



Ethics & Public Policy

THE NYCDOE HS MATCHING ALGORITHM

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THE NYCDOE HS MATCHING PROCESS

The New York City public school system uses an algorithm to determine which high schools middle-school students will attend. The goal of the algorithm is to match as many students as possible—out of the roughly 80,000 who apply to the city's public high schools each year—with their top choice schools while taking into account the schools' admission criteria and the availability of seats.

*The city's specialized high schools such as Stuyvesant, Brooklyn Tech, and LaGuardia are exempt from this procedure—admission to these schools is based solely on the specialized high school test or an audition.

Source: NYC Independent Budget Office

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THE BIG QUESTION

What is the goal of the HS
Matching process?

Is the goal to create a meritocracy in which the highest performing students are matched to NYC's "best" schools?

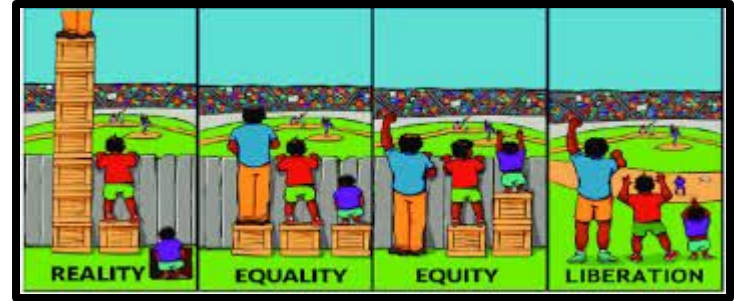
OR

Is the goal to create access for capable but underprivileged students? AND To decrease discrimination and inequity?

GOAL?



OR



ETHICAL CONSIDERATION



Is this algorithm increasing equity
or encoding inequality?



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Examining the Process

THE NYCDOE HS MATCHING ALGORITHM

The Gale-Shapley Algorithm

THE SECRET RULES OF MODERN LIVING ALGORITHMS

HOW THE
MATCHING
ALGORITHM
WORKS



RANKING DECISIONS



Students

Students have the option to rank up to 12 schools on their application from the NYCDOE school directory.

