

Project Screenshots

1. Introduction

- => Asks for the number of players
- => Asks for the distribution of players among different types
- => If user selected custom player, gets the traits from the user
- => Generates the players and shows their initial values

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How many players do you want in the simulation?
Input values between : 2 and 100 : 5
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Specify your desired number of each type of players.
Tit-for-Tat players will always perform Tit-for-tat
Cooperative players will always cooperate
Defective players will always defect
Regular players will have randomized characteristics
Customized players will behave according to characteristics you define
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Tit-for-tat Players : 1
Cooperative Players : 1
Defective Players : 1
Regular Players : 1
Custom Players : 1
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Player 1 is a Tit-for-tat player
Player 2 is a cooperative player
Player 3 is a defective player
Player 4 is a regular player
Define your 1 out of 1 custom player(s)
Base Uvalue <Inborn probability of cooperation: 0-100> : 10
Base Factor <How important your inborn character is : 0-100>: 20
Memory Factor <How important others' past gameplay is : 0-100>: 30
Distance Factor <How important the distance with other is : 0-100> : 40
Reputation Factor <How important the other's reputation is : 0-100> : 50
Player 5 is a customized player
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 50, x = 368, y = 464
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 50, x = 576, y = 147
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 50, x = 17, y = 366
Player 4 : base = 12, basefac = 29, memfac = 60, distfac = 73, repfac = 3, rep = 50, x = 746, y = 328
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 50, x = 769, y = 391
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2. Matrices

=> Shows the results of the games in a condensed form

(for more information about the meaning of each information, refer to the report)

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How many rounds should we play (to quit, type in 0) : 170
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< 1402>< 130>< 146>< 132>< 261>< 248>< 258>< -36>< -20>< -32>< 123>< 192>< 0>
How many rounds should we play (to quit, type in 0) : 
```

3. Play by Generation

- => Run 50 rounds per generation, creating offspring and going through mutation after each generation
- => Note that traits of the players changed from the first image
- => Can perform collusion upon choice

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Do you want to simulate by Generation or Rounds?
1. Generation 2. Rounds : 1
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Do you want to know the details of each game in your log? (0=No, 1=Yes) : 0
Do you want to allow collusion? (0=No, 1=Yes) : 0
< 0: 0: 0>< 0: 0: 0>< 0: 0: 0>< 0: 0: 0>< 0: 0: 0>< 0: 0: 0>< 0: 0: 0>
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How many generations do you want to simulate?(To quit, type in 0): 3

Processing 0th generation

Processing 1th generation

Processing 2th generation
Result of last game :
< 50: 0: 0>< 139: 3: 140>< 143: 3: 148>< 3: 0: -9>< 134: 3: 139>< 147: 3: 148>
< 138: 3: 137>< 1: 0: 0>< 1: 1: 50>< 0: 0: 0>< 1: 1: 41>< 1: 1: 46>
< 138: 3: 133>< 1: 1: 50>< 1: 0: 0>< 0: 0: -1>< 1: 1: 36>< 1: 1: 48>
< 15: 0: 27>< 0: 0: 6>< 0: 0: 5>< 1: 0: 0>< 0: 0: 12>< 0: 0: 4>
< 129: 3: 124>< 1: 1: 38>< 1: 1: 42>< 0: 0: -6>< 1: 0: 0>< 1: 1: 50>
< 146: 3: 145>< 1: 1: 46>< 1: 1: 51>< 0: 0: -2>< 1: 1: 50>< 1: 0: 0>
Status of Players in generation 3
Player 1 : base = 12, basefac = 0, memfac = 60, distfac = 4, repfac = 2, rep = 50, x = 384, y = 460
Player 2 : base = 12, basefac = 0, memfac = 60, distfac = 8, repfac = 15, rep = 50, x = 373, y = 447
Player 3 : base = 50, basefac = 1, memfac = 60, distfac = 1, repfac = 1, rep = 50, x = 385, y = 462
Player 4 : base = 84, basefac = 1, memfac = 82, distfac = 1, repfac = 1, rep = 50, x = 380, y = 461
Player 5 : base = 31, basefac = 1, memfac = 60, distfac = 1, repfac = 2, rep = 50, x = 380, y = 455
How many generations do you want to simulate?(To quit, type in 0): 1
```

4. Play by Round

=> Round by specified number of rounds

=> Can perform collusion upon choice : Note that unlike the previous printout, there is not "team" added to the end for each player

