HW1, Q1

- For Exp 1 in M1-1, with $a^0 = 1, \gamma^0 = 0.05$, what is the value of a^1 when gradient descent algorithm is applied (round up to 1 digits after decimal point)?
  - A: 2.0
  - B: 1.3
  - C: 2.7
  - D: 1.0

x_i	1.0	2.0	3.5
y_i	2.1	3.98	7.0

$$\min_a \sum_{i=1}^{3} (y_i - ax_i)^2$$
$$\text{s.t. } a \in \mathbb{R}$$

HW1, Q2

- For Exp 1 in M1-1, what is the optimal value of a? (round up to 3 digits after decimal point)

x_i	1.0	2.0	3.5
y_i	2.1	3.98	7.0

$$\min_a \sum_{i=1}^{3} (y_i - ax_i)^2$$
$$\text{s.t. } a \in \mathbb{R}$$

HW1, Q3

- In Exp 2 in M1-1, if the unit price of product 2 is $20, what is the optimal solution? (round up to 1 digit after decimal point)

	Price	Labor	Machine
Product 1	$30	0.2 hour	4 hour
Product 2	$20	0.5 hour	2 hour
Total		<=90	<=800

HW1, Q4

- In Exp 2 in M1-1, if we require the numbers of units of products to be integers, what is the optimal solution?

	Price	Labor	Machine
Product 1	$30	0.2 hour	4 hour
Product 2	$30	0.5 hour	2 hour
Total		<=90	<=800

HW1, Q5

- List all Nash equilibria (NE) for the following game (round up to 1 digit after decimal point)

		Payer 2	
		c	d
Player 1	a	3,5	2,9
	b	4,8	5,3

HW1, Q6

- What is the Strong Stackelberg Equilibrium (SSE) for the following game? (round up to 3 digits after decimal point)

		Payer 2	
		c	d
Player 1	a	5, -3	-1, 1
	b	-5, 4	2, -1

HW1, Q7

- Which game models are suitable for modeling the Cuban Missile Crisis?
  - A: Chicken Game
  - B: Battle of Sexes
  - C: Prisoner's Dilemma
  - D: Matching Pennies

HW1, Q8 (Bonus Question)

- A conservation area is divided into 3 by 3 grid. The distance between any neighboring cells is 1 (4-connected neighbors). There is only one patroller whose patrol route has to start from and end with the cell at the center, with a distance limit of 4. She can only move to her 4-connected neighbors when she patrols. She can find and confiscate any snare places along her patrol route. The poacher chooses one cell to place snares. The numbers in the following figure show the reward for the poacher if his snare is not found by the patroller. There is no cost for the poacher if his snare is confiscated by the patroller. What is the poacher's expected reward when the defender plays an optimal strategy (round up to 1 digit after decimal point)? Assume the poachers can observe the defender's mixed strategy but not the exact path before placing snares. The patroller's goal is to minimize the poacher's reward.

6	9	3
5	0	1
7	4	8