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Intro Programming 162

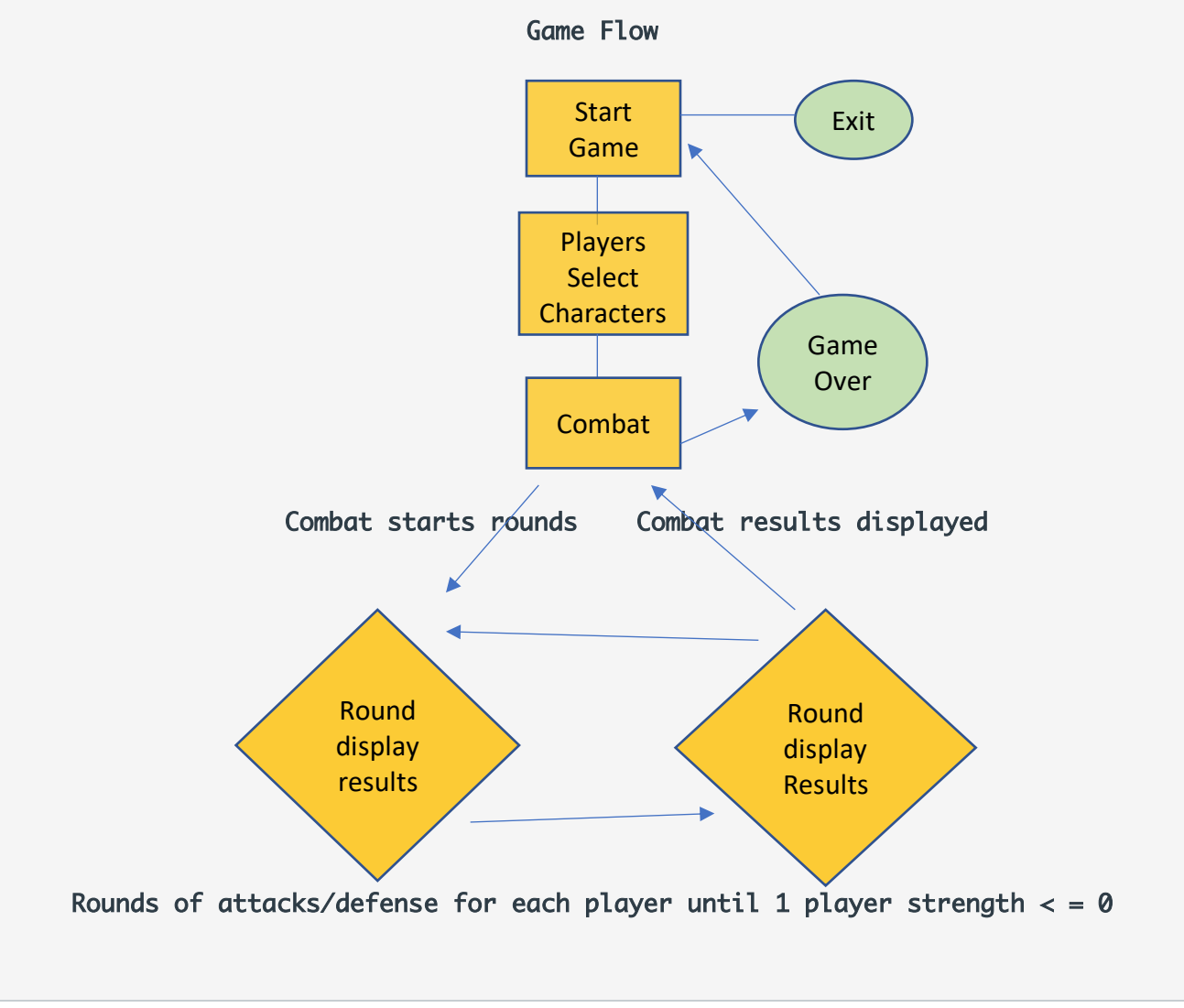
Project 3 Plan

Program Requirements/Steps

Fantasy Combat Game with Character Inheritance Design

Create a program that carries out following steps.

