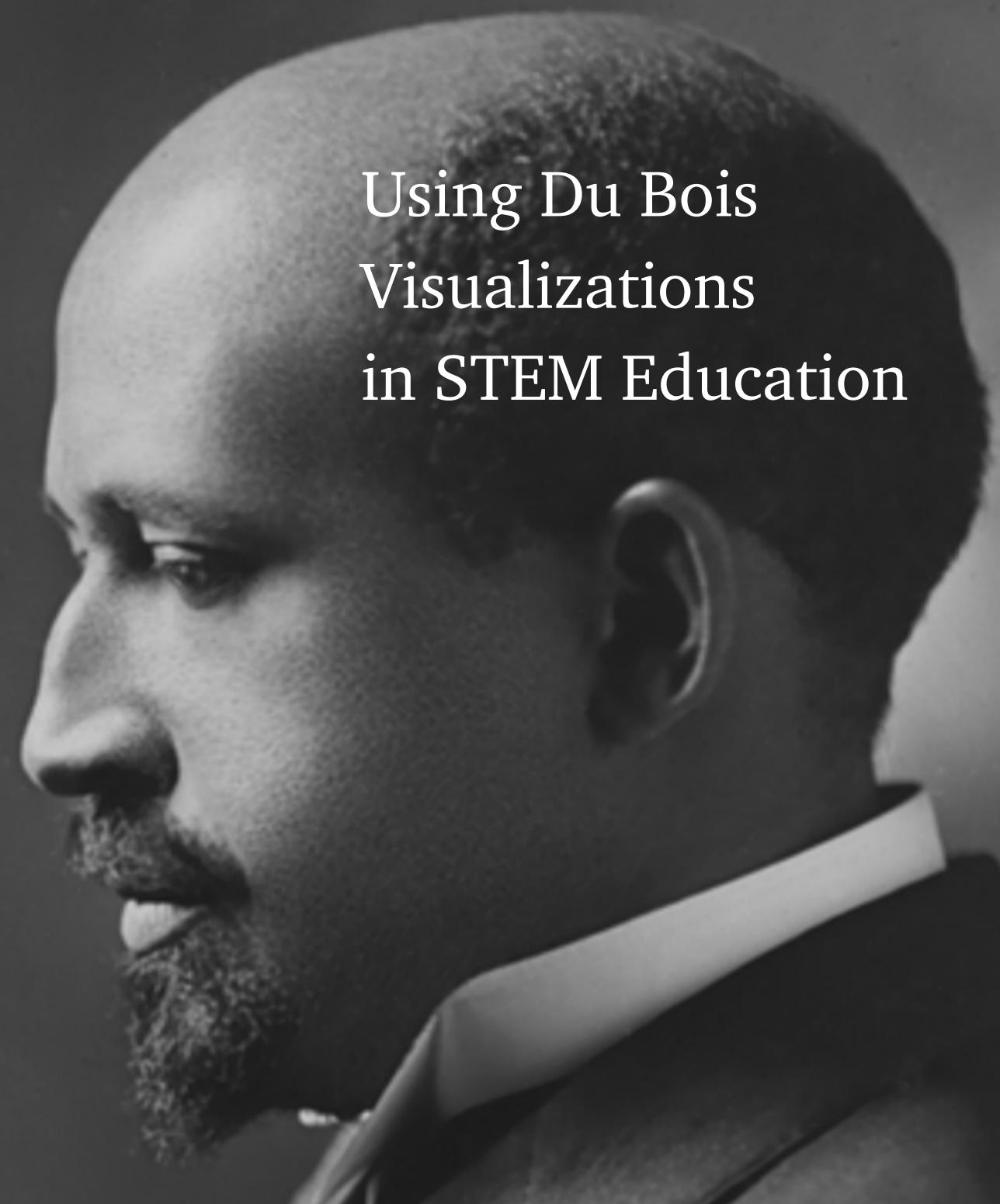




Du Bois SERVE Project

# Using Du Bois Visualizations in STEM Education



# Module Outline

The overall aim of the module is to introduce the visuals created by W.E.B. Du Bois for the 1900 Paris Exposition, and explore the role of visual communication in STEM education. The visuals are studied, by deconstruction and re-creation, while placing them in their historical context.

The sections, which may be used collectively or independently:

Context      explaining the motivation of the Du Bois visuals in a historical context.

Explore      an analog exercise to analyze and re-create Du Bois visuals using hand-drawn methods.

Implement      Re-create Du Bois style visuals using digital tools.

# Context

The Context section provides background on the conception, motivation and messaging of the visuals. Also discussed is the venue where the visuals were first shown, the Exhibition of the American Negro, within the 1900 Paris Exposition.

To better understand the times when the visuals were created, influential events leading to the Exposition are discussed.

# Context: Background



TJ Calloway



Du Bois in Paris



Atlanta U. Students

The motivation for creating the visuals designed and created by Du Bois and his collaborators was to tell, on a world stage, the state and progress of Black Americans 35 years after emancipation from slavery.

Thomas J Calloway, organized the “Exhibition of the American Negro” to be shown during the 1900 Paris Exposition, and commissioned Du Bois, his Fisk University classmate, to create a set charts, graphs, photographs and other artifacts for the world stage.

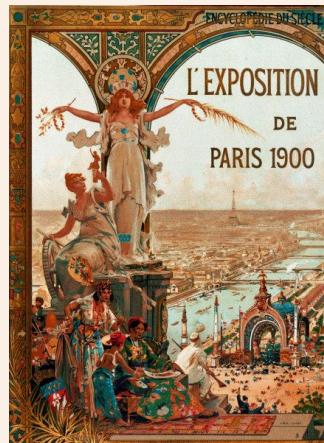
Du Bois, along with collaborators at Atlanta University spent four months creating the materials the exhibit.

