Midterm Assignment
Due July 6, 2015

Submissions are due by 11:59PM on the specified due date. Submissions may be made on the Blackboard course site under the Assignments tab. Late submissions will NOT be accepted.

Make sure your name and FSUID are in a comment at the top of the file.

For your midterm project, you will be writing a text-based RPG.

The name of our text-based RPG is Fatal Error. There is a single level which is composed of a 5-by-5 grid. As shown below, the player is initially positioned on the leftmost center square. The grid should be randomly initialized with 2 elements: a backpack (the objective) and a rat trap (an encounter with which will instantly end the game). Additionally, there should be 4 enemies randomly placed on the grid. An example initialized grid is shown below:

```
+---+---+---+---+---+
| E | | | | E |
+---+---+---+---+---+
| | | R | | |
+---+---+---+---+---+
| P | | | | |
+---+---+---+---+---+
| | E | | B | |
+---+---+---+---+---+
| E | | | | |
+---+---+---+---+---+
```

The interface is very simple; users can enter one of 5 commands: help, quit, go [N, S, E, W], health, and attack.

<table>
<thead>
<tr>
<th>Command</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>help</td>
<td>Print the commands available to the user.</td>
</tr>
<tr>
<td>quit</td>
<td>Print a small message and immediately end the game.</td>
</tr>
<tr>
<td>go [N, S, E, W]</td>
<td>Move the player one space in the specified direction.</td>
</tr>
<tr>
<td>health</td>
<td>Print the player’s current HP.</td>
</tr>
<tr>
<td>attack</td>
<td>Attack the current opponent.</td>
</tr>
</tbody>
</table>

There is only one kind of enemy, the Evil Robot. The player may choose one of two classes: CodeWarrior or 1337H4x0r. The statistics for each of these character types are listed below.

<table>
<thead>
<tr>
<th>Character Type</th>
<th>Max HP</th>
<th>Strength</th>
<th>Defense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evil Robot</td>
<td>15</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>CodeWarrior</td>
<td>30</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>1337H4x0r</td>
<td>30</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>
You are required to have the following classes implemented: Character, Player, EvilRobot, CodeWarrior, and H4x0r. Both Player and EvilRobot are derived from Character. CodeWarrior and H4x0r are further derived from Player. The methods help(), health(), go(), attack(), and quit() must be defined in the Player class (these may or may not have arguments depending on your design and usage). It is up to you to determine the other details of these class implementations (for example, which attributes the classes should have and which attributes/methods are common to multiple character types and should therefore be derived from an inherited class).

Damage from attacks is calculated in the following code snippet. You are free to come up with a different system. This code snippet does not include checks for win/death conditions. When an opponent dies, it should be removed from the grid.

```python
def calc_damage(self, opponent):
    damage = randint(0, 6) + self.strength - opponent.defense
    if damage <= 0:
        print "{} evades {}'s attack.".format(opponent.name, self.name)
    else:
        opponent.hp = opponent.hp - damage
        print "{} attacks {} for {} points of damage!".format(
            self.name, opponent.name, str(damage))
```

It is important to note that the attack command should not be effective when an enemy hasn’t been encountered. Likewise, the go command should not be effective when the player is in combat.

When you have implemented the game and you are sure that it works correctly, modify it to create a game server. The server should listen on localhost:9000 and handle multiple concurrent connections. A player should be able to connect to the game server using the following command on linux: “telnet localhost 9000”. You are free to use whichever networking tools are available to you in Python, including the sockets module, SocketServer module, and Twisted.

You may, if you choose, change any aspect of the game and add more features. Make it your own! However, you must have the following:

- Multi-level Class Structure described above and at least two possible character classes for the player to choose from.
- 5 methods: help, go, attack, quit, and health.
- Multi-client networking capabilities.

Sample command line runs are provided below for clarity:
Sample Run 1:

```
$ python rpg.py
Enter your character’s name: Caitlin
Are you a CodeWarrior or 1337H4x0r? Enter [c] or [h]: c
It’s a dark and stormy night. One unfortunate Computer Science student has fallen asleep on the Love 105 suites couch while cramming for their upcoming final. They head down to the Majors
```
Lab to gather their belongings before heading home. They approach the lab and encounter a strange sight: the lab is empty and dark...but the door is open. The power must have been knocked out by the storm. The brave little CS student enters the dark room to find their backpack...

> help
> go [N, S, E, or W]
> quit
> attack
> health
> help

> health
Caitlin has 30HP.

> attack
Caitlin doesn’t see anything worth attacking.

> quit
Caitlin has lost all hope and locked themself in the ACM office to read ancient ACM magazines and await their final doom.

Sample Run 2:

caitlin@caitlin-VPCEB19FX:~/Teaching/Python/Demos$ python rpg.py
Enter your character’s name: Caitlin
Are you a CodeWarrior or 1337H4x0r? Enter [c] or [h]: h
It’s a dark and stormy night. One unfortunate Computer Science student has fallen asleep on the Love 105 suites couch while cramming for their upcoming final. They head down to the Majors Lab to gather their belongings before heading home. They approach the lab and encounter a strange sight: the lab is empty and dark...but the door is open. The power must have been knocked out by the storm. The brave little CS student enters the dark room to find their backpack...

> go N
> go N
> go N
Caitlin has run into a wall. Try another direction.

> go E
> go E
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!

> attack
Caitlin attacks Evil Robot for 6 points of damage!
Caitlin evades Evil Robot’s attack.

> go
Caitlin can’t run from the Evil Robot.

