #	Calories used while walking
run_speed = #	Speed when walking
run_calorie_usage = #	Calories used while running
agility = #	Agility is ability to turn and accelerate
camouflage = #	Percentage chance for hiding (at home)
></species>	

Obviously animals have far more numerous characteristics, but I believe that this will provide me with the basic set of properties to provide interaction between the different animals. The “CLASS” of an animal is one of three things, “herbivore”, “carnivore”, and “omnivore”.

## Instance Properties:

This is where things will get interesting. I think it would be beneficial to note now that even after an animal's "death" it will still remain in the database, so that we can see the progression of lineage.

An animal instance will be able to have offsets for all of the normal values associated with it. However it will also have the following additional traits.

<code>&lt;creature_instance</code>	
<code>creation_date = #</code>	This is the "currentTimeMillis()" when the creature was created, the number is fairly close to unique, so will be used to identify a creature.
<code>parent1 = #</code>	Unique Parent ID
<code>parent2 = #</code>	Unique Parent ID
<code>death_date = #</code>	Unique Death Time
<code>sex = [SEX]</code>	The "SEX" of a creature, this value can be, "male", "female", and "asexual". Asexual creatures can reproduce with either Male, Female or Asexual.
<code>...offsets...</code>	
<code>&gt;&lt;/creature_instance&gt;</code>	

It is my hope that my research finds a home not only in Computer Science, but in areas outside, sociology, environmental studies, biology, etc. I think it's a unique opportunity to study not only the evolution of "algorithms", the opportunity for interdisciplinary investigation is very good.