Matching Game with Your School

——A Study on School Selection Mechanism

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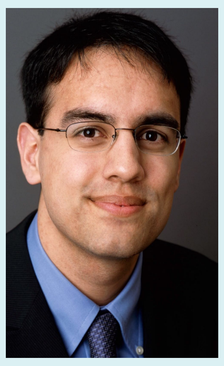
*This poster mainly introduces **Parag Pathak**, 2018 John Bates Clark Medal winner, and his contribution to market design, especially the significant improvements in the application of market-design tools to the allocation of students to schools. We compare two school selection mechanisms, the old Boston System and the new Deferred Acceptance System. Although the former is prevailing in the U.S., more regions have adopted the Deferred Acceptance System, such as New York and Chicago. The new mechanism induces students to truly represent their preference and improves stability.*

Website | Audio Guidance (English) | Audio Guidance (Mandarin)

Profile



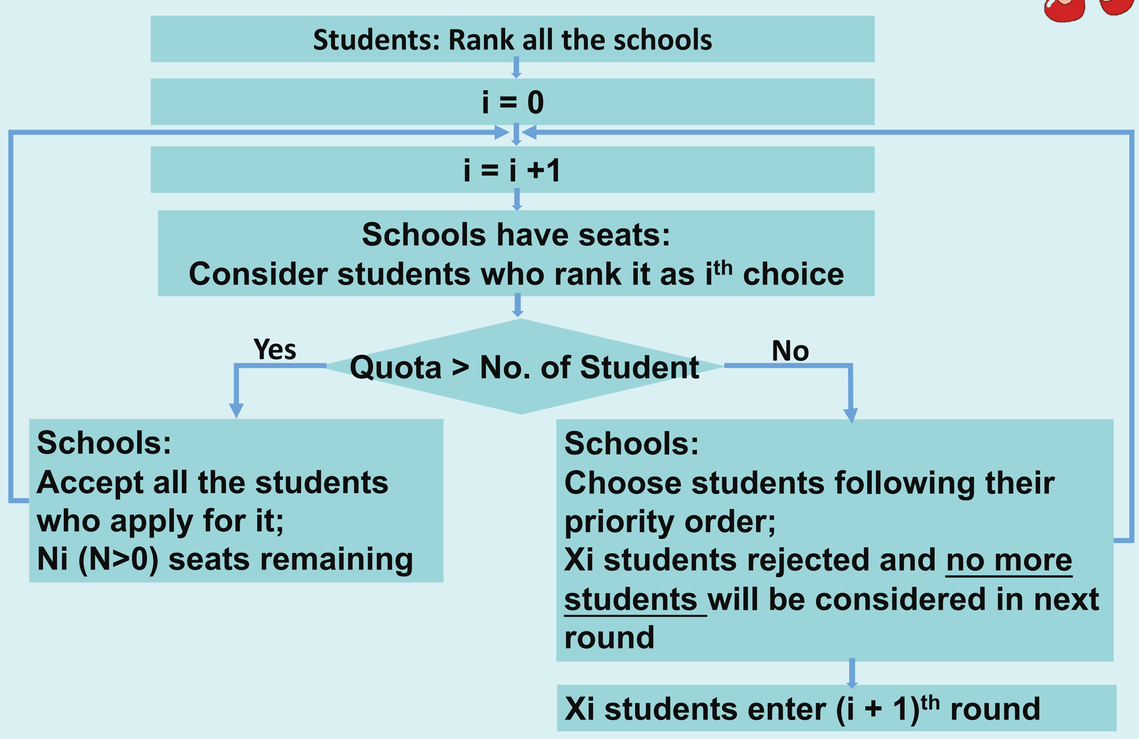
2002-2007 Education

- A.B., Harvard, Applied Mathematics, 2002
- S.M., Harvard, Applied Mathematics, 2002
- Ph.D., Harvard, Business Economics, 2003-2007

