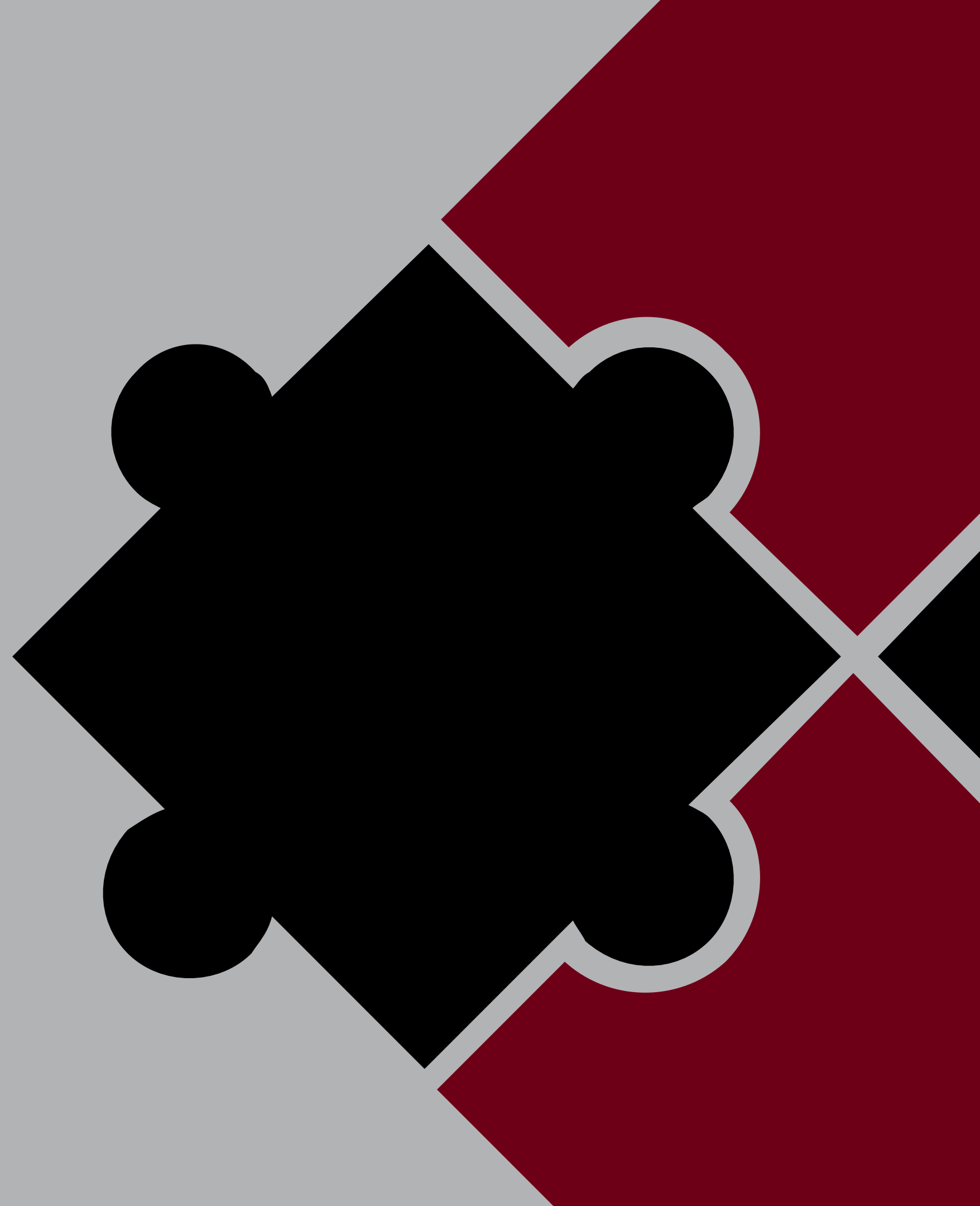


THE MISSING PIECE

Cali M. Davis, Ph.D.
Troy University



A hand with a ring is placing a puzzle piece into a larger puzzle on a cardboard surface. The puzzle features various colorful illustrations, including a woman in a green dress and a man in a yellow shirt. The background is a light gray with a large, stylized puzzle piece graphic in the top right corner.

