Robert Elsom

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Project 4

Reflection:

My biggest issue came from memory leaks. It became hard to trace the memory leak as it went from my game class, to queue, then to character. It was showing as a leak in queue but really was an error in my game class that was not deallocating the memory in the right spot. Also, I had an issue where my printing of the loser container was not working correctly, which I later changed my approach and fixed a few minor errors that I was not seeing in the beginning and everything began working correctly.

Other than the two issues above, everything else were design changes that I had to make, like adding a get and set for team name for characters, thus I could print what team they were on after adding them to the loser container. Also, I reused the Queue function with a few minor changes that at first were not planned in order for it to fit the project and add a little more ability for the user using the queue. I had to change my original plan to include a validStr function to validate Y/N input when prompting to print the loser container. I also changed my original plan for the loser container. At first, I was trying to add to the head of the queue, but instead I decided that printing in reverse would accomplish the same goal. Instead of having head as the top for printing top to bottom, I viewed the last node as the top, and it corrected some errors I was experiencing.

Start Menu/ Repeat Menu test cases

Test case	Input Values	Driver Function	Expected Outcome	Observed Outcome
Function a not an unsiged integer	A, 1.5, -4	ValidInt()	Display error, repeat options to user	Display error, repeat options to user
Integer not a valid option	5	ValidInt()	Display error, repeat options to user	Display error, repeat options to user
Integer a valid option	1	validInt(), if statements	Print starting prompts and get inputs for functions	Print prompts and get inputs for functions
Integer second option	2	Return	Quit program	Quit program