# Context: The 1900 Paris Exposition

The Exposition Universelle of 1900 was the venue for Du Bois to tell the story of Black Americans on an international stage.

Fifty-six nations participated in the expo, designed to celebrate the achievements of the 19th century, while looking forward to the developments in the 20th.

The Du Bois visuals were part of the “Exhibition of the American Negro”, seen by over 50 million people. The exhibition also included an African-American bibliography containing 1,400 titles along with 500 photographs.



Exhibition Poster



1900 Paris



Exhibition of American Negroes

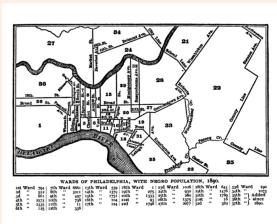
# Context: Five years before Paris



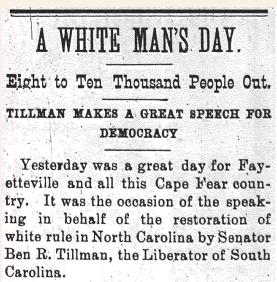
During the summer of 1895, in a Brooklyn park, there was a cotton plantation complete with five hundred Black workers reenacting slavery.



In 1896 the landmark Plessy v. Ferguson Supreme Court decision was handed down, legitimizing racial segregation, leading to generations of Jim Crow laws.



Du Bois created the Philadelphia Negro in 1897 which sought to ascertain something of the geographical distribution of his race, their organizations, and their relation to their million white fellow-citizens.



In 1898 the duly elected people in Wilmington, NC was violently overthrown. The coup occurred after the state's Southern Democrats conspired and led a mob of 2,000 white men to overthrow the legitimately elected local Fusionist government.



During the 1880s and 1890s, instances of lethal mob violence increased steadily, peaking in 1899 when twenty-seven Georgians fell victim to lynch mobs. Included in this number was the horrific lynching of Sam Hose.

# Context: References

Paris Exposition of 1900 (Exposition Universelle)

[https://en.wikipedia.org/wiki/Exposition\\_Universelle\\_\(1900\)](https://en.wikipedia.org/wiki/Exposition_Universelle_(1900))

Black America, 1895

<https://publicdomainreview.org/essay/black-america-1895>

Plessy v. Ferguson

<https://www.britannica.com/event/Plessy-v-Ferguson-1896>

The Philadelphia Negro

[https://www.google.com/books/edition/\\_/sqwJAAAAIAAJ](https://www.google.com/books/edition/_/sqwJAAAAIAAJ)

Wilmington Insurrection of 1898

[https://en.wikipedia.org/wiki/Wilmington\\_insurrection\\_of\\_1898](https://en.wikipedia.org/wiki/Wilmington_insurrection_of_1898)

The Lynching of Sam Hose

[https://en.wikipedia.org/wiki/Lynching\\_of\\_Sam\\_Hose](https://en.wikipedia.org/wiki/Lynching_of_Sam_Hose)

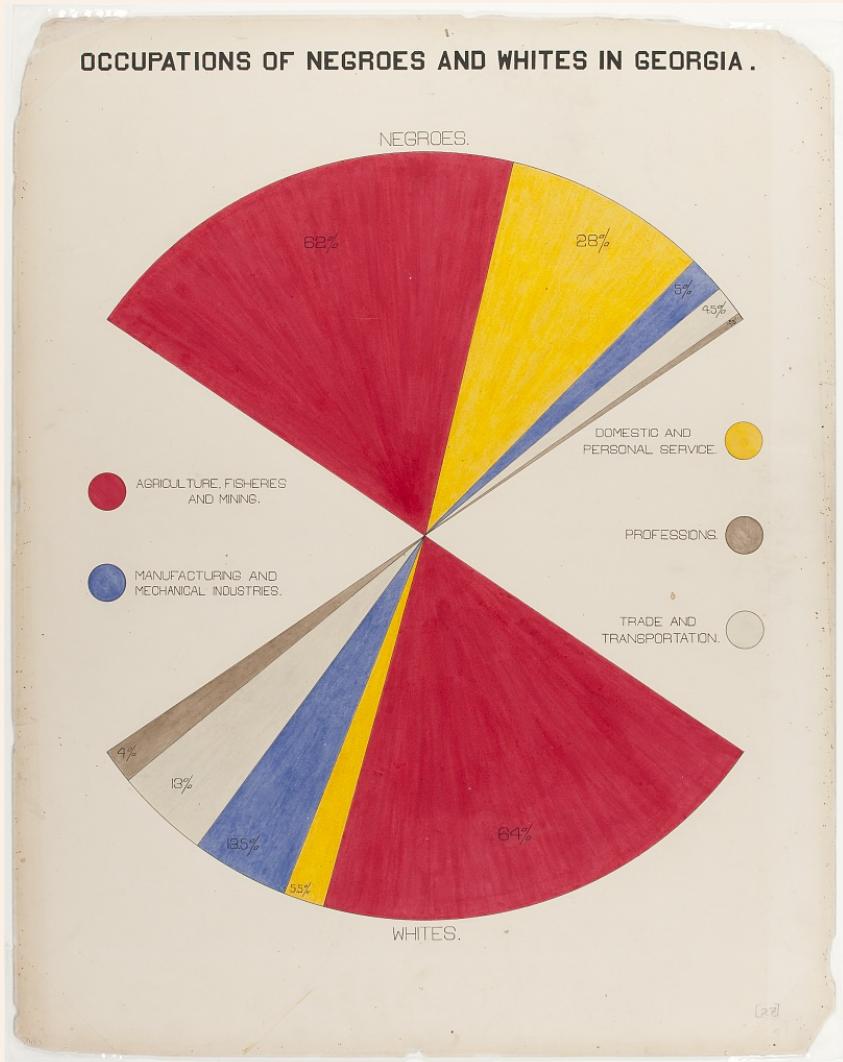
# Explore

This section is a hands-on session that will take a sample Du Bois visualization, (Plate 27 in this example) and reconstructs and analyzes various aspects of the visual.

