


Project 20: Redistricting School Zones in Durham County

The title is enclosed in a dashed rectangular border. A dashed arrow in the top right corner points from the right side of the box back to the top left. A dashed arrow in the bottom left corner points from the bottom right of the box back to the top left. A solid vertical line with an upward-pointing arrow is located on the right side of the dashed box.

Introducing the Team



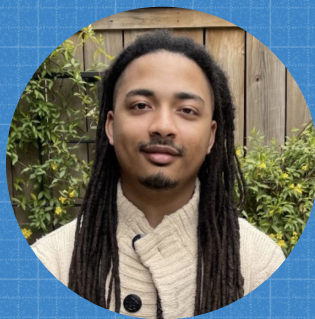
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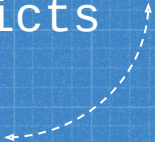


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BACKGROUND



on Durham county and its history
regarding school districts



History of Segregation in Schools

- Brown v. Board of Education-1954
 - Supreme court ruled racial segregation in public schools to be unconstitutional
- The Fair Housing Act-1968
 - prohibits discrimination in the sale, rental, and financing of housing based on race, color, national origin, religion, sex, disability, and familial status.
 - Purpose was to reverse housing segregation



Current Segregation

- More than half of students attend racially concentrated districts
 - over 75% of students are either white or nonwhite
- Racially concentrated non-white school districts receive on average \$2,226 less in funding per student per year than predominantly white school districts
- property taxes and locally raised taxes make up about half of all education funding and the state tries to make up the rest

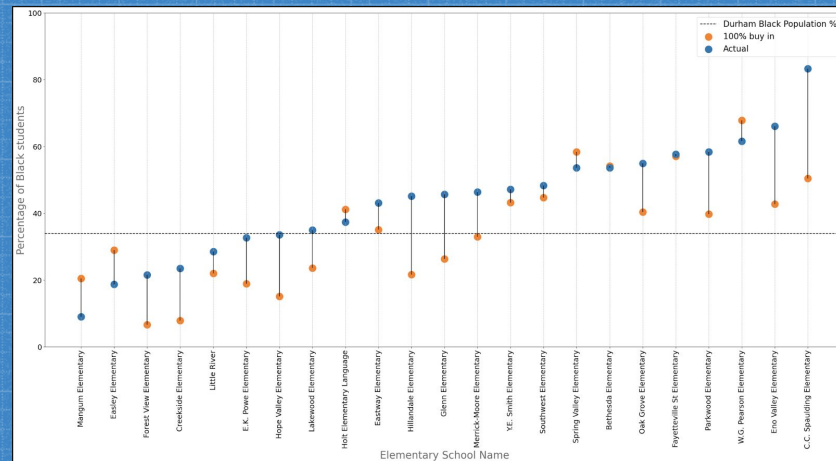
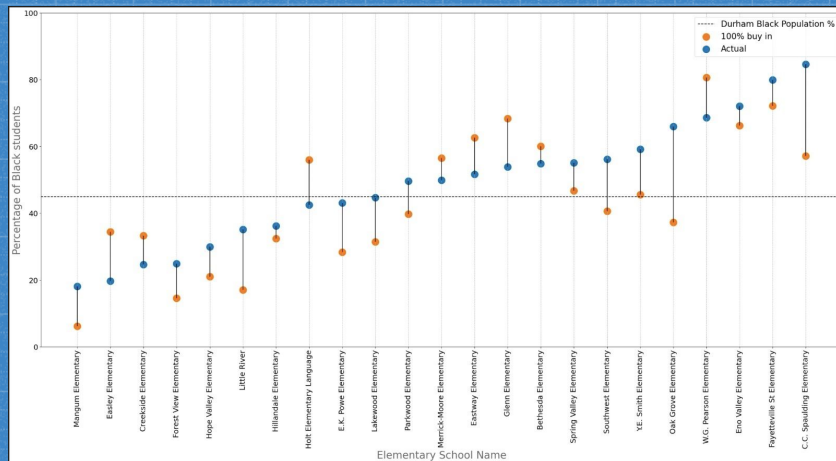


