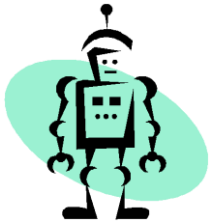
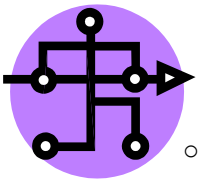
Robot War



Create a robot that will fight against all other robots in a 20 x 12 battlefield. Each robot will be placed randomly in the battlefield and will begin the war with a specified amount of health.

Specification:

1. **Robot Characteristics**
   You will have a total of 10 points to allocate for three different characteristics of your `FighterRobot` (you must have a minimum of one point allocated towards each category and can only have a maximum of 6 points in a particular category):
   - `attack`
     - This number will allow you to determine the maximum number of rounds in a fight. Each round of fight can take one health point.
     - In addition, this number will determine the # of dice can be rolled as the attacker (see "Rules of Engagement" for more details).
   - `defence`
     - The # of dice can be rolled as a defender for each round of a fight.
   - `numMoves`
     - The total distance your robot can travel at each turn. (total distance = horizontal distance + vertical distance)



2. **Health Level**
   Each robot will begin with 100 health points and the colour of the robot should be blacked once it is dead (no more lives).

   The following are the only ways that health points can be gained:
   - 2 additional health points can be gained if attacking robot wins a fight (most number of rounds).
   - 10 additional health points can be gained if attacking robot kills its opponent.

   The following are ways that health can be removed:
   - Each round of a fight can cost one health point.
   - If robot does not initiate a fight in 5 rounds, it will cost the robot 1 health point.
   - Each invalid turn requests can cost one health point. The following are invalid:
     - The end avenue and end street requires more than max number of moves
     - The end avenue and end street requires more than the available energy
     - The player tries to move to a location beyond the battlefield
     - Requested to attack another player when the location is not the same (use a request value of -1 if you do not want to fight any robots in your turn)
     - Requested to attack another player when the energy is too low to attack
     - Requested to fight more rounds than the robot is capable of fighting

3. **Energy Level**

The energy level affects the number of moves, number of rounds of attack at each fight, and the ability to defend. Each robot will begin with an energy level of 100 and if the remaining amount of energy is 0, then the robot will not be able to move, attack or defend. Each robot can gain/lose energy points as follows:

- Each player gains 1 energy point at each turn
- Each step taken costs 5 energy points
- If the attacker wins one round of fight, the attacker gains 20 energy points
- If the attacker loses one round of fight, the attacker loses 20 energy points
- If the defender wins one round of fight, the defender gains 10 energy points
- If the defender loses one round of fight, the defender loses 10 energy points
- If there is a tie, both the attacker and defender will lose 5 energy points

Rules of Engagement:

