David Mednikov

CS 162 W17

onid: mednikod

Project 3 Reflection

Project Plan

Vampire class (derived from Creature)

Member variables derived from base

Member functions:

* Vampire()
* ~Vampire()
* int attack()
* int defense()

Creature class (abstract base class)

Member variables:

* int armor
* int strengthPoints
* string name

Member functions:

* Creature()
* Virtual ~Creature
* int getArmor()
* int getStrengthPoints()
* string getName()
* virtual void removePoints(int damage)
* virtual int attack() = 0
* virtual int defense() = 0

Barbarian class (derived from Creature)

Member variables derived from base

Member functions:

* Barbarian()
* ~Barbarian()
* int attack()
* int defense()

Is A

HarryPotter class (derived from Creature)

Member variables derived from base

* bool diedOnce

Member functions:

* HarryPotter()
* ~HarryPotter()
* int attack()
* int defense()
* void removePoints(int damage)

Medusa class (derived from Creature)

Member variables derived from base

Member functions:

* Medusa()
* ~Medusa()
* int attack()
* int defense()

BlueMen class (derived from Creature)

Member variables derived from base

Member functions:

* BlueMen()
* ~BlueMen()
* int attack()
* int defense()

Design Ideas

* Destructor is virtual so that there are no memory leaks
* Define getArmor(), getStrengthPoints(), and getName() all in abstract base class
* Define removePoints() in base class but make it virtual so that HP can override it for Hogwarts ability
* Attack() and defense() are pure virtual functions that must be defined in derived class
* Use die objects to calculate attack() and defense() for each creature
* Define Medusa’s Glare as attack = 0, and define Vampire’s Charm as defense = 0
* Use rand() % 2 to determine who goes first and when Vampire uses charm

How my Design Changed

* I hadn’t accounted for attacks having a negative value, which adds to the defender’s score. I had to add code to main that would change any negative attacks to be 0.
* Similarly I had to add code to removePoints() that would check to see if the creature’s strengthPoints was negative. I changed negative strengthPoints to 0 so that the logical statements in main would work better. It also made sense for Harry Potter, since he gets revived once.
* At first I created 5 pointers at the beginning of the program, one for each creature, but I realized that it wouldn’t work when 2 creatures of the same type are fighting one another. So I changed it to having 2 pointers (player1 and player2) that would be deleted after each game.
* I tried to implement Harry’s Hogwarts ability without a bool, but it made the main method too messy so I just added a bool member variable to the HarryPotter class

Test Plan

Expected Outcomes:

* Vampire will win often thanks to Charm and high strength points
* Blue Men will win the most thanks to a high attack, defense, and armor. Mob doesn’t weaken them that much until they are down to 4 strength points
* Harry Potter will win often thanks to Hogwarts ability and high strength points
* Medusa will win if they get lucky (Glare) but their low strength points can cause them to lose despite their high defense and armor
* Barbarian is the weakest one and will lose most often

Test Plan

|  |  |  |  |
| --- | --- | --- | --- |
| **Player 1** | **Player 2** | **Expected Outcomes** | **Observed Outcomes** |
| Vampire | Vampire | Long game due to Charm | Game took 15 turns, many charms |
| Vampire | Barbarian | Vampire wins thanks to Charm | Vampire won and used 3 Charms |
| Vampire | Blue Men | Blue Men will win due to their high attack | Blue Men won in 1 turn (attack 19 defense 1) |
| Vampire | Medusa | Vampire will win because it beats Glare, but it will be slow due to Charm and Medusa’s armor | Vampire won in a long match, Charm and Medusa’s armor made it take 22 turns total |
| Vampire | Harry Potter | Harry Potter will win thanks to Hogwarts | Harry Potter won with 19 strength points left |
| Barbarian | Vampire | Vampire will win because Barbarians are weak | Vampire won with 9 strength points left |
| Barbarian | Barbarian | Long and boring match, both are pretty weak | Took 15 turns for match to end |
| Barbarian | Blue Men | Blue Men will win thanks to high attack | Blue Men won in 6 turns |
| Barbarian | Medusa | Medusa will win thanks to armor and maybe Glare | Barbarian won, Medusa rolled very low defenses |
| Barbarian | Harry Potter | Harry Potter will win thanks to Hogwarts | HP won with 19 strength points left |
| Blue Men | Vampire | Blue Men will win because their high attack and defense will be more of an advantage than Charm | Blue Men won easily, even though Vampire had several Charms |
| Blue Men | Barbarian | Blue Men will win easily thanks to high attack | Blue Men won with 12 strength points left |
| Blue Men | Blue Men | Short game, winner will have high attacks | Winner had attacks of 19 and 17 |
| Blue Men | Medusa | Blue Men will win, too powerful | Blue Men won thanks to high defense and armor |
| Blue Men | Harry Potter | Blue Men will win, they are stronger than Harry | Blue Men won, Harry used Hogwarts early |
| Medusa | Vampire | Vampire will win with help from Charm | Vampire won in just 4 turns thanks to Charm and high attack |
| Medusa | Barbarian | Medusa will win, high armor will make difference | Medusa won pretty easily |
| Medusa | Blue Men | Blue Men win as always | Blue Men won in 2 turns |
| Medusa | Medusa | Might see a glare, but if not a long boring match | Glare happened! Only 6 turns for this match |
| Medusa | Harry Potter | Harry Potter wins thanks to Hogwarts | HP won with 20 strength points left |
| Harry Potter | Vampire | Harry Potter will win because of Hogwarts | HP just barely won with 4 strength points left in his second life |
| Harry Potter | Barbarian | Harry Potter wins easily | HP wins with 18 strength points left |
| Harry Potter | Blue Men | Blue men win because they are too powerful | Blue Men won with 12 points left |
| Harry Potter | Medusa | Harry Potter will win easily | HP won with 20 strength points left |
| Harry Potter | Harry Potter | Long match due to both players having Hogwarts | Player 2 won in 42 turns and had 9 strength points left |
| Charm 50% of the time | | Expect Charm about half the time | Charm happens just under 50% of the time when a Vampire is in play |
| Player 1 goes first half the time | | P1 and P2 go first pretty evenly | They each go first ~50% of the time |
| Glare happens rarely | | See it a couple times, only should happen 2.8% of the time | Saw it happen once, but Medusa lost almost always |

Test Results

My test results largely matched my expected outcomes:

* Blue Men was the strongest, by quite a margin, never lost
* Harry Potter and Vampire were the next 2 strongest, both usually won
* Medusa and Barbarian are the 2 weakest as expected, though they were closer than I thought with just a they would be.
* Medusa and Barbarian each won just once against different characters – when they played each other. Lost to Blue Men/Vampire/HP every time
* Who goes first was split pretty evenly between the two
* Glare only happened one time
* Things I was wrong about:
  + Charm happened less than 50% of the time, though not far below
  + Barbarian beat Medusa once