The exercise aims to recreate the sample visual using hand-drawn methods (pens, paper, markers, etc.), to immerse the students in the act of creation, while thinking about the context and messaging. Rapid iteration and peer review may be used to gauge effectiveness of the visual.

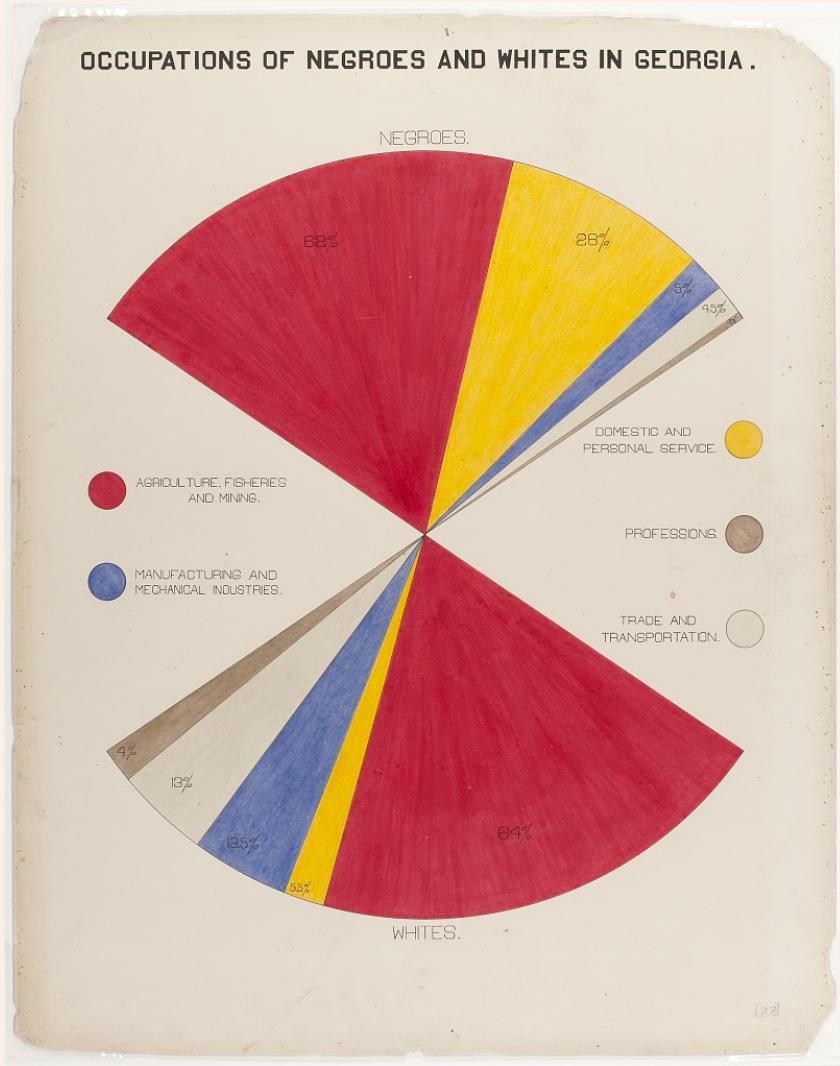
Next, drawing with modern data may be introduced.

