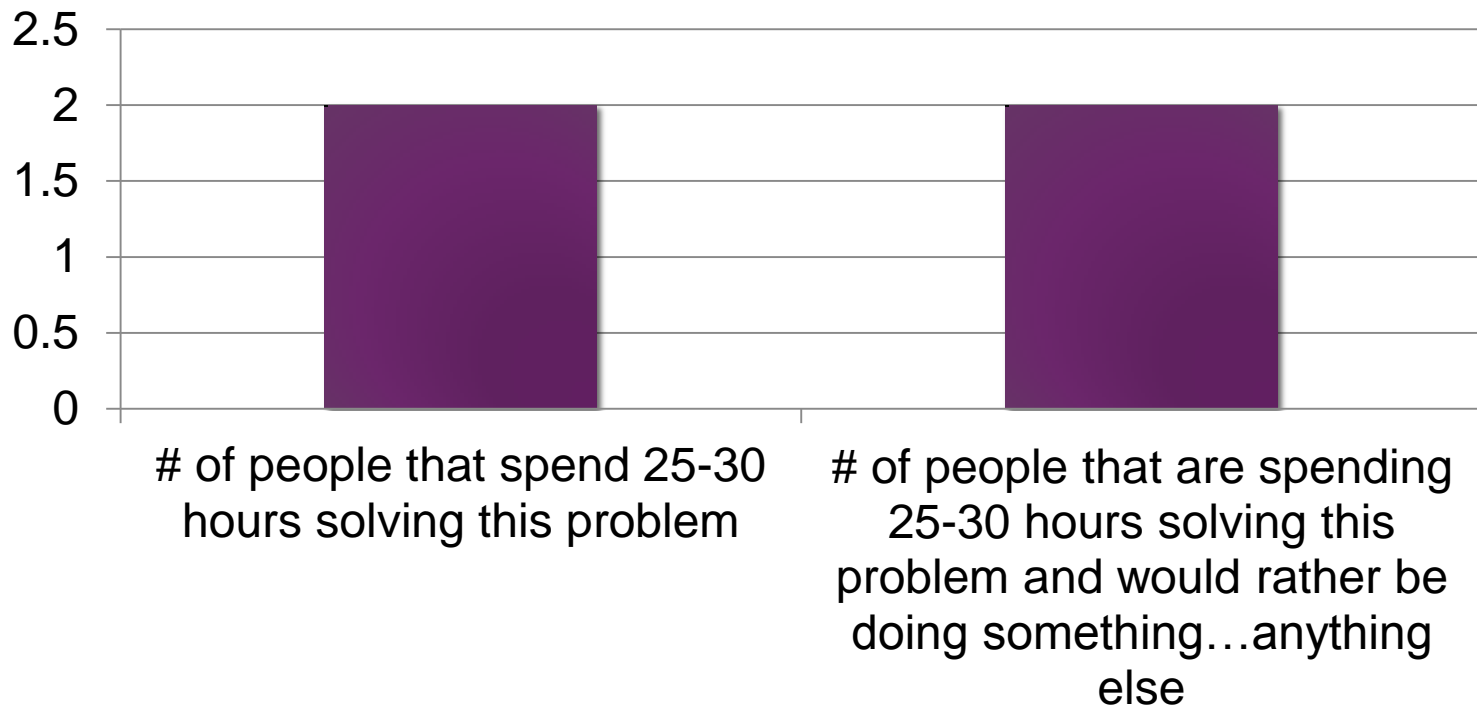# FIRST-WORLD SOLUTIONS FOR
# FIRST-YEAR PROBLEMS

Robby Mecham

# The Problem

- Roughly 350-375 incoming freshman every year
- Only 25 courses offered
- Each freshman needs a First-Year class and the classes have certain constraints

# So how can this problem be fixed?

- How can we efficiently give MORE students the classes they want while abiding by certain constraints?
  - Class size 14-16
  - Gender distribution at most 70/30 either way
  - Some classes can't have athletes
  - Some classes require certain ACT scores

