**CSE 5319/6319 Homework 3**

Due April 3, 5:00 p.m. on Canvas

1. Show that the following instance of stable marriages has two stable matchings. (15 points)

A B C D E 1 2 3 4 5

5 2 3 3 3 A E A B B

1 3 5 1 2 D B B E D

3 5 4 2 4 C A C C A

4 4 1 4 5 B C E A E

2 1 2 5 1 E D D D C

2. Find three maximum-cardinality, pareto-optimal solutions for the following instance of house allocation. (25 points)

A1: H3 H4 H5 H2 H1

A2: H1 H2 H5 H4 H3

A3: H5 H1 H4 H2 H3

A4: H3 H4 H2 H1 H5

A5: H5 H3 H2 H4 H1

3. A man dies, leaving an estate worth $550. The deceased has three widows with marriage contracts of $125, $225, and $325. Divide the estate among the widows, using the Rule of Linked Vessels. (15 points)

4. Solve problem 3 using the O’Neill’s law/race-to-the-bank method (Shapley Value). (15 points)

5. A man dies, leaving an estate worth $275. The deceased has three widows with marriage contracts of $50, $100, and $200. Divide the estate among the widows, using the Rule of Linked Vessels. (15 points)

6. Solve problem 5 using the O’Neill’s law/race-to-the-bank method (Shapley Value). (15 points)