Hawk versus Dove

How would you play the game?

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A two-player game for food...

Hawk

Fight for food, and if you win keep all for yourself.

Dove

Make peace. You either share it or let it go.

How to score?

- Make a move without knowing your opponent's move.
- Reward for food: V
- Cost of injury: I
- Cost of interaction: C

Opponent ➤ / ▼ Player	**Hawk**	**Dove**
Hawk	$\frac{(V-I)}{2}$	V
Dove	0	$\frac{V}{2} - C$

Common Strategies

Swansea University
Prifysgol Abertawe

Copycat	I start with being a Dove, and then copy your last move.
Always Hawk	I will always be aggressive.
Always Dove	I will always be nice!
Grudger	I will be nice to being with, but if you wrong me then I will be aggressive all the way.
Detective	I will be a dove, then hawk, then dove twice, if you become a hawk in the last, I will be a copycat, otherwise, I will always be a hawk.

Who would win?

Go to **menti.com** and enter the code **85 41 43** to participate in the poll.

Let's play...

You can find the game in: `http://tiny.cc/y76sfz`
The file to run is called: **HawkVsDove_Game.ipynb**

- You are now going to play the game in pairs.
- You have a round of 10 games with an opponent, and note down your final score.
- Give yourself **two points** if you have won, and **a point** if you have drawn! No points for losing.
- Then move on and find a new opponent to play with. You are not allowed to play against someone you have played before.
- Once you have completed the list, i.e. you have played against 10 opponents, stop!
- Add the number of wins.

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  - Analyse the payoff matrix using hypothetical population of hawks and doves: **Game Theory**.

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Summary

- We played a game, and explored how to develop a winning strategy.
- We can do this more efficiently through a thorough mathematical analysis of hypothetical situations.
- Developing a strategy is useful in tackling real challenges in life.
- Copycat strategy is a good one in these scenarios: Be nice to people, when they are nice to you!
- Computer Science is cool!
  - We implemented the code to simulate the game.
  - We can analyse the problem and solutions using Game Theory, a part of Computer Science.

You can find more information: `http://tiny.cc/y76sfz`
The file to run is called: **HawkVsDove_Simulation.ipynb**