Agenda

1. Introduction
2. Puzzle Data Collection
3. Puzzle Data Analysis
4. Summary, Results, and Next Steps

Troy University

Troy University is focused on a student's success in today's competitive and global marketplace.



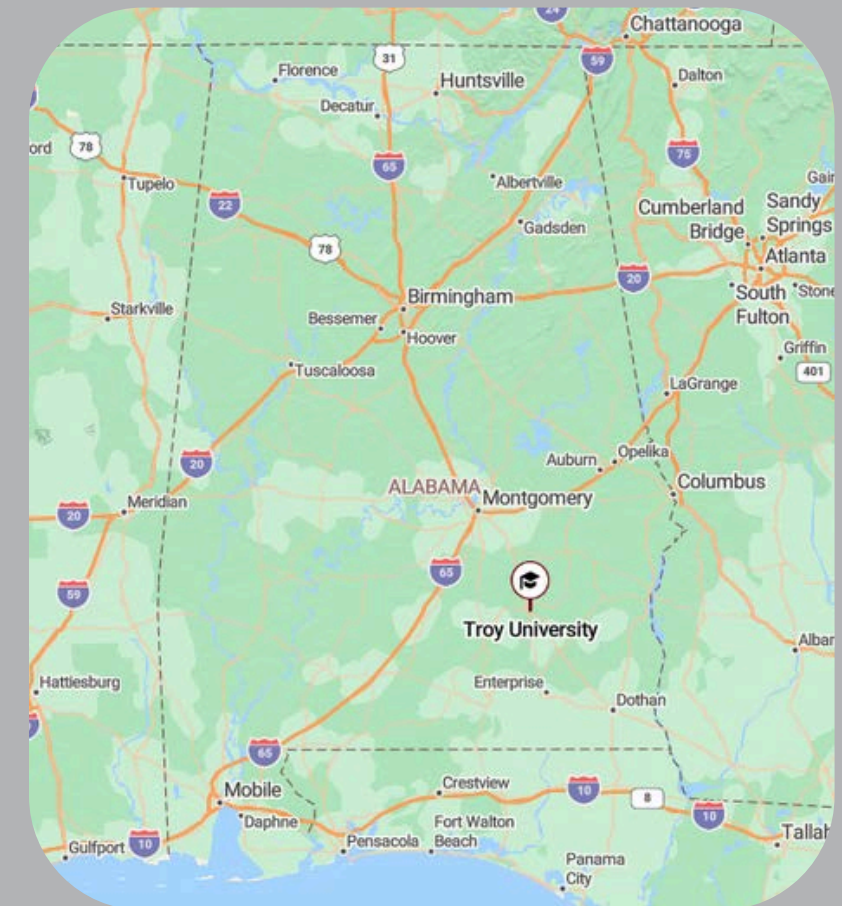
Founded in 1887 as an institution to train teachers for Alabama's schools.



15:1 Student to Faculty Ratio
140+ Fully Online Degree Options

SAS®

SAS Academic Specialization (Tier 2)



