VIENNA UNIVERSITY OF TECHNOLOGY

105.625 PR ADVANCED ECONOMICS PROJECT

Double Sided Matching

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1 Introduction

In this project we investigated the double sided matching problem (also known as the stable matching problem) along with its application in economics. At the beginning a theoretical overview in algorithmic game theory is provided. Afterwards we implemented a functional prototype in NetLogo[1]. This prototype was evaluated based on two matching problems: matching of students seeking an university place and universities offering those places in Austria and the matching of the labor supply and labor demand in the European Union.

Clemens will be here!

2 Theory

2.1 The Double Sided Matching Problem

Clemens & Flo will be here!

The double sided matching problem...

The stable matching problem refers to the problem of finding a matching between two sets of elements which may be equally sized. In [2, p. 9] this problem is firstly described based on an example of college admission: a college is considering a set of n applicants of which it can admin only a quota of q.

The assignment of students and colleges is not allowed to be unstable, i.e. there are two applicants α and β who are assigned to colleges A and B although β prefers A to B and A prefers α to β. If this does not occur, the assignment is called *stable*. In case there is more than one stable solution the *optimal* one is of particular interest. In the previously mentioned college example a stable assignment is called *optimal* if every applicant is at least well off as it would be under any other stable assignment [2, p. 10]. In Economics this is also known as pareto efficiency [3, p. 46].

2.2 Gale and Shapley Algorithm

Clemens & Flo will be here!

2.3 Relevance to Game Theory

Mattias & Thomas will be here!

3 Prototype

3.1 Subsection

Text...

4 Prototype Evaluation: College Applications in Austria

4.1 Subsection

Text...

5 Prototype Evaluation: Labor Market in the European Union

5.1 Subsection

Text...

6 Summary and Future Work

6.1 Subsection

Text...

7 Example

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$$\begin{aligned}(x+y)^3 &= (x+y)^2(x+y)\\ &= (x^2+2xy+y^2)(x+y)\\ &= (x^3+2x^2y+xy^2)+(x^2y+2xy^2+y^3)\\ &= x^3+3x^2y+3xy^2+y^3\end{aligned} \tag{7.1}$$

Phasellus viverra nulla ut metus varius laoreet. Quisque rutrum. Aenean imperdiet. Etiam ultricies nisi vel augue. Curabitur ullamcorper ultricies

Figure 7.1: One angry bird.

7.1 Heading on level 2 (subsection)

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$$A = \begin{bmatrix} A_{11} & A_{21} \\ A_{21} & A_{22} \end{bmatrix} \tag{7.2}$$

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7.1.1 Heading on level 3 (subsubsection)

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7.2 Example for list (3*itemize)

- First item in a list
  - First item in a list
    - First item in a list
    - Second item in a list
  - Second item in a list
- Second item in a list

7.3 Example for list (enumerate)

1. First item in a list
2. Second item in a list
3. Third item in a list

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References

[1] Uri Wilensky. *NetLogo*, 2016, Accessed March 16, 2016. https://ccl.northwestern.edu/netlogo/.

[2] D. Gale and L. S. Shapley. College admissions and the stability of marriage. *The American Mathematical Monthly*, 69(1):9–15, 1962.

[3] Nicholas Barr. *Economics of the Welfare State*. Oxford University Press, 2012.