# Test 1 - Default

**GA configuration**

ELITISM\_COUNT = 2  
TOURNAMENT\_SIZE = 3  
CROSSOVER\_PROBABILITY = 0.7  
MUTATION\_PROBABILITY = 0.05  
MUTATION\_STANDARD\_DEVIATION = 0.10  
WEIGHT\_CLIP\_LIMIT = 3.0

**Fitness evaluation modifiers**

FOOD\_REWARD = 0.5  
FRIEND\_ATTACK\_PENALTY = -0.3  
ENEMY\_ATTACK\_REWARD = 0.3  
HEAD\_FRIEND\_CRASH\_PENALTY = -0.2  
HEAD\_ENEMY\_CRASH\_PENALTY = -0.2  
ALIVE\_BONUS\_PER\_TURN = 0.02

Gen 190/200... avg\_fitness: 1.42e+01

Gen 191/200... avg\_fitness: 1.33e+01

Gen 192/200... avg\_fitness: 1.35e+01

Gen 193/200... avg\_fitness: 1.32e+01

Gen 194/200... avg\_fitness: 1.51e+01

Gen 195/200... avg\_fitness: 1.35e+01

Gen 196/200... avg\_fitness: 1.16e+01

Gen 197/200... avg\_fitness: 1.54e+01

Gen 198/200... avg\_fitness: 1.35e+01

Gen 199/200... avg\_fitness: 1.45e+01

Gen 200/200... avg\_fitness: 1.55e+01

Game 1...won by SinglePerceptronGA (orange) with score=185 after 100 turns.

Game 2...won by SinglePerceptronGA (orange) with score=205 after 100 turns.

Game 3...won by SinglePerceptronGA (orange) with score=171 after 100 turns.

Game 4...won by SinglePerceptronGA (orange) with score=218 after 100 turns.

Game 5...won by SinglePerceptronGA (orange) with score=196 after 100 turns.

Average Score: 195

# Test 2 - Elitism

**GA configuration**

ELITISM\_COUNT = 4  
TOURNAMENT\_SIZE = 4  
CROSSOVER\_PROBABILITY = 0.8  
MUTATION\_PROBABILITY = 0.03  
MUTATION\_STANDARD\_DEVIATION = 0.05  
WEIGHT\_CLIP\_LIMIT = 3.0

**Fitness evaluation modifiers**

FOOD\_REWARD = 0.5  
FRIEND\_ATTACK\_PENALTY = -0.3  
ENEMY\_ATTACK\_REWARD = 0.3  
HEAD\_FRIEND\_CRASH\_PENALTY = -0.2  
HEAD\_ENEMY\_CRASH\_PENALTY = -0.2   
ALIVE\_BONUS\_PER\_TURN = 0.02

Gen 190/200... avg\_fitness: 8.81e+00

Gen 191/200... avg\_fitness: 8.53e+00

Gen 192/200... avg\_fitness: 7.93e+00

Gen 193/200... avg\_fitness: 8.77e+00

Gen 194/200... avg\_fitness: 9.32e+00

Gen 195/200... avg\_fitness: 7.13e+00

Gen 196/200... avg\_fitness: 9.29e+00

Gen 197/200... avg\_fitness: 8.83e+00

Gen 198/200... avg\_fitness: 9.70e+00

Gen 199/200... avg\_fitness: 8.95e+00

Gen 200/200... avg\_fitness: 7.94e+00

Game 1...won by SinglePerceptronGA (orange) with score=115 after 100 turns.

Game 2...won by SinglePerceptronGA (orange) with score=102 after 100 turns.

Game 3...won by random (purple) with score=23 after 100 turns.

Game 4...won by SinglePerceptronGA (orange) with score=53 after 100 turns.

Game 5...won by SinglePerceptronGA (orange) with score=79 after 100 turns.