# Explore: Outline



- Message and Audience
- Aesthetics/design
- Analytical methods
- Chart Types

# Explore: Message



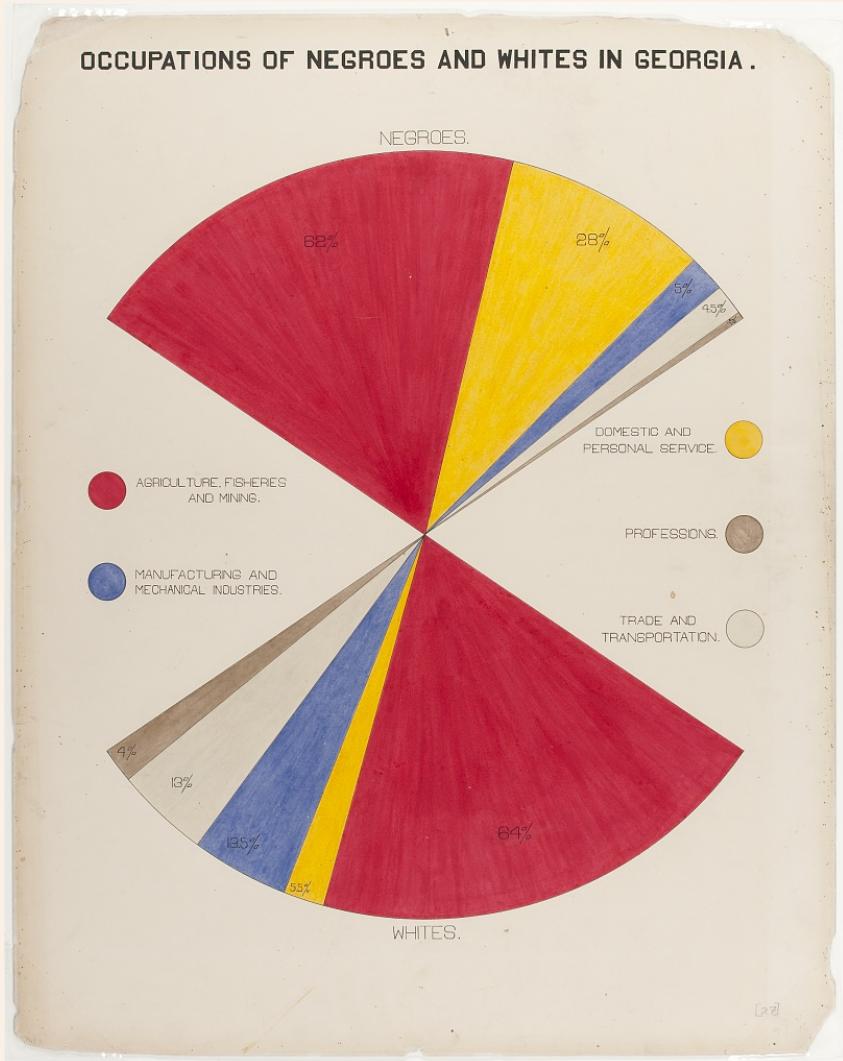
The message of the visual is tied to the overall message from Du Bois at the Paris Exposition:

Describe the status and progress of Black Americans since emancipation.

The visual compares the occupations of Black and white populations of Georgia, showing parity for some occupations, while highlighting differences for others.

Activity: Discuss the message that the visual is attempting to convey

# Explore: Aesthetics and Design



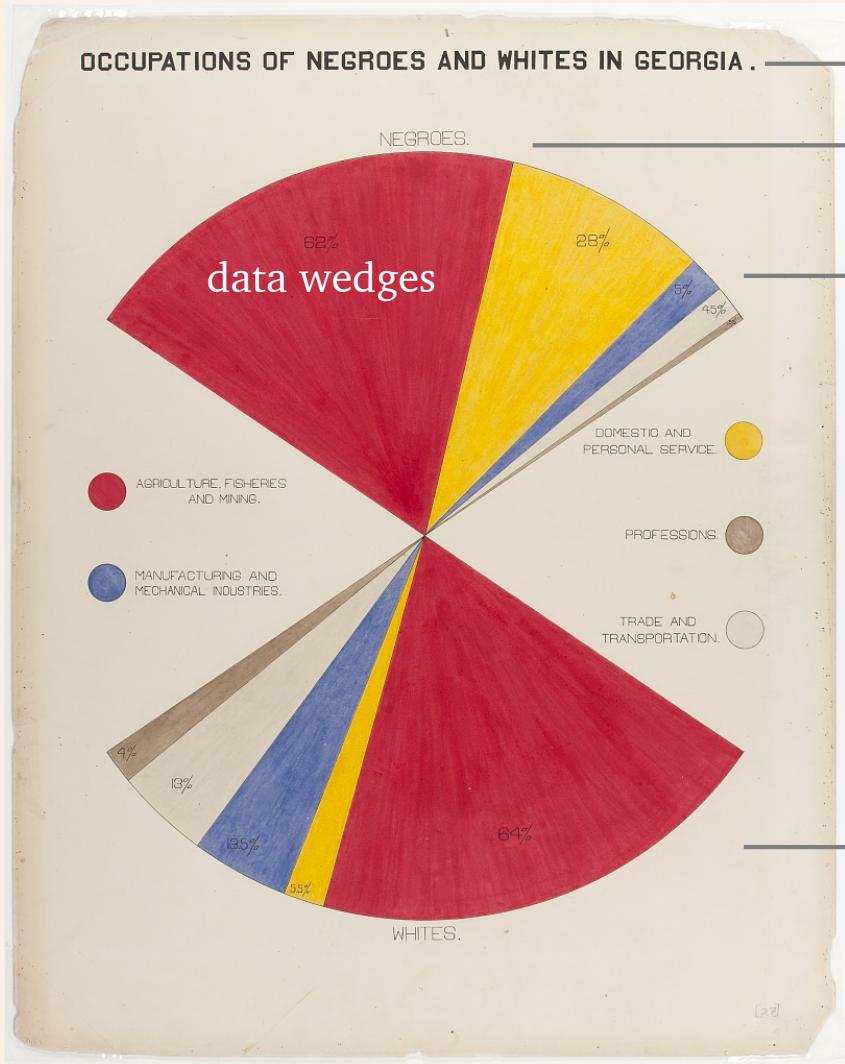
The “Fan-Chart” visual uses proportionally sized wedges to encode the data. The populations are arranged, in sections, top (Black), and bottom (white) such that the wedges may be easily compared.

Also note the legends arranged on the left and right, placed in the gaps between the wedges.

The visual uses the typical Du Bois color palette.