1. Requests from user if they want to start program or exit.
2. Prompts player 1 to pick a character from the following options: Barbarian, Blue Men, Harry Potter, Medusa and Vampire.
3. Prompts player 2 to pick a character from the following options: Barbarian, Blue Men, Harry Potter, Medusa and Vampire.
4. Plays multiple rounds of attack/defense behaviors for the picked characters until one has <= 0 strength. Then determines this player is the loser.
5. Each round consists of a Player 1 Attack/ Player 2 Defense. Then Player2 Attack/ Player 1 Defense.
6. Damage inflicted on player depends on calculation of attacker's roll – defender's roll – defenders' armor.
7. Each type of character has different values available for armor, defense, attack and strength.
8. Some characters have special skills that may change the above outcome.
9. Each round will display Attacker type, defender type, armor, strength point.
10. Each round will display defenders dice roll, total inflicted damage and defenders updated strength point.
11. After combat over displays who has lost and who has won. If both have <=0 strength at end of round, then it is a tie.
12. Prompts user if they want to play again or exit game.



Start Game: main()

Prompt user if start program or quit

input user choice

do while choice == 1 loop

1 → start program //creates instance of CombatGame and calls combat();

2 → Do nothing and quit

#% or != 1 || 2 → while choice is not 1 or 2 prompt user to enter 1 or 2*

CombatGame::combat method

Character* player1 = **selectPlayer** method //separate menu to select from 5 characters

Character* player2 = **selectPlayer** method //separate menu to select from 5 characters

- **Starts combat round loop**

while(player1 strength && player2 strength > 0)

cout <<"Round:" << round;

playRound(); //private function that will display player stats

//call attack/defend functions for each player

//also with override special combat characteristics.

-**Determine winner**

if player1 strength <= 0 && player2 strength > 0

-player 2 wins

If player 2 strength <= 0 && player1 strength > 0

-player 1 wins

If player 2 && player 1 strength <=0

-tie

Delete player1, player2 //free memory

Attack virtual method

Randomizer generates roll

maxSeed = attack data member set for character.

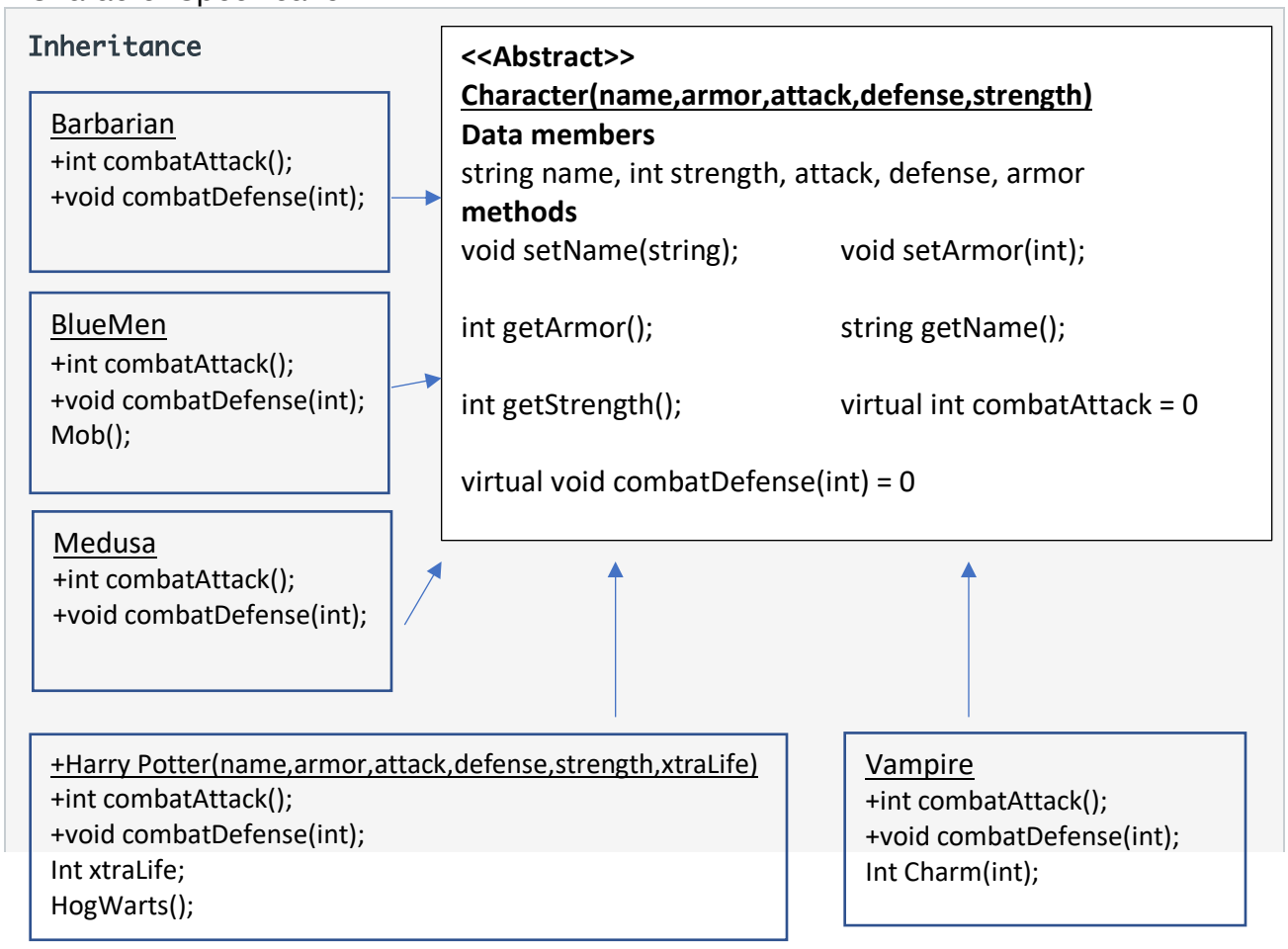
minSeed = 1; //depends on how many die that the character uses