Durham's History with Segregation

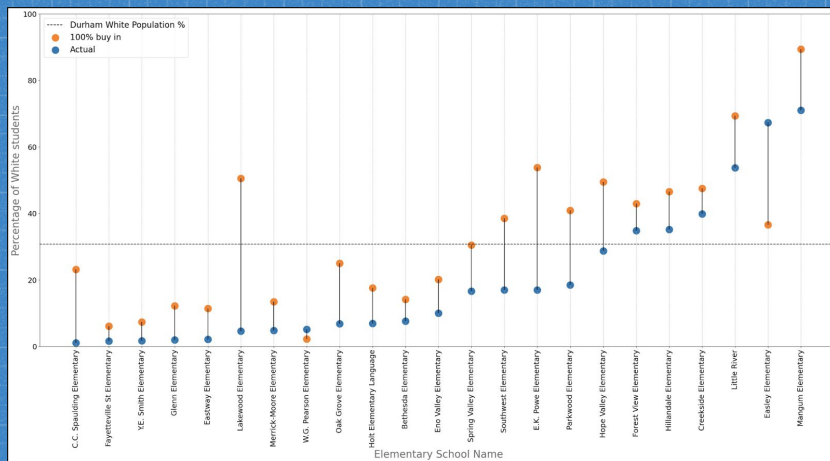
- Durham had two public school districts
- Formally desegregated in 1970
 - Triggered white flight
 - Eventually merged districts
- In 2007, number of charter schools increased
 - No guidelines to ensure they mirror Durham racial demographics
 - Concentrated students of color and poorer students in district schools



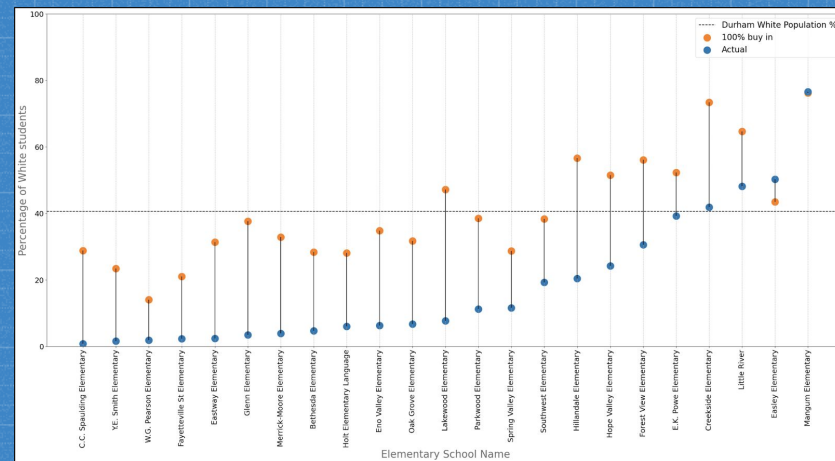
Durham County Buy-In Actual vs 100% Buy-In Black Population



Durham County Buy-In Actual vs 100% Buy-In White Population



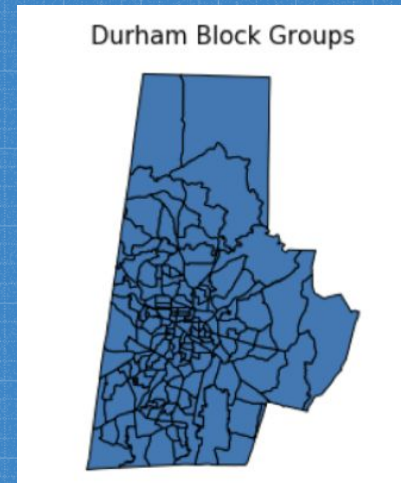
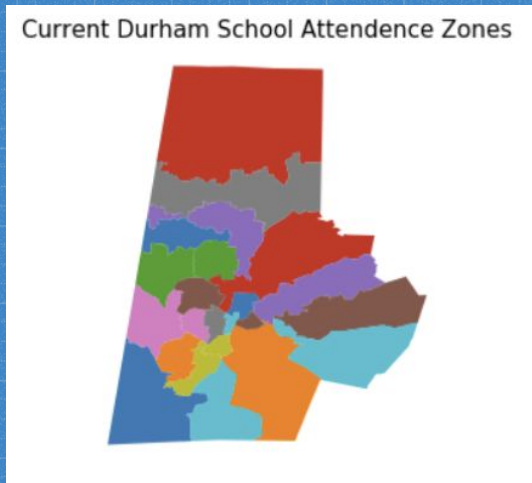
2010



2018

Our Perspective on Integration

- Integration in public schools promotes more equitable access to resources and funding
- Solution:
 - Integrate Durham's school zones via redistricting
 - For each redistricting create a new set of attendance zones based on geographic units including attributes most beneficial for students.