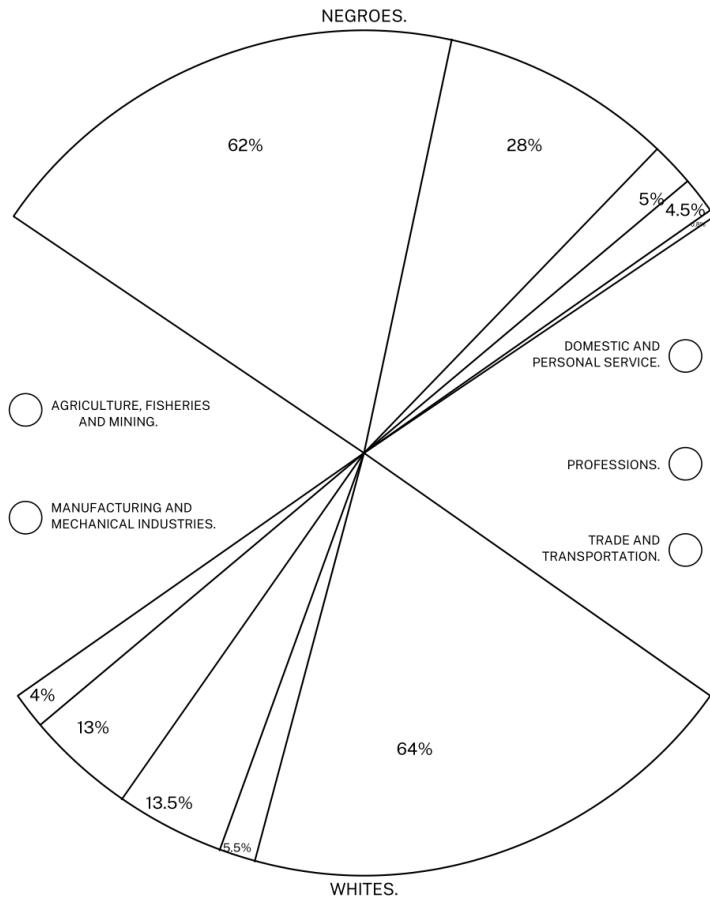
# Explore: Aesthetics and Design

22x28 inch portrait mode



# Explore: Recreate

OCCUPATIONS OF NEGROES AND WHITES IN GEORGIA.

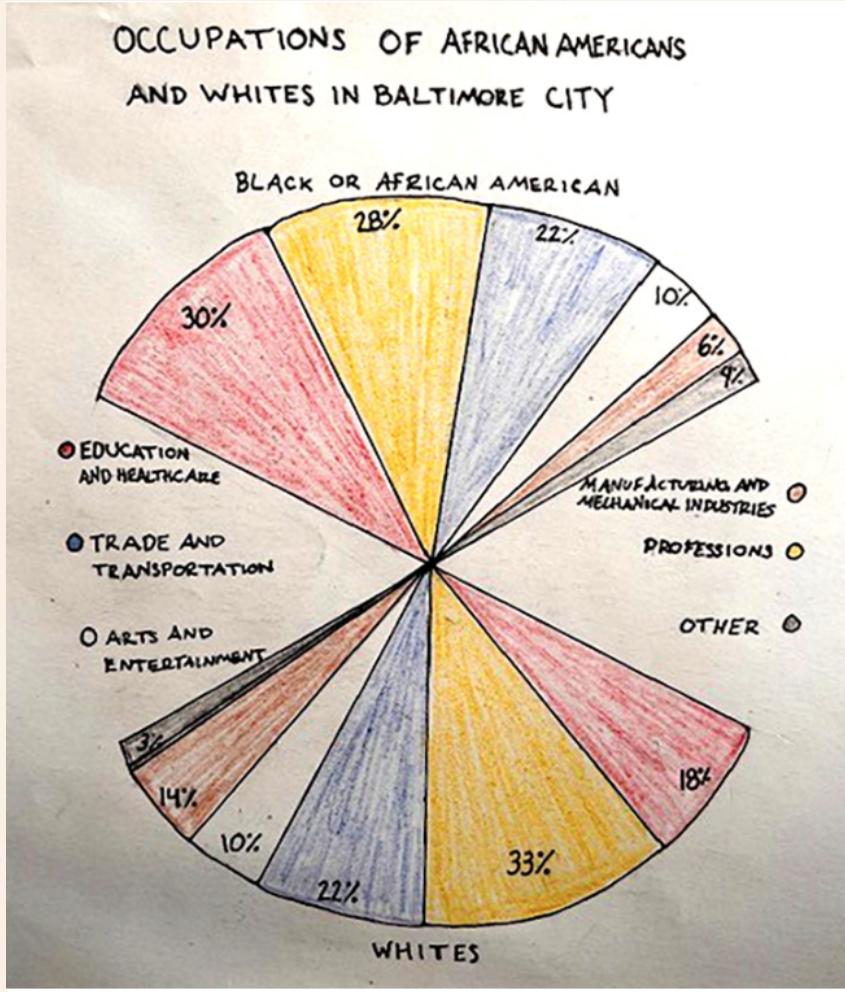


Re-create the visual using pens, paper and other analog materials like markers, colored pencils, rulers, and protractors.

Strive for rapid iteration, and do not focus on precision, but rather exploring the various components of the chart, and how they are conveying the message and information. Students may work together or individually.

At the end of the session, the re-creations may be shared and critiqued as a group.

# Explore: Modernize



In this section, students may apply modern data to the Du Bois Style. This involves data gathering, selection of appropriate chart type, and defining the elements to apply the Du Bois style to (for example color palette, labeling methods)

This example shows modern data on the occupations of African-Americans and Whites in the city of Baltimore.

# Explore: Analytical Methods

This section address the effectiveness and analytical methods used in the visual.

