

Axelrod

exploring the iterated
prisoner's dilemma

Axelrod-Python

- <https://github.com/Axelrod-Python>
 - Explore strategies for the Prisoners dilemma game
 - Over 100 strategies from literature and original ones
 - Run round robin tournaments with options
 - Population dynamics (i.e., evolution)
- Easy to install
 - pip install axelrod
- Also includes notebooks
- [Documentation](#)



Axelrod-Python

<http://axelrod.readthedocs.org/en/latest/>

<https://github.com/Axelrod-Python>

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Pinned repositories

- Axelrod**
A research tool for the Iterated Prisoner's Dilemma
Python 445 stars 167 forks
- tournament**
A repository to run the whole suite of strategies in the Axelrod library
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- Axelrod-fingerprint**
A repository of fingerprints of all strategies in the Axelrod-Python library
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- axelrod-dojo**
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Axelrod

A research tool for the Iterated Prisoner's Dilemma

python computer-science reproducible-research mathematics game-theory



Python 167 forks 445 stars 40 issues 4 pull requests Updated 2 days ago

axelrod-fortran

Python wrapper library around TourExec Fortran for Axelrod's second tournament

Python 0 forks 4 stars 1 issue 0 pull requests Updated on Dec 18, 2019

tournament

A repository to run the whole suite of strategies in the Axelrod library

Python MIT 5 forks 12 stars 3 issues 0 pull requests Updated on Oct 30, 2019

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Report abuse

Axelrod Players

- A player like TitForTat is a subclass of a Player class
- Every player subclass has a set of fixed properties (e.g., how many interactions it remembers)
- A subclass has instances with unique IDs
- Instances interact with “opponents”, who are instances of a player subtype
- Each instance maintains a history of its interactions with each opponent it encounters
- Its strategy for an encounter may depend on this

TitForTat

```
class TitForTat(Player):
    name = "Tit For Tat"
    classifier = {
        "memory_depth": 1,
        "stochastic": False,
        "inspects_source": False,
        "manipulates_source": False,
        ...}
```

*Remembers only
last interaction
with a given player*

```
def strategy(self, opponent: Player) -> Action:
    # First move
    if not self.history:
        return C
    # React to the opponent's last move
    if opponent.history[-1] == D:
        return D
    return C
```

*Note use of type
hints, added in 3.5*

TitFor2Tats

```
class TitFor2Tats(Player):
```

```
    """player starts by cooperating and then defects only after 2 defects by opponent"""
```

```
    name = "Tit For 2 Tats"
```

```
    classifier = {
```

```
        "memory_depth": 2,
```

```
        "stochastic": False,
```

```
        "inspects_source": False,
```

```
        "manipulates_source": False,
```

```
        ...}
```

Remembers last 2 interactions with a given player

```
@staticmethod
```

```
def strategy(opponent: Player) -> Action:
```

```
    return D if opponent.history[-2:] == [D, D] else C
```

Cooperates unless this opponent defected last two times

Bulley

```
class TitFor2Tats(Player):  
    """ player that behaves opposite to Tit For Tat, including first move """  
    name = "Tit For 2 Tats"  
    classifier = {  
        "memory_depth": 2,  
        "stochastic": False,  
        "inspects_source": False,  
        "manipulates_source": False,  
        ...}  
  
    @staticmethod  
    def strategy(opponent: Player) -> Action:  
        return C if opponent.history[-1:] == [D] else D
```

Predefined Player Strategies

- There are 24 variations on the basic *Tit For Tat* strategy
- And more than 100 other player strategies
- See an index [here](#) with brief descriptions and links to the Python source code