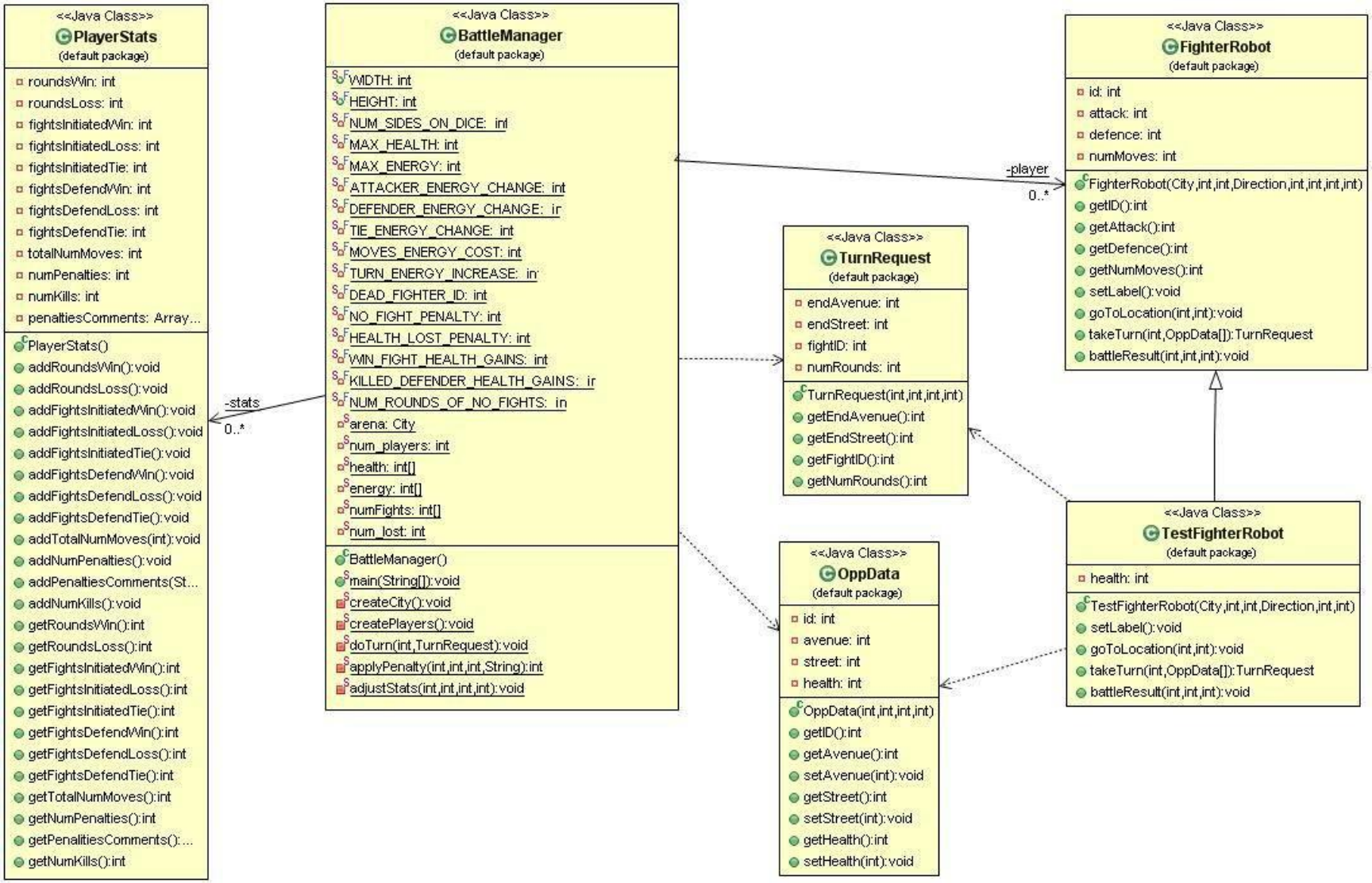
Similar to the rolling of dice in the game of Risk, at each round of a fight the highest die rolled from the attacker will compete against the highest die rolled from the defender. The `FighterRobot` with the highest value wins the round. If it is a tie, neither robot will lose any health points. The number of dice that can be rolled by the attacker and defender is determined by the `FighterRobot`'s characteristics. Note: 10-sided dice will be used in this game.

1. Example of a typical fight:
   - Attacker has attack power of 3, Defender has a defense power of 2
   - The attacker has a choice of attacking up to 3 times at the time of the turn request

Round of Fight	Dice Rolled		Health Result		Energy Result	
	Attacker	Defender	Attacker	Defender	Attacker	Defender
1	4, 8, 1	4, 5	-	-1	+20	-10
2	2, 7, 3	7, 1	-	-	-5	-5
3	10, 1, 4	8, 9	-	-1	+20	-10

2. Exceptions:
   - The fight stops if the attacker has no more energy (energy = 0).
   - If the defender has no more energy, then the attacker automatically wins the remaining rounds.

RobotWar UML Diagram *(auto-generated using ObjectAid)*



Notes:

- All class files will be provided except for each individual robot created. (i.e. `TestFightRobot`)
- On each player's turn, the `BattleManager` will call the `fighterRobot`'s `takeTurn` method, sending its current energy level and an array of all the players of class `OppData`.
- `fighterRobot`'s `takeTurn` method should return an object of class `TurnRequest` providing its desired endAvenue, endStreet, fightID (the ID of the robot it wishes to fight or -1 if no fight selected) and the number of rounds of fights desired.
- `BattleManager` will then test the requested location and `fighterRobot` to determine if the request is legitimate, if not, penalties (health points deducted) will be applied.
- When the battle is completed, `BattleManager` will call both the attacker and defender robots' `battleResult` method, providing the number of health lost by attacker, the defender ID, and the number of health lost by defender.