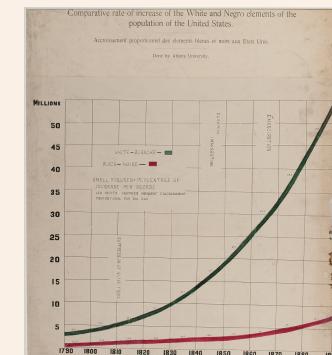
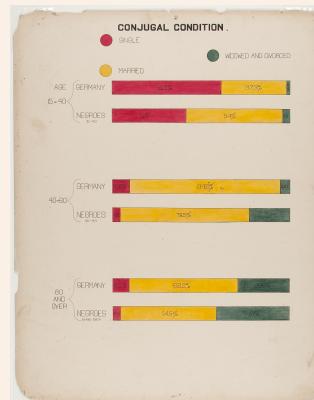
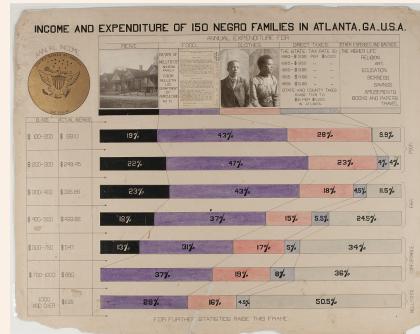
- Is the “fan chart” an effective method of envoking the message?
- Can the viewer make appropriate comparisons?
- What conclusions are drawn from the visual?
- What additional questions are raised?

# Explore: Chart Types

In the section, consider the selection of chart type, and its role in conveying the appropriate message.

For example, here are four other types of charts in the Du Bois collection, covering economics, population, and social status.

The types include the fanciful Du Bois spiral, stacked bars with integrated photographs, conventional bar and line graphs.



# Explore: References

## Du Bois Visualizations for Consideration in STEM Education

<https://github.com/ajstarks/dubois-data-portraits/tree/master/dubois-stem>

## Du Bois Visualization Style Guide

<https://github.com/ajstarks/dubois-data-portraits/blob/master/dubois-style.pdf>

## Recreating the Du Bois Data Portraits

<https://speakerdeck.com/ajstarks/recreating-the-dubois-data-portraits>

## Du Bois Visualizations Catalog (originals)

<https://speakerdeck.com/ajstarks/du-bois-visualizations-originals>

## African American Photographs Assembled for 1900 Paris Exposition

[https://www.loc.gov/collections/african-american-photographs-1900-paris-exposition/?st=grid&sb=date\\_desc](https://www.loc.gov/collections/african-american-photographs-1900-paris-exposition/?st=grid&sb=date_desc)

## W.E.B. Du Bois Data Portraits, Visualizing Black America

<https://papress.com/products/w-e-b-du-boiss-data-portraits-visualizing-black-america>