Overall Project Goal

1. A comprehensive integration plan
2. To create districts influenced by the following criteria:
 1. Socioeconomic status
 2. Race (integration)
 3. Walkability
 4. One school per district





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CURRENT WORK



What we've accomplished so far
in a technical aspect



SOFTWARE AND DATA

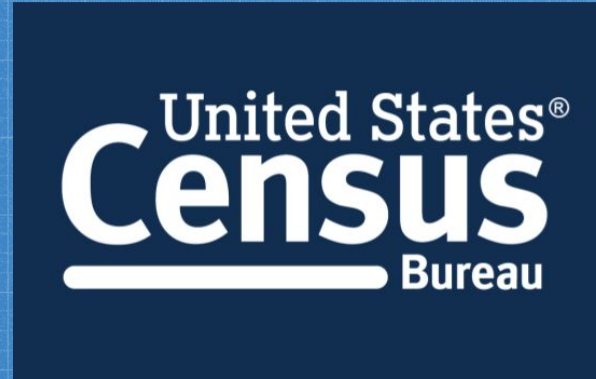
Software

Geopandas, pandas, and QGIS



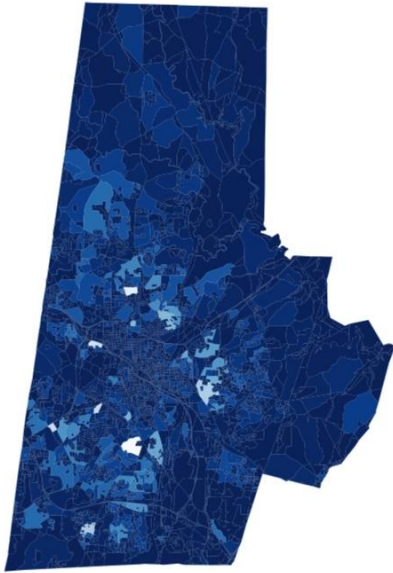
Data

US Census and GSS

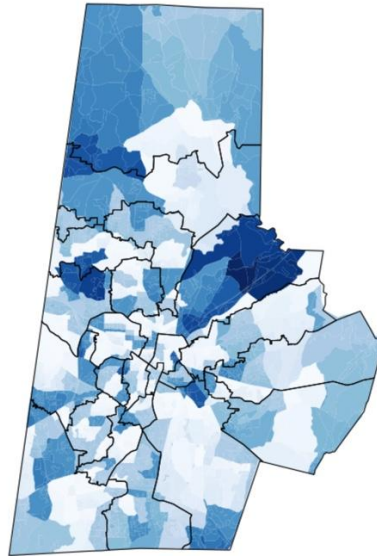


SOFTWARE AND DATA

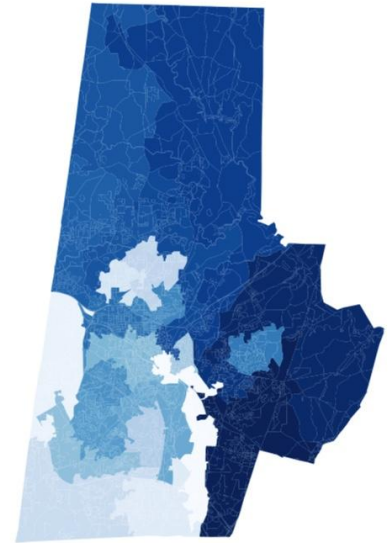
Geopandas and QGIS allow us to visualize shapefiles, and pandas allows us to manipulate data in shapefiles



