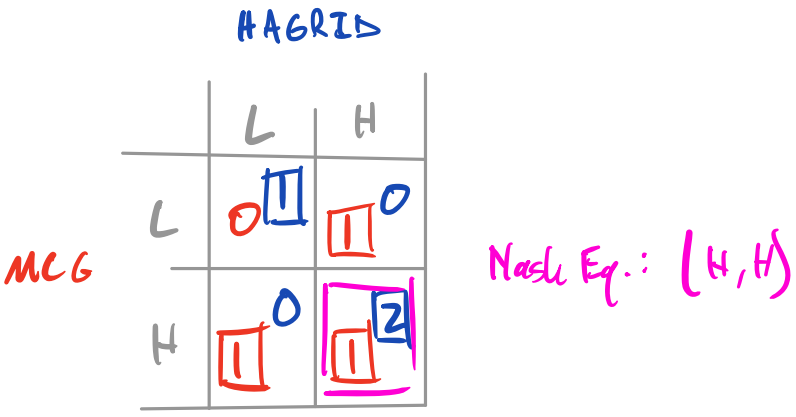
Econ 101 | Demo D3

Demo D3 is adapted from homework assigned in a previous semester.

Question 1 | Date Night

Hagrid and McGonagall planned a date night, but had forgotten to decide between two locations: the Leaky Cauldron or Hog's Head Pub. The time for the date was quickly approaching but neither knew where the other was going and didn't have an owl with which to communicate. McGonagall knew Hagrid likes going out with McGonagall ($\Pi = 1$) more than going out alone ($\Pi = 0$), but that he likes going out with her to Hog's head the best ($\Pi = 2$). Hagrid knew McGonagall likes going out to Hog's Head equally whether with or without Hagrid ($\Pi = 1$), but that she only likes going to the Leaky Cauldron alone ($\Pi = 0,1$). Find the Nash Equilibrium.



Question 2 | Study Room Dynamics

Students in Ravenclaw and Hufflepuff share a secondary study room, which is open to all students from both houses at all hours. Every year the heads of house from both houses organize sharing cleaning duties. Cleaning improves the usefulness of the study room for members of both houses, but the chore is inconvenient. If both houses clean, the study room is a fantastic resource. But cleaning takes precious time away from studying, so neither house prefers doing it. The following matrix represents the benefits of each possible strategy combination.

		Hufflepuff: Clean	Hufflepuff: Don't Clean
Ravenclaw	Clean	10, 10	6, 12
	Don't Clean	12, 6	8, 8

a) Ravenclaw

What is Ravenclaw's best response?

$$BR_R = \begin{cases} D & \text{if } \sigma_H = C \\ D & \text{if } \sigma_H = D \end{cases}$$

b) Hufflepuff

What is Hufflepuff's best response?

$$BR_H = \begin{cases} D & \text{if } \sigma_R = C \\ D & \text{if } \sigma_R = D \end{cases}$$

c) Nash Equilibrium

Does this game have a Nash equilibrium? If yes, what is the Nash equilibrium?

Yes: the NE: (D, D).

Question 3 | The Dumbledor Memorial

Three Dumbledores were considering whether to install a memorial of their brother Albus in their town. The individual marginal benefits for three Dumbledors is below.

	Aurelius	Aberforth	Ariana
	75	10	20
b)	✓	✗	✗

Any of the three are able to enjoy the statue, regardless of whether they helped pay for it. And it costs 90 galleons per year to operate and maintain the memorial.

a) Continued Funding

There's an endowment to fund the memorial for a year. How many of the Dumbledores value this memorial enough to visit? Simply considering their financial interests, how many Dumbledores will contribute to the memorial's continued operation?

The memorial is open to the public, so all will visit since they have a positive marginal benefit. Under simple financial considerations, none will contribute.

b) The Referendum

Aurelius proposes a referendum that would raise residents' taxes by 30 galleons per year, and puts it to a vote. If each Dumbledor voted in their own private interests, would this referendum receive a majority vote?

Only Aurelius has a marginal benefit greater than the cost of the memorial, voting yes. So the vote would fail 1 to 2.

c) Marginal Social Benefit

What is the marginal social benefit from the memorial?

The marginal social benefit is 75+10+20 = 105.

d) Efficiency

If the referendum passed, would it lead to an efficient outcome?

Yes. The marginal social cost of the referendum is 90. So since MSB = 105 is greater than MSC = 90, the social planner would implement the policy, even though the vote failed.