## Black Lives 1900, W.E.B. Du Bois at the Paris Exposition

<https://www.theredstoneshop.com/products/black-lives-1900>

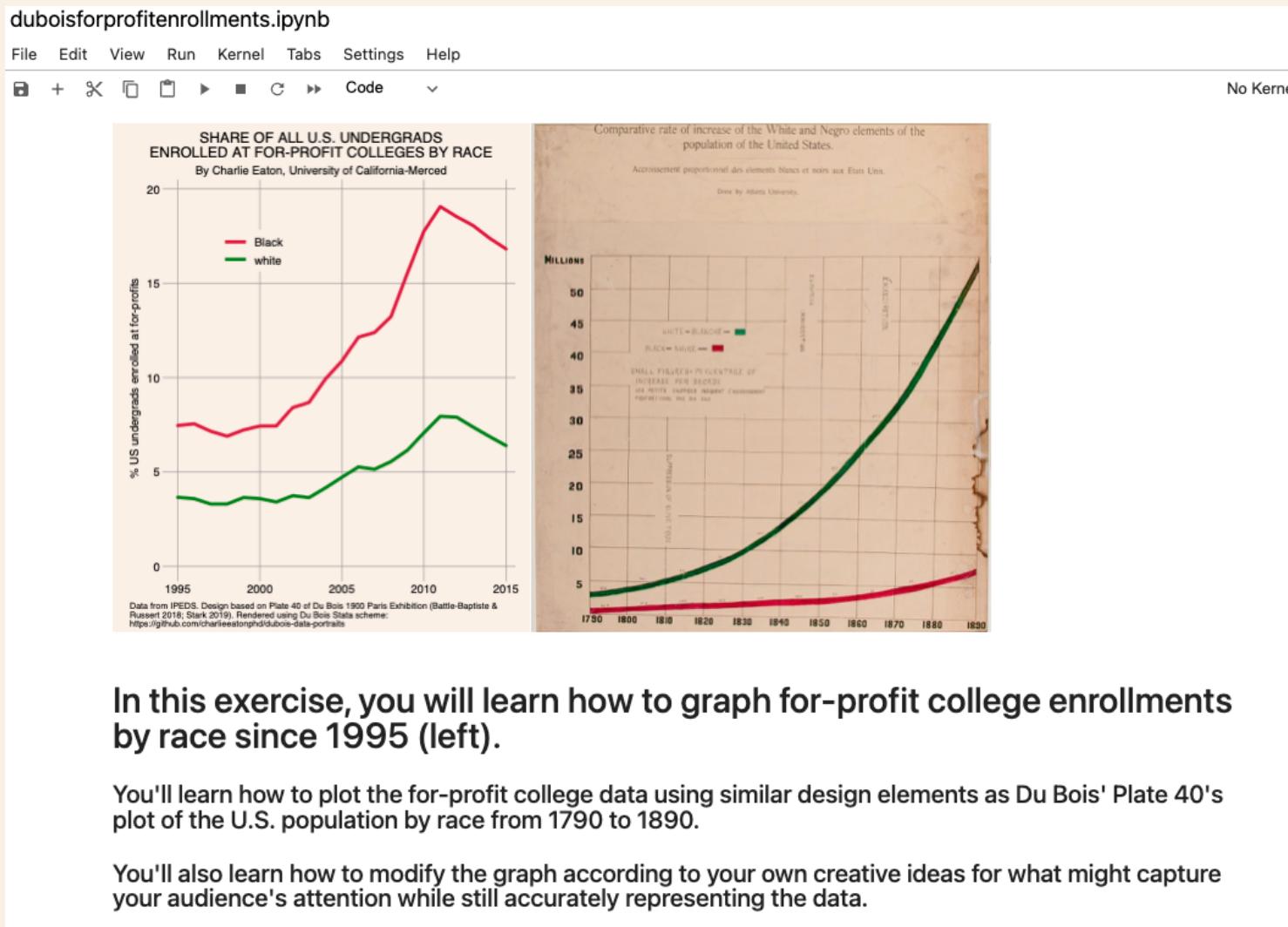
# Implementation

The Implementation section builds on the Context and Explore sections and guides the students through building a Du Bois-style visualization using digital tools.

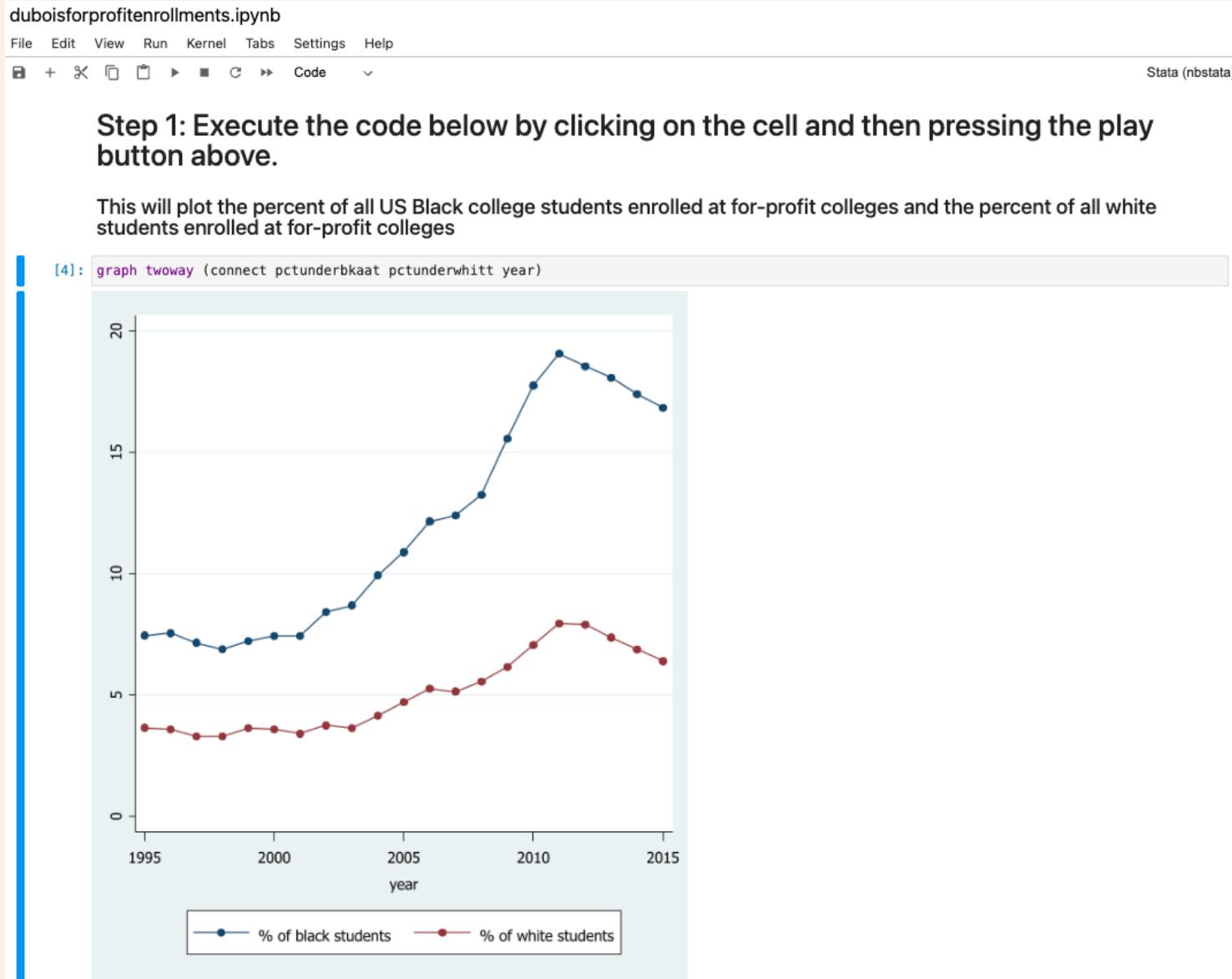
The example shown here uses R and Jupyter notebook, which provides an interactive environment to explore the visual, starting from a basic graph, to applying the Du Bois style.

Note that participants of the Du Bois Challenge, an annual online exercise that re-creates a curated set of Du Bois visuals, provides examples of digital re-creations using tools such as R, python/matplotlib, and Tableau.

