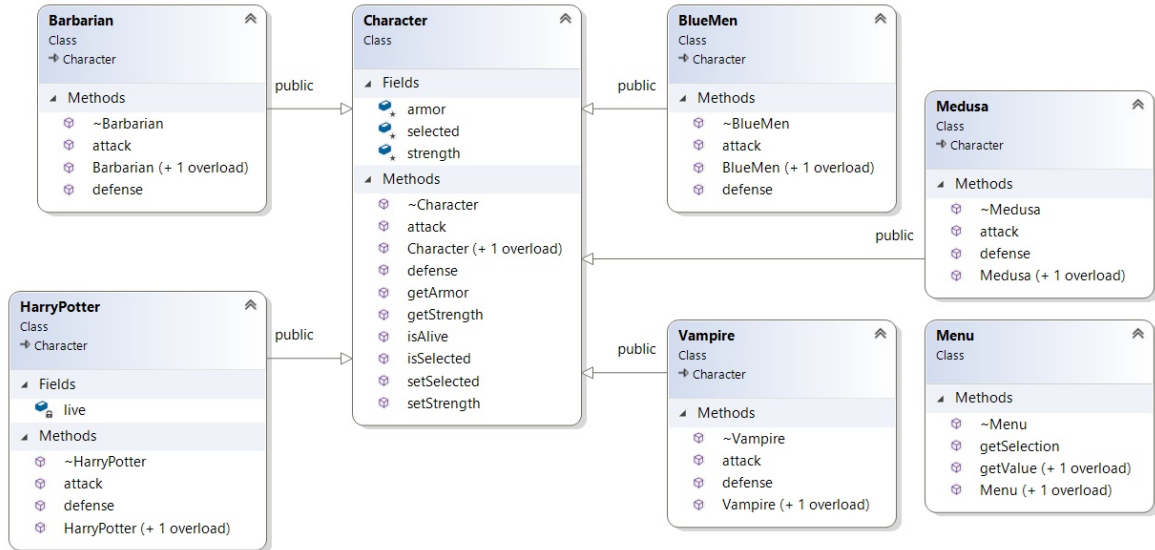


1. Class hierarchy diagram



2. Design description

a. Base abstract class:

i. Character

1. Attribute

- Armor: object's armor
- Strength: object's strength
- Selected: object's state while choosing the character from the list

2. Method

- Attack: pure virtual method
- Defense: pure virtual method
- Getter
 - `getArmor() : int`
 - `getStrength() : int`
 - `isAlive() : bool`
 - `isSelected() : bool`
- Setter
 - `setStrength() : void`
 - `setSelected() : void`
- Constructor
- Destructor

b. Subclass classes: inheriting from Character class

- Barbarian
- HarryPotter

1. Attribute

- a. live: Harry Potter's life
 - iii. BlueMen
 - iv. Vampire
 - v. Medusa
 - c. Extra class:
 - i. Menu
 - 1. Constructor
 - 2. Destructor
 - 3. getValue() : double
 - 4. getValue() : int
 - 5. getSelection(): int
- 3. Reflection
 - a. Changes in design
 - i. I have to add a new class named Menu to the project to validate all user's inputs
 - b. Problem encountered
 - i. It's hard to tell the defender that Medusa is glaring at him
 - c. Solution
 - i. The damage of Medusa's glare is set to the biggest integer "INT_MAX"
- 4. Test table

Test case	Input value	Driver function	Expected Outcome	Observed Outcome
Vampire vs. Barbarian	0 1	void play(Character ** fighters, string * fighter_names, int size)	First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0 Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1 First attacking: Attacker type: Barbarian Defender type: Vampire, armor: 1, strength point: 18	First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0 Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1 First attacking: Attacker type: Barbarian Defender type: Vampire, armor: 1, strength point: 18

			<p>The attacker's attack dice roll: 9 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 16</p> <p>Second attacking: Attacker type: Vampire Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 8 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 10</p>	<p>The attacker's attack dice roll: 9 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 16</p> <p>Second attacking: Attacker type: Vampire Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 8 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 10</p>
Vampire vs Bluemen	0 2	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>First attacking: Attacker type: BlueMen</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>First attacking: Attacker type: BlueMen</p>

			<p>Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 15 The defender's defend dice roll: 6 Total inflicted damage calculation: 8 The defender's updated strength point amount after subtracting damage: 10</p> <p>Second attacking: Attacker type: Vampire Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 8 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p>	<p>Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 15 The defender's defend dice roll: 6 Total inflicted damage calculation: 8 The defender's updated strength point amount after subtracting damage: 10</p> <p>Second attacking: Attacker type: Vampire Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 8 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p>
Vampire vs. Medusa	0 3	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter</p>