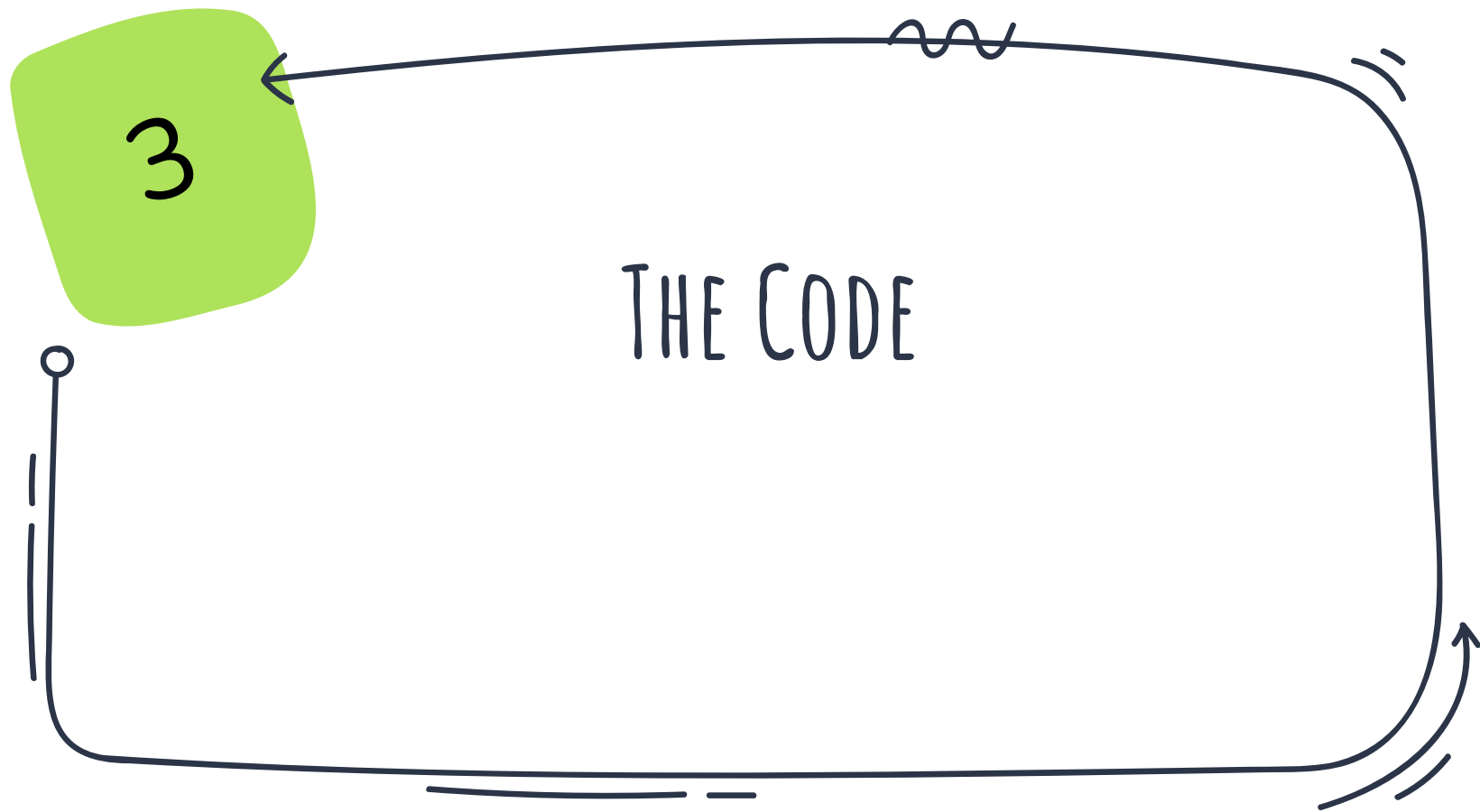


Screened Schools

Schools get a list of their applicant pool and are required to rank each student in the pool.
*more on this later.









MATCHING ALGORITHM: IMPLEMENTED IN JAVA

```
public static void match(ArrayList<Student> students, ArrayList<School> schools)
{
    boolean anotherRound = true;
    int round = 1;

    /* Loop while it is still possible to match students. */
    while(anotherRound)
    {
        System.out.println("\nROUND " + round + "\n");
        //Check each Student's current top choice and place them in the school's pool
        for(Student s: students)
        {
            //Ignore students that are already matched
            if(s.canBeRanked())
            {
                //get first choice
                int schoolID = s.topChoice();
                //place in school pool
                schools.get(schoolID-1).addToPool(s);
            }
        }
        //end students loop
    }
}
```

```
/* Place students from the pool into their chosen Schools
** IF the schools ranked them high enough */
for(School s: schools)
    s.fillSchool();

/* Print out the state of each student at the end of the round.
** AND
** Check if there are any students left to be ranked.
*/
anotherRound = false;
for(Student s: students)
{
    System.out.println(s);
    if(s.canBeRanked())
        anotherRound = true;
}
round++;
} //end while loop
} //end match
```

GET THE CODE



repl.it



GitHub





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NYCDOE HS MATCHING PROCESS:
SUSTAINING SEGREGATION

RACE OF WHO APPLIES VS. WHO GETS IN TO SELECTIVE NYC HIGH SCHOOLS

“New York has one of the most segregated school systems in the country, especially for black students. Many of the most desirable, highest-performing schools have a gross disparity between the racial breakdown of who applies versus who eventually attends those schools.”