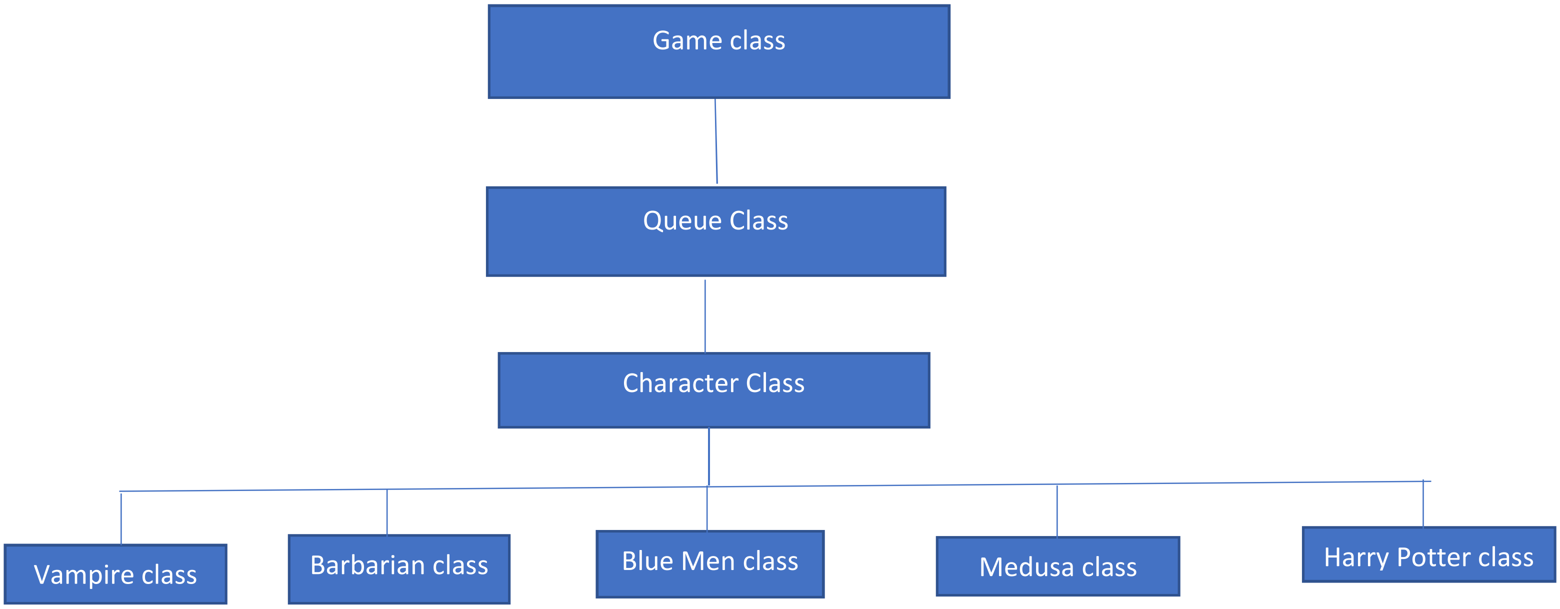
Character Creation test cases

Test case	Input Values	Driver Function	Expected Outcome	Observed Outcome
Function a not an unsiged integer	A, 1.5, -4	ValidStr()	Display error, repeat options to user	Display error, repeat options to user
Integer not a valid option	10	ValidStr()	Display error, repeat options to user	Display error, repeat options to user
Integer first option	1	If input == 1	Creates new blue men object	Creates new blue men object
Integer second option	2	If input == 2	Creates new barbarian object	Creates new barbarian object
Integer third options	3	If input == 3	Creates new Harry Potter object	Creates new Harry Potter object
Integer fourth option	4	If input == 4	Creates new medusa object	Creates new medusa object
Integer fifth option	5	If input == 5	Creates new vampire object	Creates new vampire object

Print Loser container test cases

Test case	Input Values	Driver Function	Expected Outcome	Observed Outcome
Function a not a valid option	A, 1.5, -4	ValidStr()	Display error, repeat options to user	Display error, repeat options to user
Enters a char 'Y' or 'y'	Y, y	ValidStr()	Prints loser list	Prints loser list
Enters a char 'N' or 'n'	N, n	validStr()	Does nothing	Does nothing

Class hierarchy:



Design:

- Queue class
    - Makes containers with characters in them, holds both team lineups along with the loser container
    - Functions
        - Print
        - Print reverse
        - Add back
        - Add head
        - getFront – returns character in first node
        - removeFront – deletes first node
        - moveToBack – moves winner to back of queue
- Game class
    - Creates lineups, makes appropriate calls to fight for each team, then calls functions to move characters based on outcomes of fight. Also calculates score and displays final results to user
    - Functions
        - newCharacter-Creates characters and stores them in queue elements
        - addToLoser – adds loser to loserQue and deletes from team lineup
        - winnerMove – calls recovery function for character and moves to back of lineup
        - battle – stores results of fights, calculates when team is empty, and displays final score
        - fight – individual fight between characters
        - updateScore
        - printLosers – prints loser list
- Base class
    - Abstract class, virtual functions that = 0
    - Functions
        - Attack
        - Defense
            - Takes roll, attack points, and calculates actual damage inflicted then updateStrength
        - getArmor
        - getStrength
        - updateStrength
        - getName
- Menu
    - Display names and get user to pick two
        - Can pick two of the same characters
    - Print round stats including
        - Attacker type
        - Defender type, armout, strength
        - Attackers die roll
        - Defenders die roll

    - Damage inflicted calculations
    - Defenders updated strength points after attack
      - If defenders die, ends game
  - Continue
    - 1 continue
    - 2 quit
- Vampire class
  - Attack
    - 1 12 sided die
  - Defense
    - 1 6 sided die
    - Charm power- 50% chance to charm attacker into not attacking for any attack
      - Trumps medusas glare if happens at same time
    - Takes roll, attack points, and calculates actual damage inflicted then updateStrength
  - getArmor
    - 1
  - getStrength
    - 18
  - updateStrength

- Barbarian class
  - Attack
    - 2 6 sided die
  - Defense
    - 2 6 sided die
    - Takes roll, attack points, and calculates actual damage inflicted then updateStrength
  - getArmor
    - 0
  - getStrength
    - 12
  - updateStrength

- Blue men class
  - Attack
    - 2 10 sided die
  - Defense
    - 3 6 sided die
    - For every four points strength lost, lose a defense die, represents loosing a couple of little blue men
    - Takes roll, attack points, and calculates actual damage inflicted then updateStrength

  - getArmor
    - 3
  - getStrength
    - 12
    - Mob power- for every four points strength lost, loses one defense die
  - updateStrength

- Medusa class
  - Attack
    - 2 6 sided die
    - Glare power – if rolls a 12, target instantly gets turned to stone and medusa wins, unless against harry potter who still has Hogwarts power left
  - Defense
    - 1 6 sided die
    - Takes roll, attack points, and calculates actual damage inflicted then updateStrength
  - getArmor
    - 3
  - getStrength
    - 8
  - updateStrength
  -
- Harry Potter class
  - Attack
    - 2 6 sided die
  - Defense
    - 2 6 sided die
    - Takes roll, attack points, and calculates actual damage inflicted then updateStrength
  - getArmor
    - 0
  - getStrength
    - 10
    - Hogwarts power- if strength <= 0, resets to 20 one time per fight
  - updateStrength