- COMPUTERS!!
  - Don't fatigue or become mentally exhausted
  - VERY FAST
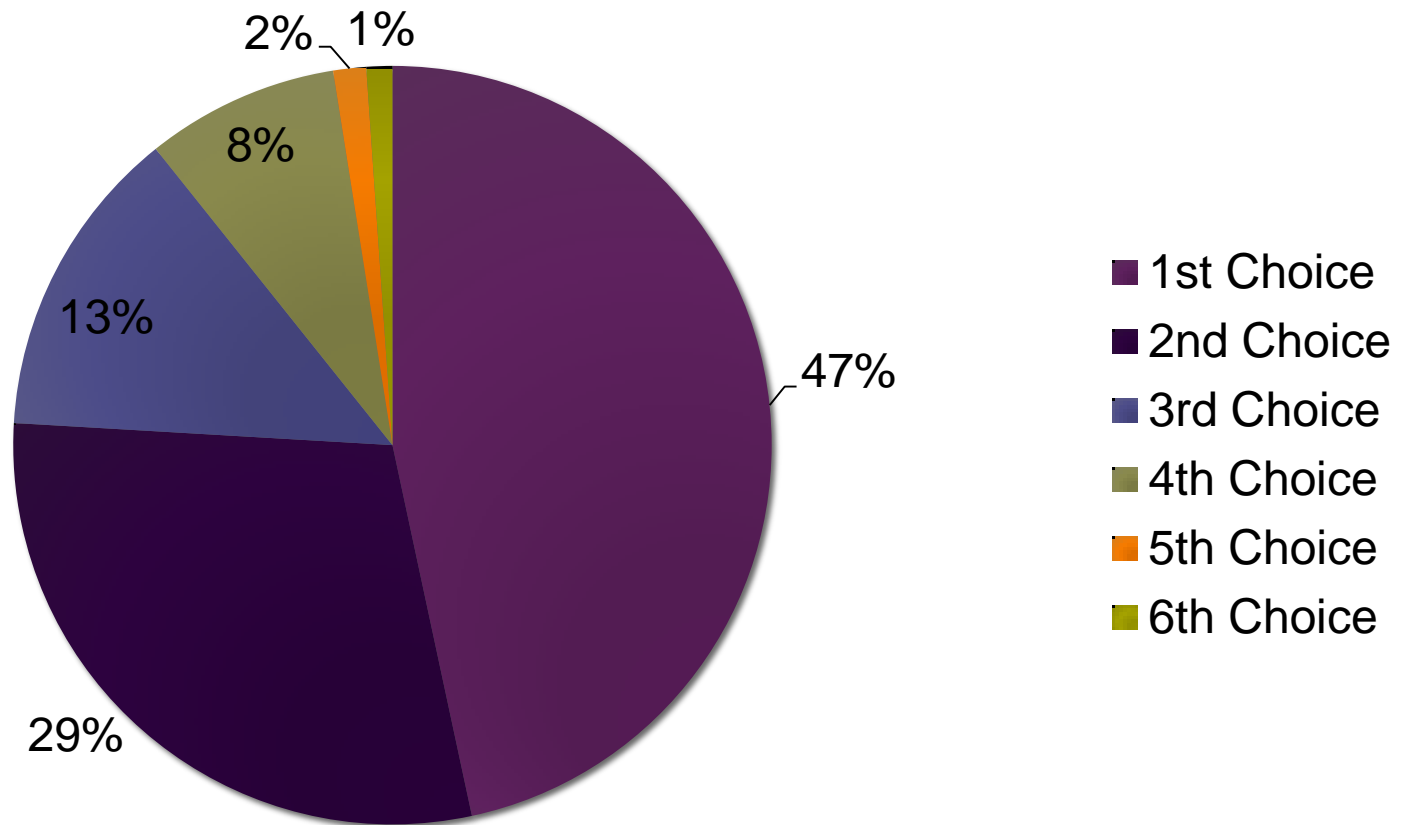  - Programmed to find the best possible outcome

# The Process

1. Start out small, work with toy problems and familiarize yourself with the language and problem
2. Gather the data needed and break it down
    1. Separate the data into two main groups groups: Students, Classes
    2. Divide the two main groups into even smaller groups: males/females, athletes, ACT scores, Non-athlete classes, Classes with certain ACT scores
3. Make minor changes to your toy problem and feed the data into the main code
4. Analyze the outcome and rejoice in a job well done!