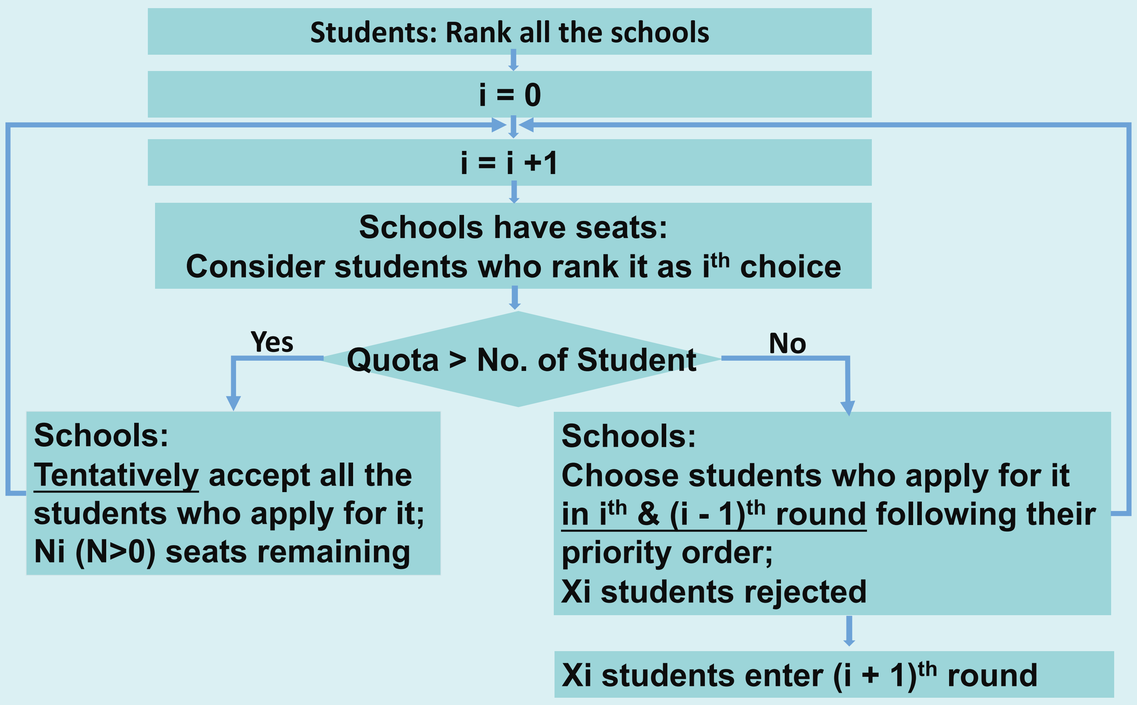
2008-Now Career

- Co-director of NBER, Working Group on Market Design, 2008
- Founder of MIT School Effectiveness and Inequality Initiative,2011
- Professor of Microeconomics(MIT),2016
- John Bates Clark Medal winner, American Economic Association,2018

Comparison: Boston Mechanism



Comparison: Deferred Acceptance Mechanism

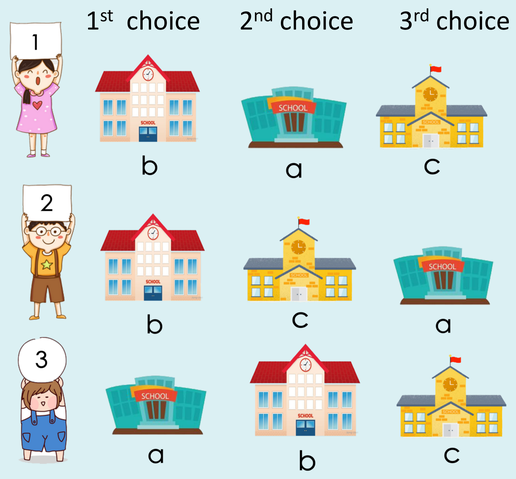


Model: Assumptions

Assumption1:There are 3 schools and 3 students. The utilities of different students from choosing different schools are as follows:

Table of utilities

	School_a	School_b	School_c
Student_1	1	2	0
Student_2	0	2	1
Student_3	2	1	0



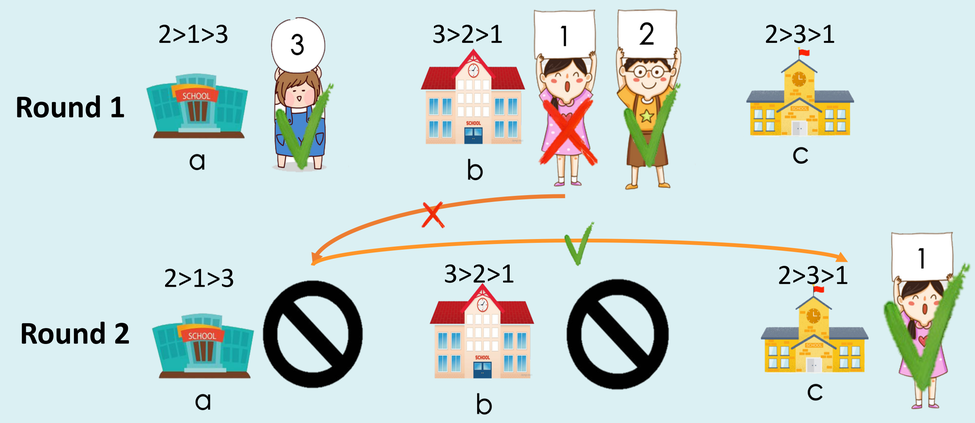
Assumption2: Preferences of Schools

For school_a, Student_2 > Student_1 >Student_3
For school_b, Student_3 > Student_2 >Student_1
For school_c, Student_2 > Student_3 >Student_1

Assumption3: Student 3 will always tell the truth about her preference while Student 1 & Student 2 can choose to lie or not.

Model: Example of BM Model

If all of them report their true preferences…



As a result…

Student	School	Utility
1	a	0
2	b	2
3	c	2

→ Both Student 1 & 2 can lie, and Student 1 has incentive to lie in order to improve her utility. If she lies, Student 2 may also choose to lie.