//Medusa does an override here to increase damageRoll = 50 if damageRoll == 12..

return damageRoll

```
Defense (damageRoll) virtual method

//Vampire will override with Charm(damageRoll) to have 50/50 chance of being
turned to 0

//BlueMen will override with Mob(); to check what defense should be based on
strength

 Randomizer generates roll

maxSeed = defense data member set for character.

minSeed = 1; //depends on Character //Blue men this value will change if stre
ngth changes

        //

 Strength -= defenseRoll.

If strength <=0 // Harry Potter overrides to come back to life once
```

Character Specification



Test Plan

Combat Game Test Menu/Players

Tests	*Action performed*	*Expected output*
Test1:	choice Entered 0	`Invalid input. Please enter 1 to start program or 2 to` `Enter your choice:`
	choice Entered @#1	`Invalid input. Please enter 1 to start program or 2 to` `Enter your choice:`
	choice Entered 1.5	**choice:** 1 //removes decimal values
	playerChoice Entered 100	`Enter your fighter choice: 100` `1. Barbarian` `2. Blue Men` `3. Harry Potter` `4. Medusa` `5. Vampire` `Enter your fighter choice:`
	playerChoice Entered @!#3	`Enter your fighter choice: @!#3` `1. Barbarian` `2. Blue Men` `3. Harry Potter` `4. Medusa` `5. Vampire` `Enter your fighter choice:`
	player1Choice Entered 3	**Player1:** Harry Potter
	player2Choice Entered 1$%##@	**Player2:** Barbarian
		**** Game will Automatically now play out****