			<p>Enter value from 0 to 4: 2</p> <p>First attacking: Attacker type: BlueMen Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 15 The defender's defend dice roll: 6 Total inflicted damage calculation: 8 The defender's updated strength point amount after subtracting damage: 10</p> <p>Second attacking: Attacker type: Vampire Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 8 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p>	<p>Enter value from 0 to 4: 2</p> <p>First attacking: Attacker type: BlueMen Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 15 The defender's defend dice roll: 6 Total inflicted damage calculation: 8 The defender's updated strength point amount after subtracting damage: 10</p> <p>Second attacking: Attacker type: Vampire Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 8 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p>
Vampire vs. Harry Potter		void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 0</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire</p>

			<p>1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 9 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 16</p> <p>Second attacking: Attacker type: Vampire Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 8 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 8</p>	<p>1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: Vampire, armor: 1, strength point: 18 The attacker's attack dice roll: 9 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 16</p> <p>Second attacking: Attacker type: Vampire Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 8 The defender's defend dice roll: 6 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 8</p>
Barbarian vs. Bluemen	1 2	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter:</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter:</p>

			<p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 2</p> <p>First attacking:</p> <p>Attacker type: BlueMen</p> <p>Defender type: Barbarian, armor: 0, strength point: 12</p> <p>The attacker's attack dice roll: 15</p> <p>The defender's defend dice roll: 8</p> <p>Total inflicted damage calculation: 7</p> <p>The defender's updated strength point amount after subtracting damage: 5</p> <p>Second attacking:</p> <p>Attacker type: Barbarian</p> <p>Defender type: BlueMen, armor: 3, strength point: 12</p> <p>The attacker's attack dice roll: 7</p> <p>BlueMen uses Mob</p> <p>The defender's defend dice roll: 7</p> <p>Total inflicted damage calculation: 0</p> <p>The defender's updated strength point amount after subtracting damage: 12</p>	<p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 2</p> <p>First attacking:</p> <p>Attacker type: BlueMen</p> <p>Defender type: Barbarian, armor: 0, strength point: 12</p> <p>The attacker's attack dice roll: 15</p> <p>The defender's defend dice roll: 8</p> <p>Total inflicted damage calculation: 7</p> <p>The defender's updated strength point amount after subtracting damage: 5</p> <p>Second attacking:</p> <p>Attacker type: Barbarian</p> <p>Defender type: BlueMen, armor: 3, strength point: 12</p> <p>The attacker's attack dice roll: 7</p> <p>BlueMen uses Mob</p> <p>The defender's defend dice roll: 7</p> <p>Total inflicted damage calculation: 0</p> <p>The defender's updated strength point amount after subtracting damage: 12</p>
Barbarian vs. Medusa	1 3	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p>	<p>First fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p>

			<p>4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 3</p> <p>First attacking: Attacker type: Medusa Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 9 The defender's defend dice roll: 8 Total inflicted damage calculation: 1 The defender's updated strength point amount after subtracting damage: 11</p> <p>Second attacking: Attacker type: Barbarian Defender type: Medusa, armor: 3, strength point: 8 The attacker's attack dice roll: 7 The defender's defend dice roll: 1 Total inflicted damage calculation: 3 The defender's updated strength point amount after subtracting damage: 5</p>	<p>4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 3</p> <p>First attacking: Attacker type: Medusa Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 9 The defender's defend dice roll: 8 Total inflicted damage calculation: 1 The defender's updated strength point amount after subtracting damage: 11</p> <p>Second attacking: Attacker type: Barbarian Defender type: Medusa, armor: 3, strength point: 8 The attacker's attack dice roll: 7 The defender's defend dice roll: 1 Total inflicted damage calculation: 3 The defender's updated strength point amount after subtracting damage: 5</p>
Barbarian vs Harry Potter	1 4	void play(Character ** fighters, string *	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian</p>