> attack
Caitlin attacks Evil Robot for 7 points of damage!
Evil Robot attacks Caitlin for 5 points of damage!
> attack
Caitlin attacks Evil Robot for 2 points of damage!
Evil Robot has crashed! Caitlin wins!
> health
Caitlin has 25 HP.
> go S
> go W
> go W
> go S
> go S
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 4 points of damage!
Caitlin evades Evil Robot's attack.
> attack
Caitlin attacks Evil Robot for 5 points of damage!
Evil Robot attacks Caitlin for 2 points of damage!
> attack
Caitlin attacks Evil Robot for 6 points of damage!
Evil Robot has crashed! Caitlin wins!
> health
Caitlin has 23 HP.
> go S
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 4 points of damage!
Evil Robot attacks Caitlin for 2 points of damage!
> attack
Caitlin attacks Evil Robot for 1 point of damage!
Caitlin evades Evil Robot's attack.
> attack
Caitlin attacks Evil Robot for 2 points of damage!
Caitlin evades Evil Robot's attack.
> attack
Caitlin attacks Evil Robot for 6 points of damage!
Evil Robot attacks Caitlin for 3 points of damage!
> attack
Caitlin attacks Evil Robot for 7 points of damage!
Evil Robot has crashed! Caitlin wins!
> health
Caitlin has 18 HP.
> go S
Caitlin has run into a wall. Try another direction.
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!

> attack
Caitlin attacks Evil Robot for 3 points of damage!
Evil Robot attacks Caitlin for 3 points of damage!

> attack
Caitlin attacks Evil Robot for 3 points of damage!
Evil Robot attacks Caitlin for 1 points of damage!

> attack
Caitlin attacks Evil Robot for 2 points of damage!
Caitlin evades Evil Robot’s attack.

> attack
Caitlin attacks Evil Robot for 1 points of damage!
Evil Robot attacks Caitlin for 1 points of damage!

> attack
Caitlin attacks Evil Robot for 5 points of damage!
Evil Robot attacks Caitlin for 4 points of damage!

> attack
Caitlin attacks Evil Robot for 1 points of damage!
Evil Robot has crashed! Caitlin wins!

> health
Caitlin has 9HP.

> go E
> go E
> go E
> go E

Caitlin has run into a wall. Try another direction.

> go N
> go W
> go W
> go W

Caitlin ran into one of those legendary mechanical rat traps in the Love basement. RIP.

Sample Run 3:

caitlin@caitlin-VPCEB19FX:~/Teaching/Python/Demos$ python rpg.py
Enter your character’s name: Caitlin
Are you a CodeWarrior or 1337H4x0r? Enter [c] or [h]: c
It’s a dark and stormy night. One unfortunate Computer Science student has fallen asleep on the Love 105 suites couch while cramming for their upcoming final. They head down to the Majors Lab to gather their belongings before heading home. They approach the lab and encounter a strange sight: the lab is empty and dark...but the door is open. The power must have been knocked out by the storm. The brave little CS student enters the dark room
to find their backpack...
> go S
> go S
> go E
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 7 points of damage!
Evil Robot attacks Caitlin for 4 points of damage!
> attack
Caitlin attacks Evil Robot for 4 points of damage!
Evil Robot attacks Caitlin for 6 points of damage!
> attack
Caitlin attacks Evil Robot for 9 points of damage!
Evil Robot has crashed! Caitlin wins!
> go E
> go E
> go E
> go N
> go N
> go N
> go W
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 8 points of damage!
Evil Robot attacks Caitlin for 5 points of damage!
> attack
Caitlin attacks Evil Robot for 3 points of damage!
Evil Robot attacks Caitlin for 3 points of damage!
> attack
Caitlin attacks Evil Robot for 6 points of damage!
Evil Robot has crashed! Caitlin wins!
> health
Caitlin has 12HP.
> go W
> go N
Caitlin has run into a wall. Try another direction.
> go W
Caitlin doesn’t know what you’re talking about.
> go W
> go W
Caitlin has run into a wall. Try another direction.
> go S
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 7 points of damage!
Evil Robot attacks Caitlin for 5 points of damage!
> attack
Caitlin attacks Evil Robot for 5 points of damage!
Evil Robot attacks Caitlin for 7 points of damage!
Caitlin’s epic backpack search has come to an end. RIP.

Sample Run 4

$ python rpg.py
Enter your character’s name: Caitlin
Are you a CodeWarrior or 1337H4x0r? Enter [c] or [h]: h
It’s a dark and stormy night. One unfortunate Computer Science student has fallen asleep on the Love 105 suites couch while cramming for their upcoming final. They head down to the Majors Lab to gather their belongings before heading home. They approach the lab and encounter a strange sight: the lab is empty and dark...but the door is open. The power must have been knocked out by the storm. The brave little CS student enters the dark room to find their backpack...
> go E
> go S
> go E
> go E
> go N
Caitlin has encountered an Evil Robot. It appears to have assembled itself out of spare parts. Prepare to fight!
> attack
Caitlin attacks Evil Robot for 7 points of damage!
Evil Robot attacks Caitlin for 2 points of damage!
> attack
Caitlin attacks Evil Robot for 4 points of damage!
Caitlin evades Evil Robot’s attack.
> attack
Caitlin attacks Evil Robot for 5 points of damage!
Evil Robot has crashed! Caitlin wins!
> go W
Congratulations, Caitlin found their backpack!!!
And so, our hero safely makes their way to the exit. Luckily, Caitlin made it out alive this time. But one thing is for sure: Caitlin will never put off studying for their final exams ever again.