Get to know our **STUDENTS**

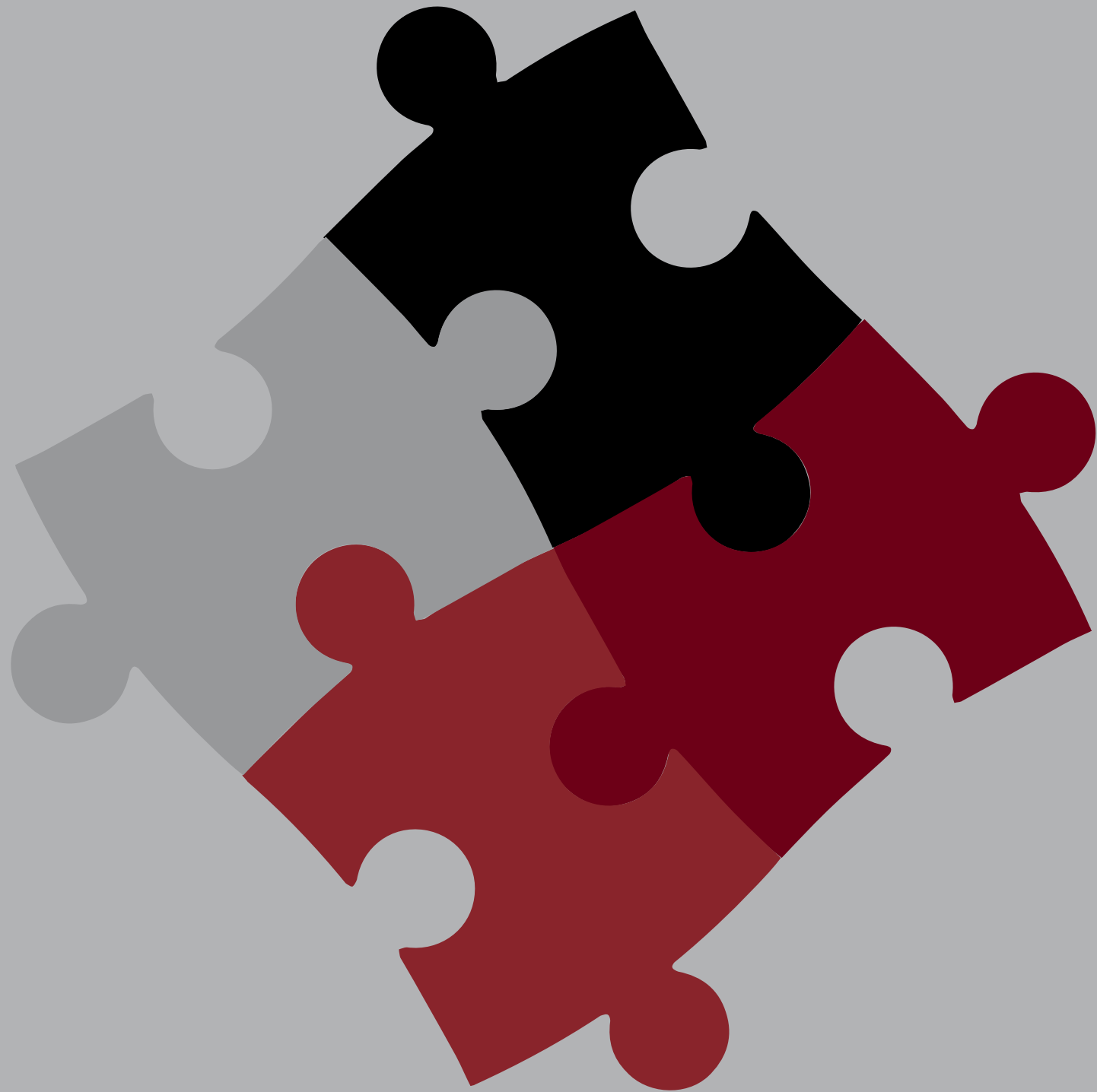
- Total Enrollment (Fall 2024) = 14,537
- From Alabama, Georgia, and the Florida panhandle
- Strong International student population
- Veteran and Military friendly
- Sorrell College of Business is the largest academic college
- 62 Business Analytics Majors
- Division 1 Athletics



Puzzle Data Collection

Business Data Mining Course

1. We needed an interactive activity with a small sample size.
2. Students were familiar with SAS VIYA®, but had little experience with real data.
3. The average attention span of a college student is 10-15 minutes.



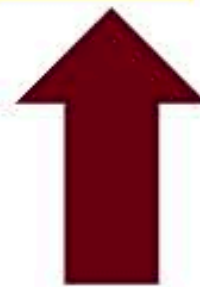
Putting Together Puzzles and Collecting Data

- ▶ Determine teams by random name draw.
- ▶ Record all data in the notebooks provided.
- ▶ Data includes:
 - ▶ Puzzle order assigned (next slide)
 - ▶ Team
 - ▶ Puzzle name (princess, jurassic, baby shark, peppa pig, cocomelon)
 - ▶ Number of pieces
 - ▶ The Puzzler
 - ▶ Time to complete the puzzle (time total, minute/seconds, time in seconds)
 - ▶ Worked together (1=yes,0=no) – only applicable for one puzzle – baby shark
 - ▶ Shape of puzzle (square, no corners)
 - ▶ Course (4410)
 - ▶ Faculty member on your team? (1=yes,0=no)
 - ▶ Comments



Puzzle Order

Team 1: 48, 24, **24**, 24, 12
Team 2: 12, 24, **24**, 24, 48
Team 3: 48, 12, **24**, 24, 24



Baby Shark Puzzle – team members work together on this puzzle.