Average Score: 74.4

# Test 3 – Food First

**GA configuration**

ELITISM\_COUNT = 2  
TOURNAMENT\_SIZE = 3  
CROSSOVER\_PROBABILITY = 0.7  
MUTATION\_PROBABILITY = 0.05  
MUTATION\_STANDARD\_DEVIATION = 0.10  
WEIGHT\_CLIP\_LIMIT = 3.0

**Fitness evaluation modifiers**

FOOD\_REWARD = 0.8  
FRIEND\_ATTACK\_PENALTY = -0.8  
ENEMY\_ATTACK\_REWARD = 0.3  
HEAD\_FRIEND\_CRASH\_PENALTY = -1.0  
HEAD\_ENEMY\_CRASH\_PENALTY = -0.5   
ALIVE\_BONUS\_PER\_TURN = 0.03

Gen 190/200... avg\_fitness: 1.75e+01

Gen 191/200... avg\_fitness: 1.43e+01

Gen 192/200... avg\_fitness: 1.68e+01

Gen 193/200... avg\_fitness: 1.46e+01

Gen 194/200... avg\_fitness: 1.89e+01

Gen 195/200... avg\_fitness: 1.59e+01

Gen 196/200... avg\_fitness: 1.72e+01

Gen 197/200... avg\_fitness: 1.74e+01

Gen 198/200... avg\_fitness: 1.84e+01

Gen 199/200... avg\_fitness: 1.62e+01

Gen 200/200... avg\_fitness: 1.59e+01

Game 1...won by SinglePerceptronGA\_v.3 (orange) with score=80 after 100 turns.

Game 2...won by SinglePerceptronGA\_v.3 (orange) with score=95 after 100 turns.

Game 3...won by SinglePerceptronGA\_v.3 (orange) with score=116 after 100 turns.

Game 4...won by SinglePerceptronGA\_v.3 (orange) with score=114 after 100 turns.

Game 5...won by SinglePerceptronGA\_v.3 (orange) with score=134 after 100 turns.

Average Score: 107.8

# Test 4 – Balanced Skirmisher

**GA configuration**

ELITISM\_COUNT = 2  
TOURNAMENT\_SIZE = 3  
CROSSOVER\_PROBABILITY = 0.7  
MUTATION\_PROBABILITY = 0.05  
MUTATION\_STANDARD\_DEVIATION = 0.10  
WEIGHT\_CLIP\_LIMIT = 3.0

**Fitness evaluation modifiers**

FOOD\_REWARD = 0.6  
FRIEND\_ATTACK\_PENALTY = -0.7  
ENEMY\_ATTACK\_REWARD = 0.45  
HEAD\_FRIEND\_CRASH\_PENALTY = -0.9  
HEAD\_ENEMY\_CRASH\_PENALTY = -0.5   
ALIVE\_BONUS\_PER\_TURN = 0.02

Gen 190/200... avg\_fitness: 1.33e+01

Gen 191/200... avg\_fitness: 1.36e+01

Gen 192/200... avg\_fitness: 1.32e+01

Gen 193/200... avg\_fitness: 1.46e+01

Gen 194/200... avg\_fitness: 1.45e+01

Gen 195/200... avg\_fitness: 1.14e+01

Gen 196/200... avg\_fitness: 1.30e+01

Gen 197/200... avg\_fitness: 1.35e+01

Gen 198/200... avg\_fitness: 1.07e+01

Gen 199/200... avg\_fitness: 1.52e+01

Gen 200/200... avg\_fitness: 1.33e+01

Game 1...won by SinglePerceptronGA\_v.4 (orange) with score=179 after 100 turns.

Game 2...won by SinglePerceptronGA\_v.4 (orange) with score=202 after 100 turns.

Game 3...won by SinglePerceptronGA\_v.4 (orange) with score=187 after 100 turns.

Game 4...won by SinglePerceptronGA\_v.4 (orange) with score=130 after 100 turns.

Game 5...won by SinglePerceptronGA\_v.4 (orange) with score=200 after 100 turns.