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Do you want to simulate by Generation or Rounds?
1. Generation 2. Rounds : 2
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Do you want to know the details of each game in your log? <0=No, 1=Yes> : 0
Do you want to allow collusion? <0=No, 1=Yes> : 1
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< 0: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>
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< 0: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>< 1: 0: 0>
How many rounds should we play <to quit, type in 0> : 3
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 70, x = 31, y = 958, team = 0
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 70, x = 36, y = 199, team = 0
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 30, x = 789, y = 744, team = 0
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 60, x = 901, y = 834, team = 0
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 40, x = 368, y = 941, team = 0
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 60, x = 31, y = 958, team = 1
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 80, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 20, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 60, x = 901, y = 834, team = 0
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 40, x = 368, y = 941, team = 0
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 70, x = 31, y = 958, team = 1
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 90, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 10, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 60, x = 901, y = 834, team = 0
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 40, x = 368, y = 941, team = 0
< 3: 0: 0>< 10: 5: 12>< 11: 5: 14>< 4: 2: 1>< 7: 1: 7>< 5: 1: 3>
< 8: 2: 6>< 1: 0: 0>< 1: 1: 3>< 1: 1: 1>< 0: -1: 0>< 1: 1: 2>
< 8: 2: 5>< 1: 1: 3>< 1: 0: 0>< 1: 1: 2>< 1: 1: 3>< 0: -1: -3>
< 7: 2: 10>< 1: 1: 4>< 1: 1: 2>< 1: 0: 0>< 0: 0: 2>< 0: 0: 2>
< 7: 4: 7>< 1: 2: 3>< 1: 1: 3>< 0: 0: -1>< 1: 0: 0>< 1: 1: 2>
< 7: 4: 9>< 1: 1: 2>< 1: 2: 6>< 0: 0: -1>< 1: 1: 2>< 1: 0: 0>
How many rounds should we play <to quit, type in 0> :
```

5. Collusion

=> Some players combine to create teams, as well as separate

=> Note that in the 2nd round, player 5 joins team 3. Also, on the last round, both player 2 and 5 break out of their respective teams