		<p>fighter_names, int size)</p> <p>2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 9 The defender's defend dice roll: 8 Total inflicted damage calculation: 1 The defender's updated strength point amount after subtracting damage: 11</p> <p>Second attacking: Attacker type: Barbarian Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 7 The defender's defend dice roll: 5 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 8</p>	<p>2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: Barbarian, armor: 0, strength point: 12 The attacker's attack dice roll: 9 The defender's defend dice roll: 8 Total inflicted damage calculation: 1 The defender's updated strength point amount after subtracting damage: 11</p> <p>Second attacking: Attacker type: Barbarian Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 7 The defender's defend dice roll: 5 Total inflicted damage calculation: 2 The defender's updated strength point amount after subtracting damage: 8</p>
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Bluemen vs. Medusa	2 3	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 3</p> <p>First attacking: Attacker type: Medusa Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 9 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p> <p>Second attacking: Attacker type: BlueMen Defender type: Medusa, armor: 3, strength point: 8 The attacker's attack dice roll: 10 The defender's defend dice roll: 4 Total inflicted damage calculation: 3</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 3</p> <p>First attacking: Attacker type: Medusa Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 9 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p> <p>Second attacking: Attacker type: BlueMen Defender type: Medusa, armor: 3, strength point: 8 The attacker's attack dice roll: 10 The defender's defend dice roll: 4 Total inflicted damage calculation: 3 The defender's updated strength point amount after subtracting damage: 5</p>
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			The defender's updated strength point amount after subtracting damage: 5	
Bluemen vs. Harry Potter	2 4	void play(Character ** fighters, string * fighter_names, int size)	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 9 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p> <p>Second attacking: Attacker type: BlueMen Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 10</p>	<p>First fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 2</p> <p>Second fighter: Choose an alive and free fighter 0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 4</p> <p>First attacking: Attacker type: HarryPotter Defender type: BlueMen, armor: 3, strength point: 12 The attacker's attack dice roll: 9 BlueMen uses Mob The defender's defend dice roll: 10 Total inflicted damage calculation: 0 The defender's updated strength point amount after subtracting damage: 12</p> <p>Second attacking: Attacker type: BlueMen Defender type: HarryPotter, armor: 0, strength point: 10 The attacker's attack dice roll: 10 The defender's defend dice roll: 6</p>

			<p>The defender's defend dice roll: 6</p> <p>Total inflicted damage calculation: 4</p> <p>The defender's updated strength point amount after subtracting damage: 6</p>	<p>Total inflicted damage calculation: 4</p> <p>The defender's updated strength point amount after subtracting damage: 6</p>
Medusa vs. Harry Potter	3 4	<p>void</p> <p>play(Character ** fighters, string * fighter_names, int size)</p>	<p>First fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 3</p> <p>Second fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 4</p> <p>First attacking:</p> <p>Attacker type: HarryPotter</p> <p>Defender type: Medusa, armor: 3, strength point: 8</p> <p>The attacker's attack dice roll: 9</p> <p>The defender's defend dice roll: 2</p> <p>Total inflicted damage calculation: 4</p> <p>The defender's updated strength point amount after subtracting damage: 4</p> <p>Second attacking:</p> <p>Attacker type: Medusa</p> <p>Defender type: HarryPotter, armor: 0, strength point: 10</p>	<p>First fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 3</p> <p>Second fighter:</p> <p>Choose an alive and free fighter</p> <p>0. Vampire</p> <p>1. Barbarian</p> <p>2. Blue men</p> <p>3. Medusa</p> <p>4. Harry Potter</p> <p>Enter value from 0 to 4: 4</p> <p>First attacking:</p> <p>Attacker type: HarryPotter</p> <p>Defender type: Medusa, armor: 3, strength point: 8</p> <p>The attacker's attack dice roll: 9</p> <p>The defender's defend dice roll: 2</p> <p>Total inflicted damage calculation: 4</p> <p>The defender's updated strength point amount after subtracting damage: 4</p> <p>Second attacking:</p> <p>Attacker type: Medusa</p> <p>Defender type: HarryPotter, armor: 0, strength point: 10</p> <p>The attacker's attack dice roll: 8</p>

			<p>The attacker's attack dice roll: 8</p> <p>The defender's defend dice roll: 6</p> <p>Total inflicted damage calculation: 2</p> <p>The defender's updated strength point amount after subtracting damage: 8</p>	<p>The defender's defend dice roll: 6</p> <p>Total inflicted damage calculation: 2</p> <p>The defender's updated strength point amount after subtracting damage: 8</p>
Duplicated character selection	1 1	<pre>void play(Character ** fighters, string * fighter_names, int size)</pre>	<p>First fighter: Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>The selected figher has been selected before Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4:</p>	<p>First fighter: Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>Second fighter: Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4: 1</p> <p>The selected figher has been selected before Choose an alive and free fighter</p> <p>0. Vampire 1. Barbarian 2. Blue men 3. Medusa 4. Harry Potter Enter value from 0 to 4:</p>