Average Score: 179.6

# Test 5 – Aggressive Vs. Enemy

**GA configuration**

ELITISM\_COUNT = 2  
TOURNAMENT\_SIZE = 3  
CROSSOVER\_PROBABILITY = 0.7  
MUTATION\_PROBABILITY = 0.05  
MUTATION\_STANDARD\_DEVIATION = 0.10  
WEIGHT\_CLIP\_LIMIT = 3.0

**Fitness evaluation modifiers**

FOOD\_REWARD = 0.5  
FRIEND\_ATTACK\_PENALTY = -0.7  
ENEMY\_ATTACK\_REWARD = 0.6  
HEAD\_FRIEND\_CRASH\_PENALTY = -0.9  
HEAD\_ENEMY\_CRASH\_PENALTY = -0.4   
ALIVE\_BONUS\_PER\_TURN = 0.015

Gen 190/200... avg\_fitness: 1.18e+01

Gen 191/200... avg\_fitness: 1.10e+01

Gen 192/200... avg\_fitness: 1.24e+01

Gen 193/200... avg\_fitness: 1.24e+01

Gen 194/200... avg\_fitness: 1.24e+01

Gen 195/200... avg\_fitness: 1.07e+01

Gen 196/200... avg\_fitness: 1.24e+01

Gen 197/200... avg\_fitness: 1.20e+01

Gen 198/200... avg\_fitness: 1.32e+01

Gen 199/200... avg\_fitness: 1.29e+01

Gen 200/200... avg\_fitness: 1.17e+01

Game 1...won by SinglePerceptronGA\_v.5 (orange) with score=141 after 100 turns.

Game 2...won by SinglePerceptronGA\_v.5 (orange) with score=123 after 100 turns.

Game 3...won by SinglePerceptronGA\_v.5 (orange) with score=138 after 100 turns.

Game 4...won by SinglePerceptronGA\_v.5 (orange) with score=177 after 100 turns.

Game 5...won by SinglePerceptronGA\_v.5 (orange) with score=189 after 100 turns.

Average Score: 153.6

Default Vs Skirmisher

Tournament Skirmisher vs. DefaultSnake!!!

Game 1...won by Skirmisher (orange) with score=116 after 100 turns.

Game 2...won by Skirmisher (orange) with score=52 after 100 turns.

Game 3...won by Skirmisher (orange) with score=52 after 100 turns.

Game 4...won by Skirmisher (orange) with score=95 after 100 turns.

Game 5...won by Skirmisher (orange) with score=95 after 100 turns.

Default vs Skirmisher

Gen 490/500... avg\_fitness: 1.03e+01

Gen 491/500... avg\_fitness: 8.90e+00

Gen 492/500... avg\_fitness: 9.71e+00

Gen 493/500... avg\_fitness: 9.52e+00

Gen 494/500... avg\_fitness: 9.07e+00

Gen 495/500... avg\_fitness: 9.87e+00

Gen 496/500... avg\_fitness: 5.61e+00

Gen 497/500... avg\_fitness: 1.06e+01

Gen 498/500... avg\_fitness: 8.77e+00

Gen 499/500... avg\_fitness: 1.06e+01

Gen 500/500... avg\_fitness: 9.39e+00

Default vs Skirmisher

Gen 490/500... avg\_fitness: 1.42e+01

Gen 491/500... avg\_fitness: 1.33e+01

Gen 492/500... avg\_fitness: 1.52e+01

Gen 493/500... avg\_fitness: 1.60e+01

Gen 494/500... avg\_fitness: 1.75e+01

Gen 495/500... avg\_fitness: 1.28e+01

Gen 496/500... avg\_fitness: 1.50e+01

Gen 497/500... avg\_fitness: 1.40e+01

Gen 498/500... avg\_fitness: 1.61e+01

Gen 499/500... avg\_fitness: 1.32e+01

Gen 500/500... avg\_fitness: 1.71e+01