

# Exam Decision and Risk analysis in Operations Management

Q1: Stable matchings (10 points)

- A. Use Gale-Shapley Algorithm
- B. Is this assignment efficient? Explain
- C. Question where you had to use the concept of blocking pairs

Q2: Game Theory (10 points)

- A. Use the best dynamic response method on a congestion game

Q3: Decision Tree Classifier (10 points)

- A. Make a decision tree with a depth of 2 for a certain dataset (2 categorical and 1 numerical attribute)

Q4: Infinite MDP (10 points)

- A. Define the states, transition probabilities (4 points)
- B. Use 1 loop of Policy Iteration with  $\beta$  (4 points)
- C. Conceptual question about the meaning of  $\beta$  (Should  $\beta$  increase or decrease?) (2 points)

Q5: Cost-Sharing in Cooperative games

- A. Define the cost function and the players (3 players)
- B. Calculate the Shapley-Value
- C. Is the cost function submodular?