# Implementation: Introduction



# Implementation: Basic Chart



# Implementation: Hinting

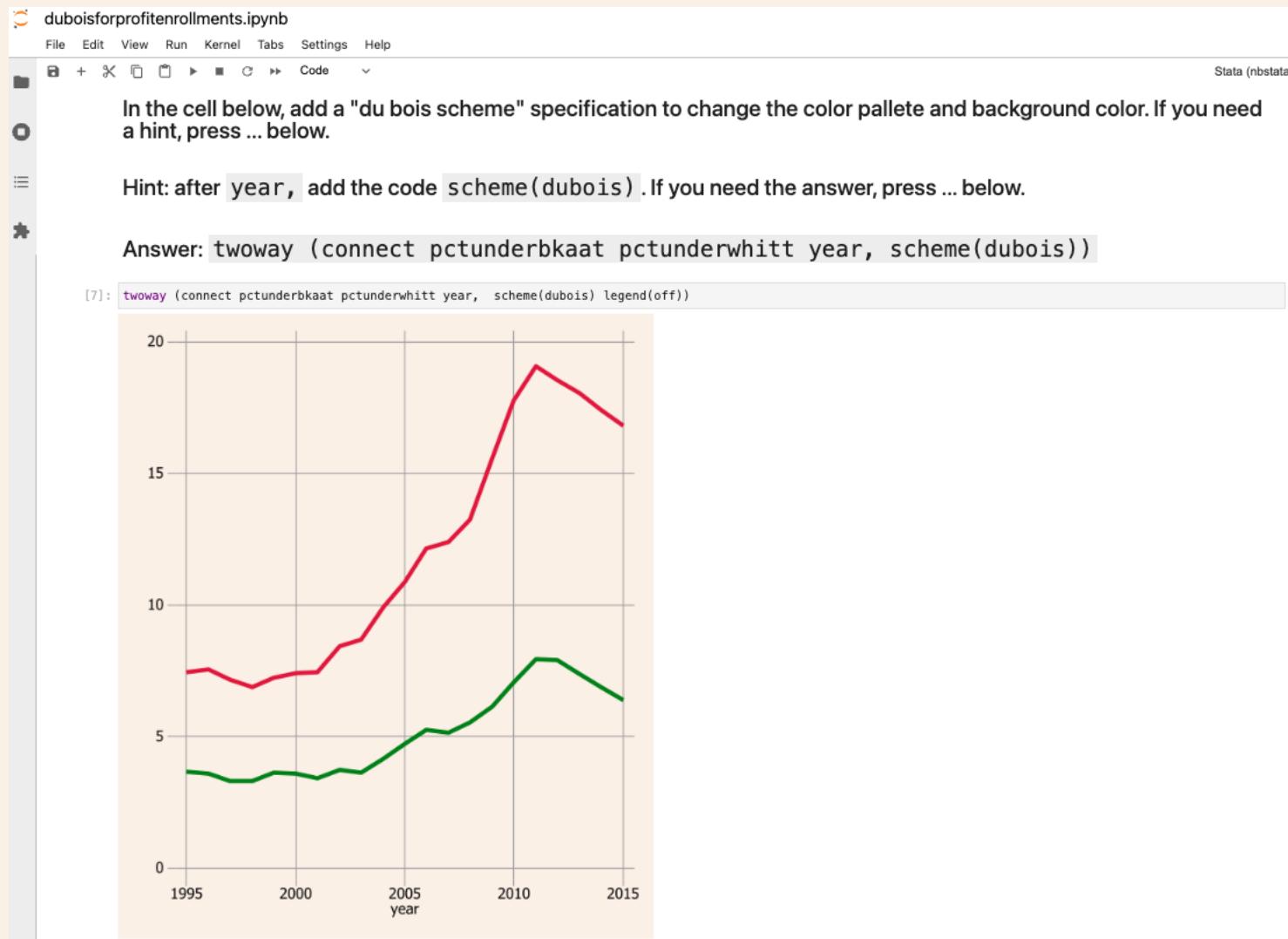
In the cell below, add a "du bois scheme" specification to change the color pallete and background color. If you need a hint, press ... below.

Hint: after `year,` add the code `scheme(dubois)`. If you need the answer, press ... below.

...

```
[6]: twoway (connect pctunderbaat pctunderwhitt year, legend(off)) scheme(dubois)
scheme(dubois) is not a twoway plot type
r(198);
```

# Implementation: Applying style



# Implement: References

Github Repository for the #DuBoisChallenge2024

<https://github.com/ajstarks/dubois-data-portraits/blob/master/challenge/2024/README.md>

Du Bois Challenge 2024 Recap

<https://speakerdeck.com/ajstarks/du-bois-challenge-2024-recap>

2024 Du Bois Challenge using R Programming.

<https://medium.com/illumination/2024-du-bois-challenge-using-r-programming-02af8afa5626>

Developing Du Bois's Data Portraits with Python and Matplotlib

<https://www.edriessen.com/2024/02/07/developing-du-boiss-data-portraits-with-python-and-matplotlib/>

Three Tricks I Learned In The Du Bois Data Visualization Challenge

<https://nightingaledvs.com/recreating-historical-dataviz-three-tricks-i-learned-in-the-du-bois-data-visualization-challenge/>

Molly Kuhs Du Bois Challenge repo

<https://github.com/makuhs/DuboisChallenge>

#DuBoisChallenge2024 using Python and Matplotlib

<https://github.com/edriessen/dubois24-python-matplotlib>

#DuBoisChallenge2024 using R

<https://github.com/sndaba/2024DuBoisChallengeInRstats/tree/main>

#DuBoisChallenge2024 using Tableau

<https://public.tableau.com/app/profile/camaal.moten7357/vizzes>