LSU Math Circle Research Proposal

Introduction to Algorithmic Combinatorics

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Category: Combinatorics (Calculus not required)

Abstract: Imagine that \( n \) different students apply to \( p \) different universities. Each student ranks the universities by preference (he might not rank some of them) and each university ranks the students that apply to it (based on grades and extracurricular activities for instance). How does one assign each student to a university to make everyone happy?

Each student cannot get in their favourite university because the number of spots in each university is limited. Therefore, one would like each student to be assigned to a university that they ranked high but that still has a spot for them. But that is not all, one would not like to have a student \( a \) assigned to a university \( A \) and a student \( b \) assigned to a university \( B \) while \( a \) would have preferred to be admitted to \( B \) and \( b \) would have preferred to be admitted to \( A \) (based on their respective rankings).

One should thus try to achieve stable matches in which case the above situation does not happen. In this project, we will study how to create these stable matches, their properties and code some examples using python.

☑ This research proposal has the potential for continued research after the program.

REFERENCES