[Source: FastCompany](#)

■ % White ■ % Black ■ % Asian ■ % Hispanic ■ % Other ■ % Undisclosed

Bard High School Early College



Beacon High School



Eleanor Roosevelt High School



N.Y.C. Lab School for Collaborative Studies



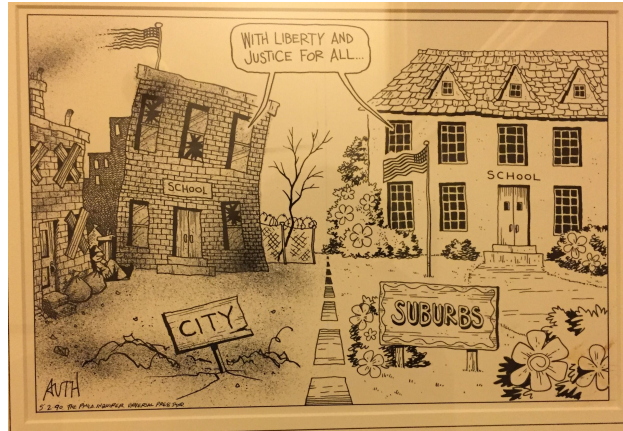
HOW SCHOOLS RANK

NYC High Schools **do not** have a universal method of ranking student applicants.

- X X Schools receive a de-identified list of students and their associated data: attendance records, test scores, report card grades etc...
- X X The data is de-identified with the hopes that it will remove implicit bias.
- X X School ranking teams determine how to rank the applicant pool.
 - X Some schools have district priorities.
 - X Some schools have lotteries.
 - X Some schools require interviews.
 - X Others rank based the student's data alone.

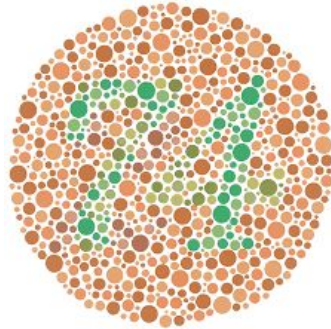
INSTITUTIONAL RACISM

If this were an ideal world and all students came into the process with identical means and resources, then a meritocracy would not create the equity issues or segregation that is prevalent in NYC public schools.



INSTITUTIONAL RACISM

Color-blind algorithms tend to replicate racial disparity and that is exactly what is going on with the NYCDOE HS Matching process and matching algorithm. The problem with this algorithm is that students are frequently screened by test scores and it ends up reinforcing existing inequality.

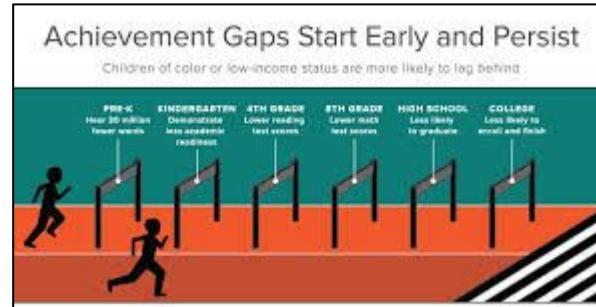


INSTITUTIONAL RACISM

Students who have access to good middle schools, private tutors, and test prep outperform students with less means. Unfortunately, this means historically disadvantaged groups of students are being denied access and thus the cycle continues.



Before



After

==



DIVERSITY INITIATIVES

Schools across New York City are participating in an initiative to increase diversity within their schools. Some schools give an admissions priority to students who are English Language Learners (ELLs) or Emerging Multilingual Learners (EMLs), are in the child welfare system, are in temporary housing, or are low-income.

Source: NYCDOE



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HACKING THE
HS MATCHING PROCESS
TO CREATE EQUITY & ACCESS



AUTOMATING DECISION SYSTEMS CAN INCREASE DISCRIMINATION AND INEQUALITY.

We can decide when the City should or shouldn't automate decisions. We can ask the tough questions to make sure that government systems don't leave out those of us who have historically been, or are currently being ignored. We can bring together our diverse experiences to make our voices stronger.

Source: automating.nyc

STUDENT HACKATHON

Create a prototype of a new algorithm that would take into account the **race** of students so that high schools might better reflect the diversity of the city.

Create a prototype of a new algorithm that would take into account the **holistic context of students experiences & access** so that high schools might better reflect the diversity of the city.

FIN

Any questions?

- X Margie MonteLeon
- X Alex Torres

THANK
YOU