Problem 1: Most of the time we are interested in the following properties of matchings:

- Individual rationality
- Pareto efficiency
- Incentive compatibility

What properties does the Random serial dictatorship with squatting rights exhibit?

Problem 2: Let $I_E = \{i_1, i_2, i_3\}$, $I_N = \emptyset$, $H_O = \{h_1, h_2, h_3\}$, and $H_V = \{h_4\}$. Here the existing tenant i_k occupies the house h_k for $k = 1, 2, 3$. Let the ordering f order the agents as $i_1 - i_2 - i_3$ and let the preferences (from best to worst) be as follows:

P_{i_1}	P_{i_2}	P_{i_3}
h_2	h_3	h_1
h_3	h_1	h_4
h_1	h_2	h_3
h_4	h_4	h_2
h_0	h_0	h_0

Find the outcome of Random serial dictatorship with waiting list. Is it Pareto efficient?

Problem 3: Let $I_E = \{i_1, i_2, i_3, i_4\}$, $I_N = \{i_5\}$, $H_O = \{h_1, h_2, h_3, h_4\}$, and $H_V = \{h_5\}$. Here the existing tenant i_k occupies the house h_k for $k = 1, 2, 3, 4$. Let the ordering f order the agents as $i_1 - i_2 - i_3 - i_4 - i_5$ and let the preferences be as follows:

P_{i_1}	P_{i_2}	P_{i_3}	P_{i_4}	P_{i_5}
h_3	h_4	h_5	h_3	h_4
h_4	h_5	h_3	h_5	h_5
h_5	h_2	h_4	h_4	h_3
h_1	h_3	h_2	h_2	h_1
h_2	h_1	h_1	h_1	h_2
h_0	h_0	h_0	h_0	h_0

Find the outcome of MIT-NH4 mechanism. Is it Pareto efficient?

Problem 4: Let $I_E = \{i_1, i_2, i_3, i_4\}$, $I_N = \{i_5\}$, $H_O = \{h_1, h_2, h_3, h_4\}$, and $H_V = \{h_5, h_6, h_7\}$. Let the ordering f order the agents as $i_1 - i_2 - i_3 - i_4 - i_5$ and the preferences (from best to worst) as follows:

P_{i_1}	P_{i_2}	P_{i_3}	P_{i_4}	P_{i_5}
h_2	h_7	h_2	h_2	h_4
h_6	h_1	h_1	h_4	h_3
h_5	h_6	h_4	h_3	h_7
h_1	h_5	h_7	h_6	h_1
h_4	h_4	h_3	h_1	h_2
h_3	h_3	h_6	h_7	h_5
h_7	h_2	h_5	h_5	h_6
h_0	h_0	h_0	h_0	h_0

Use YRMH-IGYT (You request my house-I get your turn) to find the outcome of this matching problem.