Population 5 to 9
Darker Blue = More Children



Districts over Census Blocks
Black Outline is Current Districts



Initial Redistricting Plan

DEVELOPING INITIAL DISTRICTS

1. Find locations of schools

- Assures that no more than one school will be placed in each district

2. Add population by census block of elementary age children

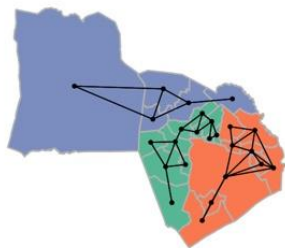
- Determines how many census blocks should be contained in each district

3. Develop output set of preliminary districts

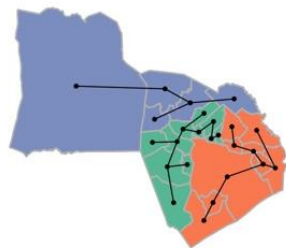
HOW DOES THE CODE MAKE DISTRICTS?



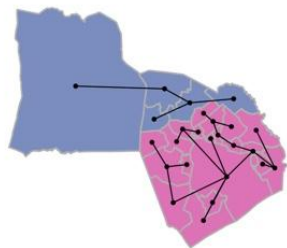
(a) Graph



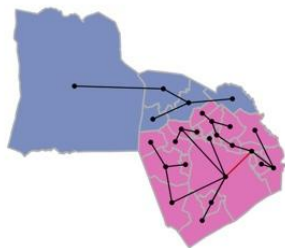
(b) Graph Partition



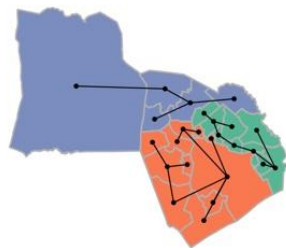
(c) Tree Partition (extended state)



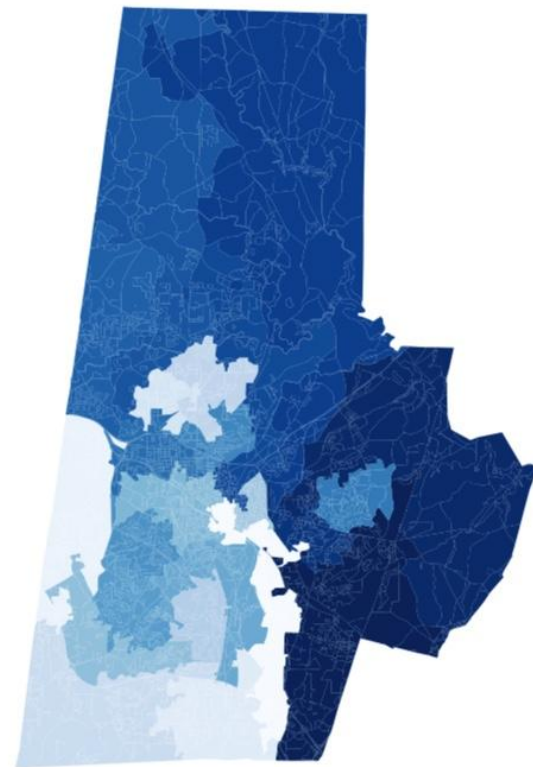
(d) Merge & Sample New Tree on Merged Sub-graph