Note: Randomization in rolls the game results will not be the same every time.

```
*************************
Round: 1
*************************
Player 1 Harry Potter Attacks!
Attacker Strength: 10
Harry Potter rolled 3 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 3 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 12
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 12
Barbarian rolled 11 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 5 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 6
Strength: 4
--------------------
*************************
Round: 2
*************************
Player 1 Harry Potter Attacks!
Attacker Strength: 4
Harry Potter rolled 5 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 12 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 12
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 12
Barbarian rolled 8 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 9 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 4
--------------------
```

```
**************************
Round: 3
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 4
Harry Potter rolled 3 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 6 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 12
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 12
Barbarian rolled 4 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 3 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 1
Strength: 3
--------------------
**************************
Round: 4
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 3
Harry Potter rolled 3 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 11 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 12
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 12
Barbarian rolled 8 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 11 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 3
--------------------
**************************
Round: 5
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 3
Harry Potter rolled 5 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 3 out of 12 possible defense points.
```

```
Barbarian rolled 3 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 2
Strength: 10
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 10
Barbarian rolled 3 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 6 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 3
--------------------
**************************
Round: 6
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 3
Harry Potter rolled 5 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 3 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 2
Strength: 8
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 8
Barbarian rolled 10 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 3 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 7
Extra life of Hogwarts activated.
He's alive!
Strength: 10
--------------------
**************************
Round: 7
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 10
Harry Potter rolled 5 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 2 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 3
Strength: 5
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 5
```

```
Barbarian rolled 7 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 11 out of 12 possible defense points
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 10
--------------------
**************************
Round: 8
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 10
Harry Potter rolled 10 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 12 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 5
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 5
Barbarian rolled 9 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 5 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 4
Strength: 6
--------------------
**************************
Round: 9
**************************
Player 1 Harry Potter Attacks!
Attacker Strength: 6
Harry Potter rolled 4 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 10 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 5
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 5
Barbarian rolled 6 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 7 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 6
--------------------
**************************
```

```
Round: 10
*************************
Player 1 Harry Potter Attacks!
Attacker Strength: 6
Harry Potter rolled 9 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 7 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 2
Strength: 3
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 3
Barbarian rolled 4 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 12 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 6
--------------------
*************************
Round: 11
*************************
Player 1 Harry Potter Attacks!
Attacker Strength: 6
Harry Potter rolled 4 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 8 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 0
Strength: 3
--------------------
Player 2 Barbarian Attacks!
Attacker Strength: 3
Barbarian rolled 10 out of 12 possible hit points.
--------------------
Player 1 Harry Potter Defends!
Harry Potter rolled 6 out of 12 possible defense points.
Armor deflects 0 hit points.
Total damage inflicted: 4
Strength: 2
--------------------
*************************
Round: 12
*************************
Player 1 Harry Potter Attacks!
Attacker Strength: 2
Harry Potter rolled 8 out of 12 possible hit points.
--------------------
Player 2 Barbarian Defends!
Barbarian rolled 4 out of 12 possible defense points.
Armor deflects 0 hit points.
```

		********** Round: 12 ********** Player 1 Harry Potter Attacks! Attacker Strength: 2 Harry Potter rolled 8 out of 12 possible hit points. ---------- Player 2 Barbarian Defends! Barbarian rolled 4 out of 12 possible defense points. Armor deflects 0 hit points. Total damage inflicted: 4 Strength: -1 ---------- Player 2 Barbarian Attacks! Attacker Strength: -1 Barbarian rolled 7 out of 12 possible hit points. ---------- Player 1 Harry Potter Defends! Harry Potter rolled 10 out of 12 possible defense points. Armor deflects 0 hit points. Total damage inflicted: 0 Strength: 2 ---------- Player 2 Barbarian has Lost! Player 1 wins with remaining strength of 2 points. GAME OVER 1. Start Fantasy Combat 2. Exit Program Enter your choice: **Game Over**
	choice Entered @!2 choice Entered 2.764@	Enter your choice: @!2 Invalid input. Please enter 1 to start program or 2 to quit. Enter your choice: **Choice:** 2 // game exits
Test 2:	choice Entered 1.% player1Choice Entered 2.2@ player2 Choice Entered 0 Play2 Choice Entered 4.#@	**Choice:** 1 **Player1:** BlueMen 0 Invalid Entry 1. Barbarian 2. Blue Men 3. Harry Potter 4. Medusa 5. Vampire Enter your fighter choice: **Player2:** Medusa **** Game will Automatically now play out**** Note: Randomization in rolls the game results will not be the same every time.

		`` ************************* Round: 1 ************************* Player 1 BlueMen Attacks! Attacker Strength: 12 Blue Men rolled 12 out of 20 possible hit points. --------------------- Player 2 Medusa Defends! Medusa rolled 3 out of 6 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 6 Strength: 2 --------------------- Player 2 Medusa Attacks! Attacker Strength: 2 Medusa rolled 3 out of 12 possible hit points. --------------------- Player 1 BlueMen Defends! Blue Men rolled 6 out of 18 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 0 Strength: 12 --------------------- ************************* Round: 2 ************************* Player 1 BlueMen Attacks! Attacker Strength: 12 Blue Men rolled 13 out of 20 possible hit points. --------------------- Player 2 Medusa Defends! Medusa rolled 6 out of 6 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 4 Strength: -2 --------------------- Player 2 Medusa Attacks! Attacker Strength: -2 Medusa rolled 11 out of 12 possible hit points. --------------------- Player 1 BlueMen Defends! Blue Men rolled 17 out of 18 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 0 Strength: 12 --------------------- Player 2 Medusa has Lost! Player 1 wins with remaining strength of 12 points. GAME OVER 1. Start Fantasy Combat 2. Exit Program Enter your choice: ```
Test 3	choice Entered 1 **from previous game player1Choice Entered 4.2@	**Choice:** 1 **Player1:** Medusa