Puzzle Data Collection

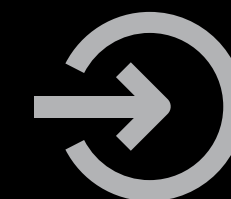


Copy: 18' 15' 51' 51' 51'

(Example)

DC - Landon (100%)

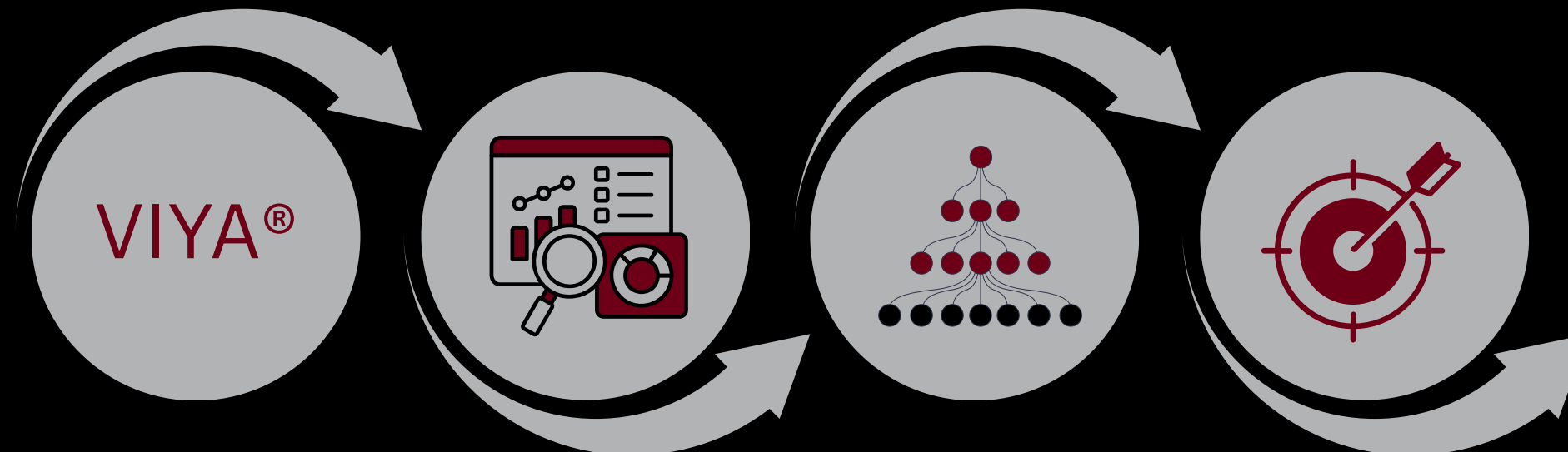
Addy	2/13/25		
Anna	Team 3		
Lane			
Puzzler	Name	Time	Shape
Anna ①	Princess		square
Anna ②	Coco		heart



Entered data after collection

Puzzle Data Analysis

Use the tools you have learned in class to do a full analysis of the data.



