Popular Matchings: A survey of the state of the art

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Abstract. In this paper, we aim to provide a general outline of our study of Popular Matchings. We begin by describing the evolution of this field, from studies of matchings, to generalizations, and the study of certain aspects of Popular Matchings. We then outline a certain kind of matchings, and the actions possible by agents involved in the matchings .....

1 Introduction

1.1 Matchings to Popular Matchings

In this paper, we discuss matchings in a bipartite graph G, with vertices $\in A \cup P$, and edges of the form $(a, b) : \{a \in A, b \in P\}$. For every one of the vertices in A, corresponding to an Applicant, we have a preference list P_a, which contains a rank assignment to every one of the edges incident on it. These lists make divide the edges of the graph into sets according to their preferences, E_1 denoting the set of all edges which have been given rank 1 by any of the vertices neighbouing it. This holds for the corresponding edge sets $E_2, E_3 \cdots E_n$. These preference lists indicate the choice of each of the Applicants, in the set A. When we say that an applicant A prefers edge e_a to edge e_b, we mean that e_a appears higher than e_b in the preference list of A, or that $b\, a$.

Consider a matching M in G, the given graph instance. For a matched vertex v, we use $M(v)$ to represent the matched vertex of v in M.

An applicant, therefore, can be said to prefer a matching M_1 to a matching M_2 if

- he/she prefers $M_1(a)$ to $M_2(a)$
- he/she is unmatched in M_2 and is matched in M_1

An applicant a is indifferent between the two matchings, if $r_a(M_1(a)) = r_b(M_2(a))$.

A matching M_1 is said to *more popular* than matching M_2, represented as $M_1 \succ M_2$, if the number of applicants who prefer M_1 to M_2 are strictly more than those who prefer M_2 to M_1 .

A matching M is said to be *popular*, if there does not exist any matching M_1 such that $M_1 \succ M$.

References

[RE1] Author: Article/Book: Other info: (date) page numbers.