(e) Find Edge to Cut



(f) Split into Two Trees





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NEXT STEPS

Where we hope to take our
project next

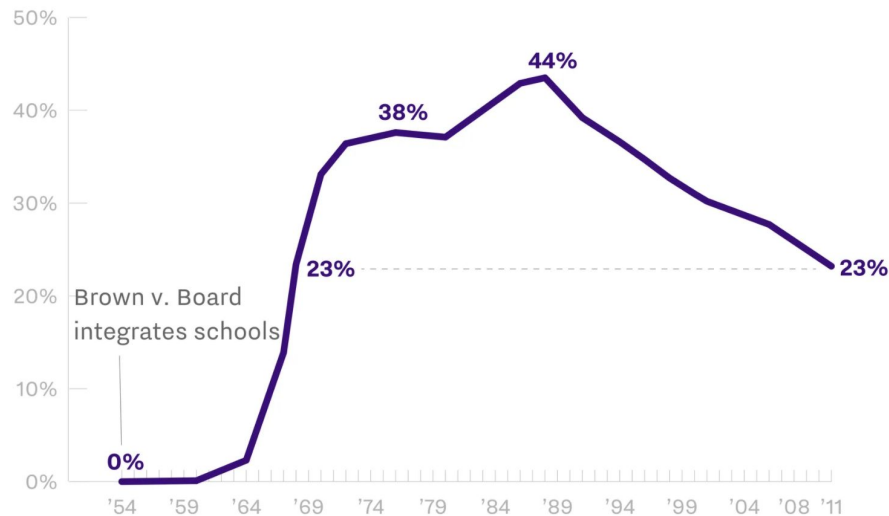
Future Project Goals

- Incorporate more Data including:
 - Race Data
 - Socioeconomic status
 - Walkability
- However, we have run into some challenges

Challenges: Social Issues

1. White flight
2. Residents are often against redistricting
3. Redistricting is only a small part of integration

Percentage of black students in the South who attend schools that are at least 50 percent white

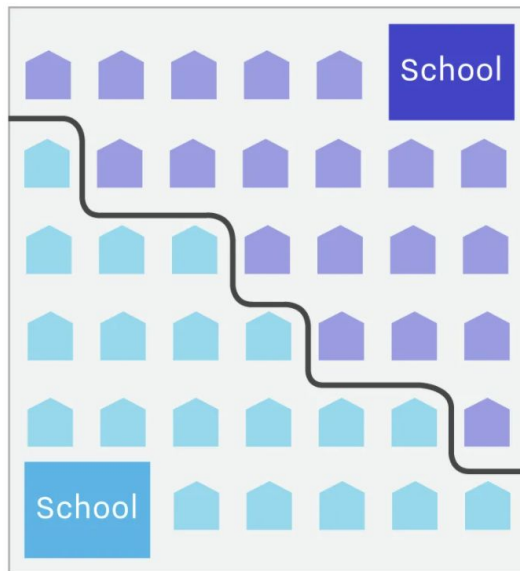


Data from the National Center for Education Statistics, via UCLA's Civil Rights Project

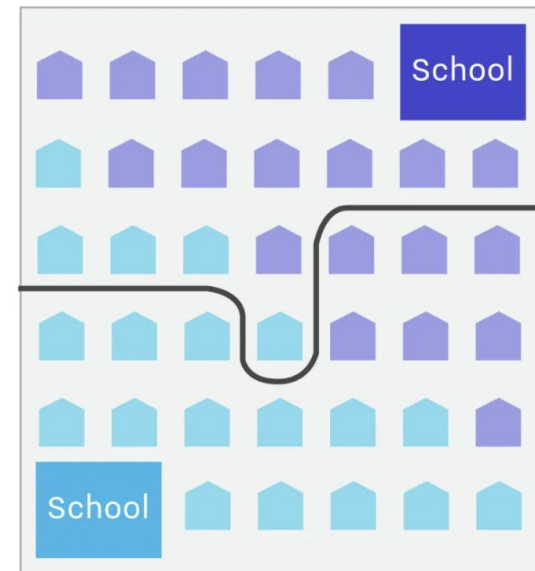
Other Challenges

- Is it possible to create districts where all criteria are met? Will some need to be sacrificed?
- Access to Data

If kids go to the **nearest school**, it would recreate the underlying residential segregation.



But it's possible to redistrict these zones to **reduce segregation** — or make it worse.



<https://www.vox.com/2018/3/5/17080218/school-segregation-getting-worse-data>

Redistricting will not solve all of our problems. However, we believe redistricting can lay the groundwork to create a more equitable system.

Works Cited

- <https://tcf.org/content/report/school-integration-america-looks-like-today/>
- <https://www.k12dive.com/news/study-splinter-districts-increase-school-segregation-in-the-south/562081/>
- <https://www.vox.com/2018/3/5/17080218/school-segregation-getting-worse-data>
- https://docs.google.com/document/d/1W6UahP0s0dXXQRLTF8DwWr0GnYGc9WP3rhz-uwN0_1U/edit

Thanks!

ANY QUESTIONS?