Work in SAS VIYA®

Use descriptive
analytics
including
graphical and
numerical
displays

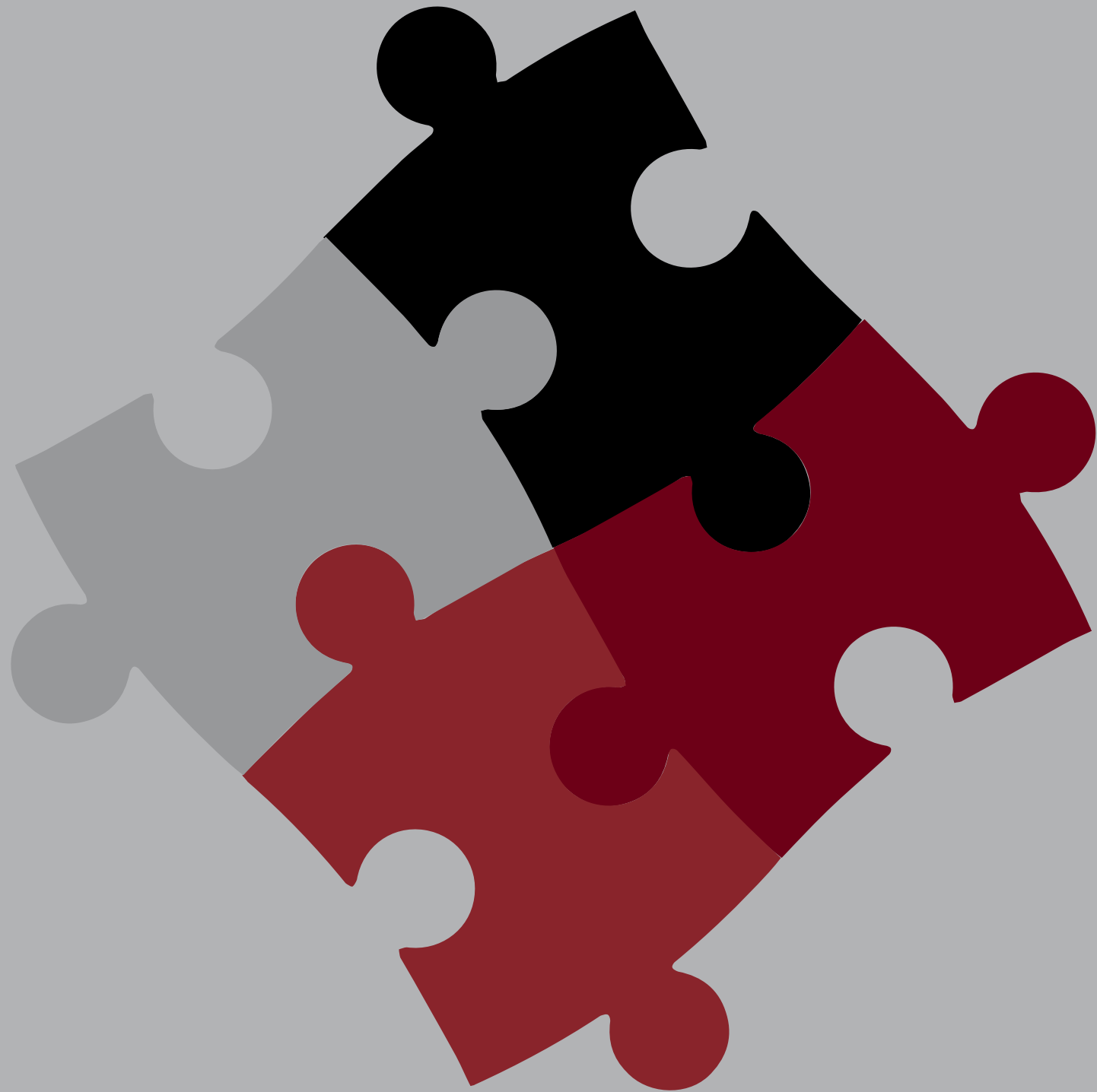
Use predictive
analytics such as
decision trees,
regressions

Plan to answer
some questions

Puzzle Data Analysis

Guiding Questions:

- How long does it take to complete a puzzle?
- Does the number of puzzle pieces matter?
- Does working together on a puzzle make the completion times faster?
- Which team had the fastest time?
- What factors, if any, help determine puzzle completion times?