```
How many rounds should we play (to quit, type in 0) : 5
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 95, x = 31, y = 958, team = 3
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 1, x = 901, y = 834, team = 3
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 1, x = 368, y = 941, team = 0
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 95, x = 31, y = 958, team = 3
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 6, x = 901, y = 834, team = 3
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 1, x = 368, y = 941, team = 3
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 95, x = 31, y = 958, team = 3
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 16, x = 901, y = 834, team = 3
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 6, x = 368, y = 941, team = 3
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 95, x = 31, y = 958, team = 3
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 36, y = 199, team = 1
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 26, x = 901, y = 834, team = 3
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 6, x = 368, y = 941, team = 3
Status of Players in generation 0
Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 95, x = 31, y = 958, team = 3
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 36, y = 199, team = 0
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 789, y = 744, team = 1
Player 4 : base = 48, basefac = 84, memfac = 2, distfac = 15, repfac = 66, rep = 21, x = 901, y = 834, team = 3
Player 5 : base = 10, basefac = 20, memfac = 30, distfac = 40, repfac = 50, rep = 1, x = 368, y = 941, team = 0
```

6. Log

-outLog.txt : detailed description of moves and traits

Status of Players in generation 0

Player 1 : base = 50, basefac = 0, memfac = 100, distfac = 0, repfac = 0, rep = 70, x = 778, y = 825
Player 2 : base = 100, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 100, x = 883, y = 774
Player 3 : base = 0, basefac = 100, memfac = 0, distfac = 0, repfac = 0, rep = 1, x = 378, y = 401
Player 4 : base = 94, basefac = 65, memfac = 64, distfac = 63, repfac = 14, rep = 100, x = 745, y = 191

Round : 5

Player 2 and Player 1 are now playing.

Last time, Player 1 cooperated and Player 2 cooperated.

Player 2 chose to cooperate and Player 1 chose to cooperate.

Player 2 earned 1 and Player 1 earned 1

Player 3 and Player 1 are now playing.

Last time, Player 1 defected and Player 3 defected.

Player 3 chose to defect and Player 1 chose to defect.

Player 3 earned 0 and Player 1 earned 0

Player 3 and Player 2 are now playing.

Last time, Player 2 cooperated and Player 3 defected.

Player 3 chose to defect and Player 2 chose to cooperate.

Player 3 earned 2 and Player 2 earned -1

Player 4 and Player 1 are now playing.

Last time, Player 1 cooperated and Player 4 cooperated.

Player 4 chose to defect and Player 1 chose to cooperate.

Player 4 earned 2 and Player 1 earned -1

Player 4 and Player 2 are now playing.

Last time, Player 2 cooperated and Player 4 cooperated.

Player 4 chose to defect and Player 2 chose to cooperate.

Player 4 earned 2 and Player 2 earned -1

Player 4 and Player 3 are now playing.

Last time, Player 3 defected and Player 4 cooperated.

Player 4 chose to defect and Player 3 chose to defect.

Player 4 earned 0 and Player 3 earned 0

-GEN.csv : shows the trait change of the avatars over generations

	A	B	C	D	E	F	G	H
1	Generation 0							
2	Status of Players in generation 0							
3	Player 1 : base = 50	basefac = 0	memfac = 100	distfac = 0	repfac = 0	rep = 50	x = 640	y = 937
4	Player 2 : base = 100	basefac = 100	memfac = 0	distfac = 0	repfac = 0	rep = 50	x = 773	y = 355
5	Player 3 : base = 0	basefac = 100	memfac = 0	distfac = 0	repfac = 0	rep = 50	x = 4	y = 819
6	Player 4 : base = 65	basefac = 53	memfac = 65	distfac = 50	repfac = 14	rep = 50	x = 103	y = 956
7	Generation 19							
8	Status of Players in generation 19							
9	Player 1 : base = 94	basefac = 1	memfac = 68	distfac = 1	repfac = 38	rep = 50	x = 31	y = 838
10	Player 2 : base = 100	basefac = 1	memfac = 60	distfac = 7	repfac = 19	rep = 50	x = 53	y = 811
11	Player 3 : base = 100	basefac = 1	memfac = 76	distfac = 13	repfac = 19	rep = 50	x = 56	y = 806
12	Generation 49							
13	Status of Players in generation 49							
14	Player 1 : base = 95	basefac = 1	memfac = 36	distfac = 1	repfac = 81	rep = 50	x = 137	y = 796
15	Player 2 : base = 95	basefac = 1	memfac = 36	distfac = 13	repfac = 100	rep = 50	x = 149	y = 799
16	Player 3 : base = 100	basefac = 1	memfac = 28	distfac = 13	repfac = 75	rep = 50	x = 150	y = 788
17	Generation 79							
18	Status of Players in generation 79							
19	Player 1 : base = 95	basefac = 1	memfac = 36	distfac = 1	repfac = 81	rep = 50	x = 287	y = 706
20	Player 2 : base = 95	basefac = 1	memfac = 36	distfac = 13	repfac = 100	rep = 50	x = 299	y = 709
21	Player 3 : base = 100	basefac = 1	memfac = 28	distfac = 13	repfac = 75	rep = 50	x = 300	y = 698
22	Generation 99							
23	Status of Players in generation 99							
24	Player 1 : base = 95	basefac = 1	memfac = 36	distfac = 1	repfac = 81	rep = 50	x = 387	y = 646
25	Player 2 : base = 95	basefac = 1	memfac = 36	distfac = 13	repfac = 100	rep = 50	x = 399	y = 649
26	Player 3 : base = 100	basefac = 1	memfac = 28	distfac = 13	repfac = 75	rep = 50	x = 400	y = 638

-outData.csv : shows the state matrix

	A	B	C	D	E	F	G
40	Played 5 rounds.						
41		Total	Player 1	Player 2	Player 3	Player 4	
42	Total	(15: 0: 0)	(22: 1: 24)	(45: 4: 64)	(0: -1: -26)	(26: 1: 31)	
43	Player1	(20: 1: 18)	(1: 0: 0)	(1: 1: 15)	(0: 0: -1)	(0: 0: 4)	
44	Player2	(26: 1: 7)	(1: 1: 15)	(1: 0: 0)	(0: -1: -15)	(1: 1: 7)	
45	Player3	(26: 2: 52)	(0: 0: 2)	(1: 2: 30)	(1: 0: 0)	(0: 0: 20)	
46	Player4	(21: 1: 16)	(0: 0: 7)	(1: 1: 19)	(0: 0: -10)	(1: 0: 0)	
47							
48	Played 6 rounds.						
49		Total	Player 1	Player 2	Player 3	Player 4	
50	Total	(21: 0: 0)	(30: 1: 32)	(63: 4: 89)	(0: -2: -36)	(37: 3: 45)	
51	Player1	(28: 1: 26)	(1: 0: 0)	(1: 1: 21)	(0: 0: -1)	(0: 0: 6)	
52	Player2	(37: 1: 11)	(1: 1: 21)	(1: 0: 0)	(0: -1: -21)	(1: 1: 11)	
53	Player3	(36: 4: 72)	(0: 0: 2)	(1: 2: 42)	(1: 0: 0)	(1: 2: 28)	
54	Player4	(29: 0: 21)	(0: 0: 9)	(1: 1: 26)	(0: -1: -14)	(1: 0: 0)	
55							
56	Played 7 rounds.						
57		Total	Player 1	Player 2	Player 3	Player 4	
58	Total	(28: 0: 0)	(39: 0: 40)	(84: 5: 120)	(0: -2: -47)	(48: 3: 58)	
59	Player1	(38: 3: 37)	(1: 0: 0)	(1: 1: 28)	(0: 0: -1)	(1: 2: 10)	
60	Player2	(48: -1: 12)	(1: 1: 28)	(1: 0: 0)	(0: -1: -28)	(0: -1: 12)	
61	Player3	(47: 4: 94)	(0: 0: 2)	(1: 2: 56)	(1: 0: 0)	(1: 2: 36)	
62	Player4	(38: 0: 28)	(0: -1: 10)	(1: 2: 36)	(0: -1: -18)	(1: 0: 0)	
63							