	player2 Choice Entered 5 Play2 Choice Entered 4.#@	**Player2:** Vampire **** Game will Automatically now play out**** ********** Round: 1 ********** Player 1 Medusa Attacks! Attacker Strength: 8 Attacker rolled 12. Medusa GLARE activated! Medusa rolled 50 out of 12 possible hit points. ---------- Player 2 Vampire Defends! Vampire is turning on the Charm! Your player can not damage him. Vampire rolled 2 out of 6 possible defense points. Armor deflects 1 hit points. Total damage inflicted: 0 Strength: 18 ---------- Player 2 Vampire Attacks! Attacker Strength: 18 Vampire rolled 10 out of 12 possible hit points. ---------- Player 1 Medusa Defends! Medusa rolled 5 out of 6 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 2 Strength: 6 ---------- ********** Round: 2 ********** Player 1 Medusa Attacks! Attacker Strength: 6 Medusa rolled 7 out of 12 possible hit points. ---------- Player 2 Vampire Defends! Vampire is turning on the Charm! Your player can not damage him. Vampire rolled 3 out of 6 possible defense points. Armor deflects 1 hit points. Total damage inflicted: 0 Strength: 18 ---------- Player 2 Vampire Attacks! Attacker Strength: 18 Vampire rolled 6 out of 12 possible hit points. ---------- Player 1 Medusa Defends! Medusa rolled 2 out of 6 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 1 Strength: 5 ----------

```
**************************
Round: 3
**************************
Player 1 Medusa Attacks!
Attacker Strength: 5
Medusa rolled 7 out of 12 possible hit points.
----------------------
Player 2 Vampire Defends!
Vampire is turning on the Charm!
Your player can not damage him.
Vampire rolled 2 out of 6 possible defense points.
Armor deflects 1 hit points.
Total damage inflicted: 0
Strength: 18
----------------------
Player 2 Vampire Attacks!
Attacker Strength: 18
Vampire rolled 4 out of 12 possible hit points.
----------------------
Player 1 Medusa Defends!
Medusa rolled 3 out of 6 possible defense points.
Armor deflects 3 hit points.
Total damage inflicted: 0
Strength: 5
----------------------
**************************
Round: 4
**************************
Player 1 Medusa Attacks!
Attacker Strength: 5
Medusa rolled 8 out of 12 possible hit points.
----------------------
Player 2 Vampire Defends!
Vampire rolled 5 out of 6 possible defense points.
Armor deflects 1 hit points.
Total damage inflicted: 2
Strength: 16
----------------------
Player 2 Vampire Attacks!
Attacker Strength: 16
Vampire rolled 6 out of 12 possible hit points.
----------------------
Player 1 Medusa Defends!
Medusa rolled 1 out of 6 possible defense points.
Armor deflects 3 hit points.
Total damage inflicted: 2
Strength: 3
----------------------
```

	Choice Entered 2	``` ************************** Round: 5 ************************** Player 1 Medusa Attacks! Attacker Strength: 3 Medusa rolled 7 out of 12 possible hit points. ---------------------- Player 2 Vampire Defends! Vampire is turning on the Charm! Your player can not damage him. Vampire rolled 6 out of 6 possible defense points. Armor deflects 1 hit points. Total damage inflicted: 0 Strength: 16 -------------------- Player 2 Vampire Attacks! Attacker Strength: 16 Vampire rolled 8 out of 12 possible hit points. -------------------- Player 1 Medusa Defends! Medusa rolled 1 out of 6 possible defense points. Armor deflects 3 hit points. Total damage inflicted: 4 Strength: -1 ---------------------- Player 1 Medusa has Lost! Player 2 wins with remaining strength of 16 points. GAME OVER 1. Start Fantasy Combat 2. Exit Program Enter your choice: ``` **Game Over** **Exit program**