SAS VIYA[®] Report

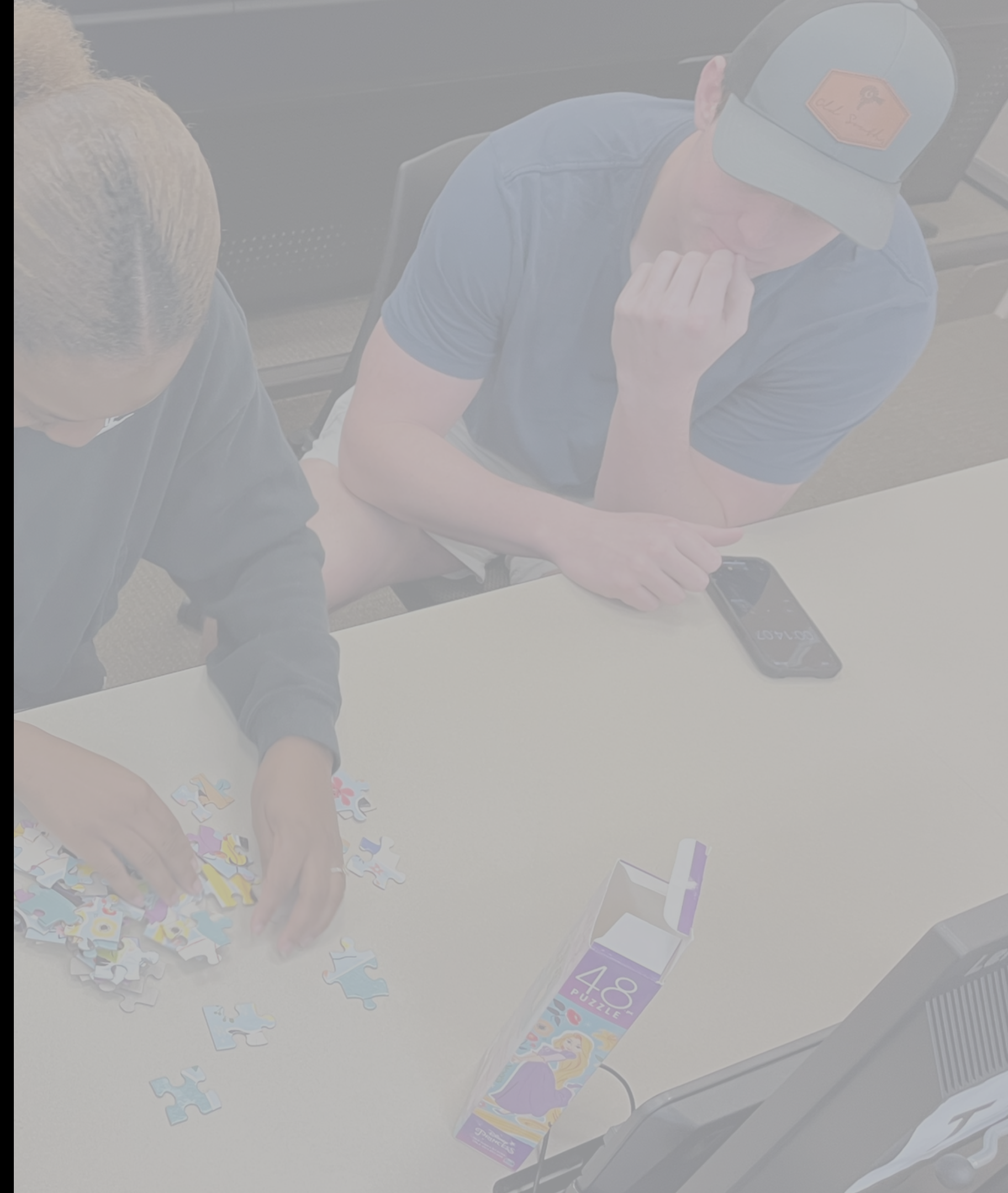
SUMMARY, RESULTS, AND NEXT STEPS



Summary and Results

Data Mining Concepts Used:

- Data collection and cleaning
- Variable types
- Bias and error
- Descriptive analytics
- Predictive analytics
- Assessment and interpretation
- Reporting



Summary and Results

- The data was relatively clean.
- Predictive models tested: decision tree and regression
- Important factors: number of pieces, working together
- Champion Model = Regression



What values for the most important factors should be used to predict?

num pieces

24

worked together (1=yes, 0=no)

1

What is the prediction for time in seconds?

124.6

The predicted time in seconds for this case is 50.4% lower than the observed average time in seconds of 251.2. Most observations (66.67%) have a higher time in seconds than this predicted case. The prediction is based on an automatically selected Linear Regression model.

NEXT STEPS

1. Continue using puzzles to teach data mining.
2. Collect additional data from more students.
3. Explore other activities for engagement.



SORRELL
College of Business
TROY UNIVERSITY

Questions or Comments?

Please contact me



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Resources

Attention span during lectures: 8 seconds, 10 minutes, or more?

Advances in Physiology Education

<https://journals.physiology.org/doi/full/10.1152/advan.00109.2016>

VIYA® and SAS

Troy University DA 4410 Business Data Mining Canvas Course and its students