Assignment 3 – Inheritance and Files

You will create a simple fantasy combat game. Your 'universe' contains Goblins, Barbarians, Reptile People, and Blue Men. Each will have characteristics for attack, defense, armor, and strength points.

Type	Attack	Defense	Armor	Strength Points
Goblin[4]	2d6	1d6	3	8
Barbarian[1]	2d6	2d6	0	12
Reptile People[2]	3d6	1d6	7	18
Blue Men[3]	2d10	3d6	3	12

2d6 is rolling two 6-sided dice. 2d10 is rolling two 10-sided dice.

To resolve an attack you will need to generate 2 dice rolls. The attacker rolls the appropriate number and type of dice under Attack. The defender rolls the appropriate number and type of dice under Defense. You subtract the Defense roll from the Attack roll. That is the damage. Then to apply the damage you subtract the Armor value. The result is then subtracted form the Strength Points. That value becomes the new Strength Points for the next round. If Strength Points goes to 0 then the character is out of the combat.

You need to create a creature, or character class. Call it what you choose. Then you will have a subclass for each of these characters. Note that the parent class will be an abstract class. You will never instantiate one. For our purposes right now each subclass will vary only in the values in the table. Since each starts with the same values you will only need one constructor. It's part of your design task to determine what functions you will need. The only value that can change is the Strength Points.

You will need to design the necessary functions. Note that you will only need one mtuator (set) function.

For now we are not differentiating the characters in any other way. But this is the first stage in what would be a larger project. For example there may be special abilities. Reptile People might be able to regenerate some damage. Of if a Blue Man grabs your ears you're done for. He'll head butt you into senselessness. And how to you attack something that's hugging your face without cutting your nose off? So you just need to do simple inheritance.

You must complete your design document. In that document and in your reflections you can discuss how the original design may have changed as you worked through the problem. You must also submit a test plan. The test plan should cover all logic paths. So you should have each character type have combat with all character types (including another of it's own). Remember to submit these documents as PDF files.

IMPORTANT: Your design document is due one week before the project is due. You need to be thinking about this in advance. While we are doing simple inheritance it is still a new concept for most of you. There are also many details to address in who you save data in the class, and how the functions will work or be called. Most of this is just defining classes, which you first learned in 161.

So it's not hard, just a lot to think about. **If you do not submit the design document on time you will get a 0 for this assignment.** The TAs will be asked to grade your project against your design so please don't just throw together some random stuff so you have a file to submit. No, you are not required to implement only the design you submit. BUT, your reflections will need to explain the difference. So the old adage garbage in, garbage out will not apply here. If you give us a random design you will need to explain each step in how you got to the code submitted. In other words, that will make it much more difficult. So, learn a good habit and think about it before you start coding. ☺

NOTE- If you're not crazy about the idea of violent fantasy combat just change the context. Many people follow conspiracy theories. One of the most widespread and longest lasting are the Illuminati. These are the secret organizations that run the world. Behind the scenes of course. So use this table instead:

Type	Attack	Defense	Armor	Strength Points
Cthulu	2d6	1d6	3	8
Gnomes of Zurich	2d6	2d6	0	12
Bavarian Illuminati	3d6	1d6	7	18
Mad Scientists	2d10	3d6	3	12

Everything else remains the same. The attacks are now the power ploys each uses to try and weaken the influence of the other. This is an example of how the abstractions are used to determine how we interpret the things we have the computer do. After all, everything any electronic digital computer does is controlling a bunch of on-off switches (the transistors).

HINT; This program has a random element. You will need to address that in your test plan. It will also affect debugging. Your design should address this (potential) problem. It's not hard but you need to think about it.

1. Big, powerful, with tough skin. But very slow.

2. Think Conan or Hercules from the movies. Big sword, big muscles, bare torso.

3. They are small (6" tall), fast and tough. So they are hard to hit and can take some damage. As for the attack value, you can do a LOT of damage when can crawl inside the armor or clothing of your opponent. ☺
And yes they are the Nac Mac Feegle of Discworld. I just wanted a shorter name for your project.

4. They felt left out without a footnote.

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In the past there was confusion about why the base class (creature of fighter) would be abstract. So I did some brainstorming of my own. Your design should include a variety of options beyond the simple variants in this first step. I've added it here for reference.

OOD Sketch of Fantasy Combat

This document is a cursory outline of a small part of a fantasy to illustrate why both attack and defense might be bet implemented as virtual functions in the parent class. And why that class would be an abstract cass. Consider these creatures:

Night Shifter	Mage Man
Move through the 4th dimension A successful defense roll allows them to shift to a new location, not only negating the attack but allowing them a free attack in addition to any other they were making this round.	Any damage that would normally be applied to strength gets diverted to an energy store. The energy store can be used to make an enhanced attack. Any damage received in excess of the store is applied to strength as usual.
The Shadow	The Retiarius
Manipulates perceptions and background. How do hit something you can't "see"?	The famous gladiator that fought with a net and trident. The net just entangles the target. The trident is used as a spear then.
Superman	Any Number of Venomous Thingies
Can only be injured by the use of kryptonite. Just make sure you get the correct color!	A single bite, sting, spit whatever inserts venom in the target. For a specified number of turns applies constant or degrading damage to the target's strength. As it's not physical energy Mega Man cannot divert the damage to the energy store but is taken against strength.
Popeye (or spinach). Eating a can of spinach gives the fighter extraordinary strength. Appears to be species-independent. Lasts for at least one minuteof a three minute cartoon.	

In these cases, and many others the attack and/or defense and armor functions will operate differently. As the other says on page 669:

> "Polymorphism refers to the ability to associate many meanings to one function name by means of the late-binding mechanism."

For these creatures attack and defense have different meanings. It would be best to make an abstract creature class with virtual functions and save the details for later. For this subset of creatures there is very little overlap.