Reflection

The BlueMen are definitely the most difficult character to beat because of the force of their attack and defense. For each individual character I used print out tests and changed default settings to check special characteristics in battle. Then I fought them between same characters to check their random behavior. Test plan 1 helped to find mistakes in combat method for menu. These are mistakes overlooked even when I encountered them before. If player started the game with a double value it would be rounded to 1, but also the next number would be still in the stream and would be entered into the next “cin” value for selectCharacter. For example with choice = 1.5 am able to correct the 5 from being the character choice by using cin.clear()

and cin.ignore. Example below. I had this issue also discovered with my player 2 if 3@$$@# was entered. I would result in invalid input for restarting the game.

```
///*****************************************
 * Game::combat
 * play rounds until player dies
 *****************************************/
void CombatGame::combat()
{
    //clear any extra from be used in next cin
    cin.clear();
    cin.ignore(std::numeric_limits<std::streamsize>::max(),'\n');

    cout << "Welcome to Fantasy Combat" <<endl;
    cout <<"**************************" <<endl;
    cout << "Player 1" <<endl;
    int round = 1;
    player1 =selectCharacter();
    cout << "Player 2" <<endl;
    player2 = selectCharacter();
    cout << " Now the battle starts" <<endl;

    //clear any extra from be used in next cin
    cin.clear();
    cin.ignore(std::numeric_limits<std::streamsize>::max(),'\n');
```

This issue even popped up later with test 2 in selectCharacter for second player if a decimal point value was entered. Also found another error on my logic using the test plan with the Hogwarts function. In my initial code I didn't include the if statement to see what level the

strength is before calling Hogwarts. Simple mistake of overlooking this if statement creates a big error. Example below of my previous code and easy fix.

```
/*******************************************************
 * HarryPotter::defense method
 * defense takes damage when attacked
 *  calculates inflicted damage on strength
 *******************************************************/
void HarryPotter::combatDefense(int inDamage)
{
    //roll defense
…….
    strength -=damageCalculated;
    Hogwarts();
    cout << "Strength: " << strength <<endl;}
```

```
    strength -=damageCalculated;
    if (strength <=0)
        {Hogwarts();}

    cout << "Strength: " << strength <<endl;
}
```

Testing is tedious and time consuming but no matter how good the programmer is or familiar with the subject it is easy to make human errors. This project out of all my projects I encountered many of these small erroneous errors that had big impacts on my code. For

example I used player1 output for the display instead of player2 on one section because of copy pasting and missing the rewrite of this to player 2. Simple to fix but easy to overlook.

One other issue I encountered was in the design of my selectCharacter method where I create the characters dynamically. I originally planed to create the pointer to the base class then use that pointer as an argument in my selectCharacter class as below.

```
----CombatGame.hpp---
 Character* player1;
 Charater* player2;
Void selectCharacter(*Character);
---CombatGame.cpp---
player1 = nullptr;
player2 = nullptr;
Void CombatGame::selectCharacter(Character* inPlayer);
{
//Select Player menu here
if (choice == 1). //create a Barbarian
    {
        inPlayer = new Barbarian ("Barbarian",0,12,12,12);
    {
    …..//etc for each character type
}
```

This resulted in segmentation error and in valgrind a “invalid read of size 8”. The Base pointer was not properly entered to be reassigned so after calling the selectCharacter it was still nullptr. I tried calling with a selectCharacter(&inplayer1); reference but this still created an error was well as the type did not match what was expected as input into the argument. I received some assistance on Piazza on this and from https://stackoverflow.com/questions/11842416/function-does-not-change-passed-pointer-c .

In the end I decided to change the flow to output a *Character pointer that can then be used for the player1 or player2 values. This seemed to be more straightforward to be and presented itself better in the code. It was generally more human friendly.

```
----CombatGame.hpp---
 Character* player1;
 Character* player2;
Character* selectCharacter();
---CombatGame.cpp---
player1 = nullptr;
player2 = nullptr;
Character* CombatGame::selectCharacter();
{
//Select Player menu here
if (choice == 1). //create a Barbarian
    {
        Character* outPtr = new Barbarian("Barbarian",0,12,12,12);
         return outPtr;
    {
    …..//etc for each character type
}
```

Overall the project went well, and I do see that I could create an actual function to clear out the system in between input variables just to clean up the code a bit. I might also experiment in future with using other commands to take inputs that don't have this issue. I also will continue to test and look at the results carefully to see if they match expected. I've caught many missed logic errors this way that I missed with testing while coding that are easily fixed.