# If only it was that easy….

- There were several things that held us back for days and sometimes weeks
  - Missing and extra numbers in the files
  - Misspelling of classes
  - Student-athletes picking non-athlete classes
  - Classes that had few, if any, people pick them
  - BLANK SPACES!!!!!!!!!

# Results!



**Choices**

- 1st Choice — 47%
- 2nd Choice — 29%
- 3rd Choice — 13%
- 4th Choice — 8%
- 5th Choice — 2%
- 6th Choice — 1%

$$
\begin{pmatrix}
492714. & \text{Stars: Black Holes, Dark Cosmos} \\
492715. & \text{Public Sculpture in Chicago} \\
492749. & \text{The Future} \\
492775. & \text{College Sport in Chicago:Then \& Now} \\
492796. & \text{Philosophy of Humans and Animals} \\
492804. & \text{Exploring Adolescence: The Role of Chicago School Experiences Then and Now} \\
492805. & \text{College Sport in Chicago:Then \& Now} \\
492841. & \text{Robots \& Brains:Fantasies \& Facts} \\
492842. & \text{Recreational Mathematics} \\
492856. & \text{Saints and Sinners: Chicago} \\
492859. & \text{Saints and Sinners: Chicago} \\
492867. & \text{Medical Mysteries of the Mind} \\
492879. & \text{Medical Mysteries of the Mind} \\
492881. & \text{Medical Mysteries of the Mind} \\
492894. & \text{The Great War} \\
492895. & \text{Recreational Mathematics} \\
492899. & \text{Exploring Adolescence: The Role of Chicago School Experiences Then and Now} \\
492927. & \text{Medical Mysteries of the Mind} \\
492932. & \text{Chicago Global–Local Microfinance} \\
492939. & \text{The Future} \\
492958. & \text{Government and Markets}
\end{pmatrix}
$$

$$
\begin{pmatrix}
\text{Music in Chicago} & 14 & 9 & 5 & 0 \\
\text{Medical Mysteries of the Mind} & 25 & 15 & 10 & 14 \\
\text{The Future} & 16 & 6 & 10 & 11 \\
\text{Robots \& Brains:Fantasies \& Facts} & 16 & 8 & 8 & 10 \\
\text{College Sport in Chicago:Then \& Now} & 16 & 7 & 9 & 14 \\
\text{The Science of Cooking} & 16 & 10 & 6 & 13 \\
\text{The Birth of Chicagos Museums 1893--1933} & 14 & 10 & 4 & 0 \\
\text{The Great War} & 15 & 6 & 9 & 10 \\
\text{Understanding Islam} & 14 & 7 & 7 & 9 \\
\text{Dostoevsky and the Russian Novel} & 14 & 10 & 4 & 4 \\
\text{Government and Markets} & 15 & 5 & 10 & 10 \\
\text{Chicago Global--Local Microfinance} & 15 & 5 & 10 & 12 \\
\text{Chicago 1968} & 14 & 10 & 4 & 10 \\
\text{Global Cultures: Chicago and Beyond} & 14 & 10 & 4 & 0 \\
\text{Recreational Mathematics} & 14 & 6 & 8 & 9 \\
\text{Rhetoric and Citizenship} & 14 & 7 & 7 & 8 \\
\text{Saints and Sinners: Chicago} & 14 & 10 & 4 & 1 \\
\text{Philosophy of Humans and Animals} & 14 & 9 & 5 & 0 \\
\text{Religion in Gilded Age Chicago} & 7 & 5 & 2 & 0 \\
\text{Public Sculpture in Chicago} & 14 & 10 & 4 & 0 \\
\text{Exploring Adolescence: The Role of Chicago School Experiences Then and Now} & 15 & 10 & 5 & 9 \\
\text{Stars: Black Holes, Dark Cosmos} & 14 & 7 & 7 & 0 \\
\text{Writing Chicago} & 14 & 8 & 6 & 9 \\
\text{American Playwrights in Chicago} & 14 & 10 & 4 & 0
\end{pmatrix}
$$

# What I learned and loved

- A new programming language that will be of use as a continue in the math/CS fields
- You can never check your data too many times
- Always start out small and double check each step
- Solving a problem no matter the size one of the greatest feelings

# Acknowledgements

- Professor Trevino
- Professor Ed Packel
- Stan Wagon
- The Richter Program