Student 1 & 2 can lie, so each of them has 6 kinds of ways to rank schools. Student 3 can only rank schools as her true preference.

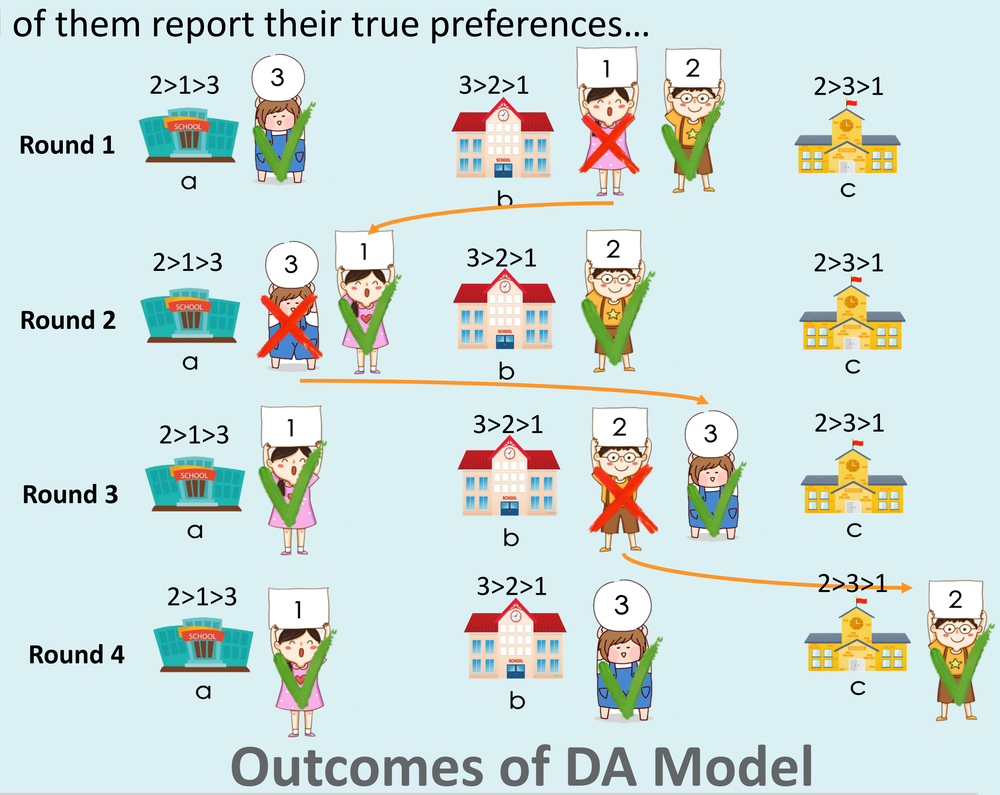
Outcomes of BM Model

Student_1 \ Student_2	a>b>c	a>c>b	b>a>c	b>c>a	c>a>b	c>b>a
a>b>c	(0,0,1)	(0,0,1)	(1,2,0)	(1,2,0)	(1,1,1)	(1,1,1)
a>c>b	(0,01)	(0,0,1)	(1,2,0)	(1,2,0)	(1,1,1)	(1,1,1)
b>a>c	(2,0,0)	(2,0,0)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)
b>c>a	(2,0,0)	(2,0,0)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)
c>a>b	(0,0,1)	(0,0,1)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)
c>b>a	(0,0,1)	(0,0,1)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)

○ Outcome of telling truth ≠ Nash Equilibrium

Model: Example of DA Model

If all of them report their true preferences…



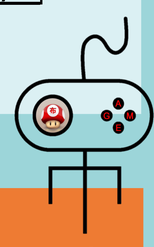
Outcomes of DA Model

Student_1 \ Student_2	a>b>c	a>c>b	b>a>c	b>c>a	c>a>b	c>b>a
a>b>c	(0,0,1)	(0,0,1)	(0,0,1)	(1,1,1)	(1,1,1)	(1,1,1)
a>c>b	(0,01)	(0,0,1)	(0,0,1)	(1,1,1)	(1,1,1)	(1,1,1)
b>a>c	(0,0,1)	(0,0,1)	(0,0,1)	(1,1,1)	(2,1,2)	(2,1,2)
b>c>a	(0,0,1)	(0,0,1)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)
c>a>b	(0,0,1)	(0,0,1)	(0,2,2)	(0,2,2)	(1,1,1)	(1,1,1)
c>b>a	(0,0,1)	(0,0,1)	(0,2,2)	(0,2,2)	(2,1,2)	(2,1,2)

○ Outcome of telling truth = Nash Equilibrium

Conclusion

Compared with the BM model, DA model is strategy-proof, ie. you are at least **NOT WORSE** by being truthful, regardless of what the others do. Therefore, each student in DA Mechanism has **NO INCENTIVE** to deviate from telling truth. As a result, DA algorithms identify a **STABLE** match.



Game

Find your Mr. Right

Use some words to describe yourself, like
Humorous , Loyal , Gentle
Easy-going , Considerate
Enthusiastic , Modest
Smart, Romantic
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