



# Northwind Database

Liz Alvarez

# Big Idea

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

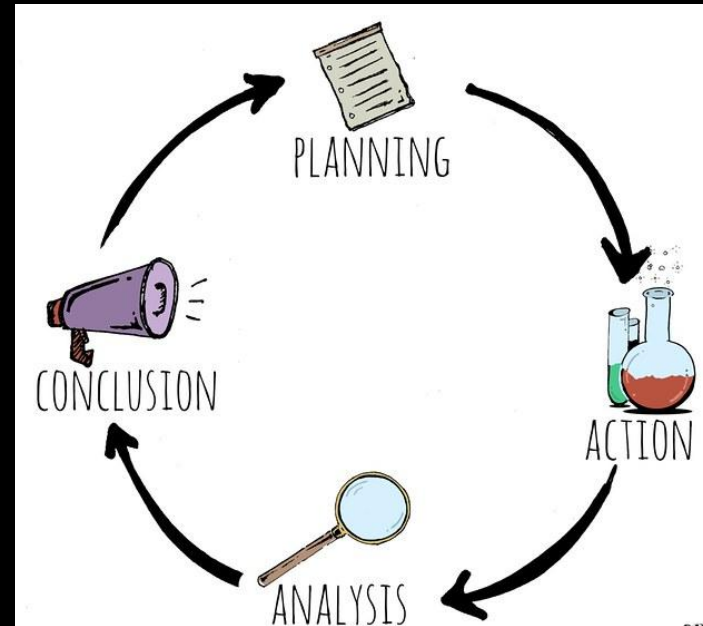
**Increase Revenue**

Decrease Cost



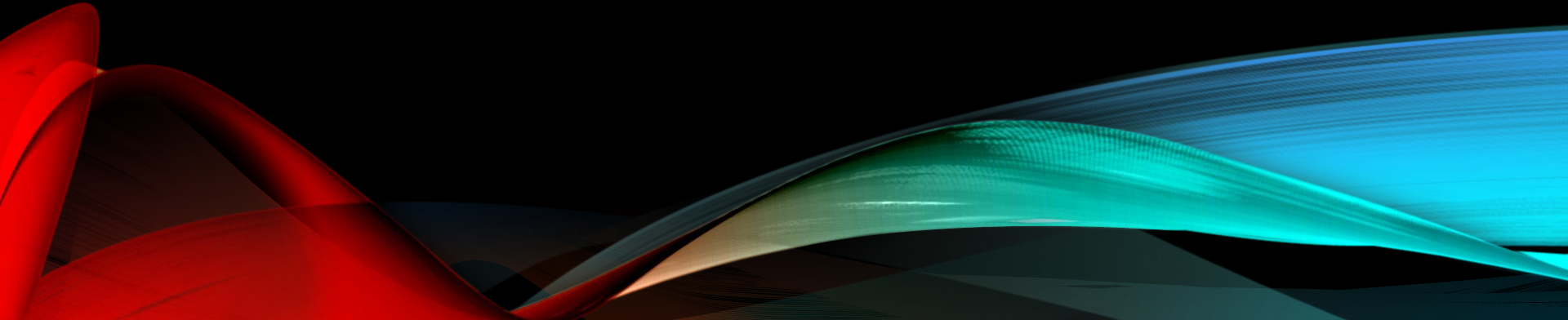
# General Method

- Ask: what's the problem?
- Retrieve and clean data
- Normalize the data
  - Sample the data
  - Find means
- Compare means
- Explain what that means
- Ask more questions!



# Increasing Revenue

Discounts, Seasons, Teams

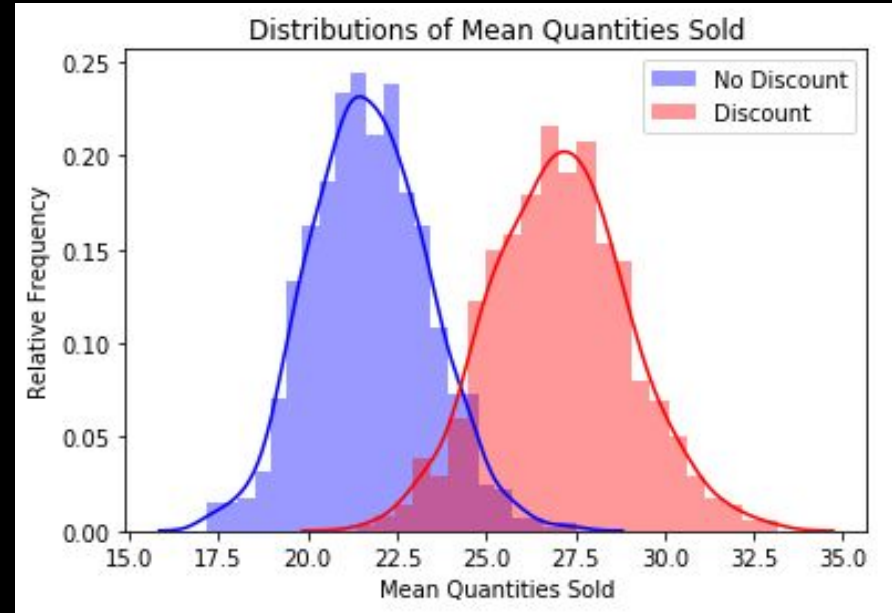


# Discounts

Discounts make a difference!

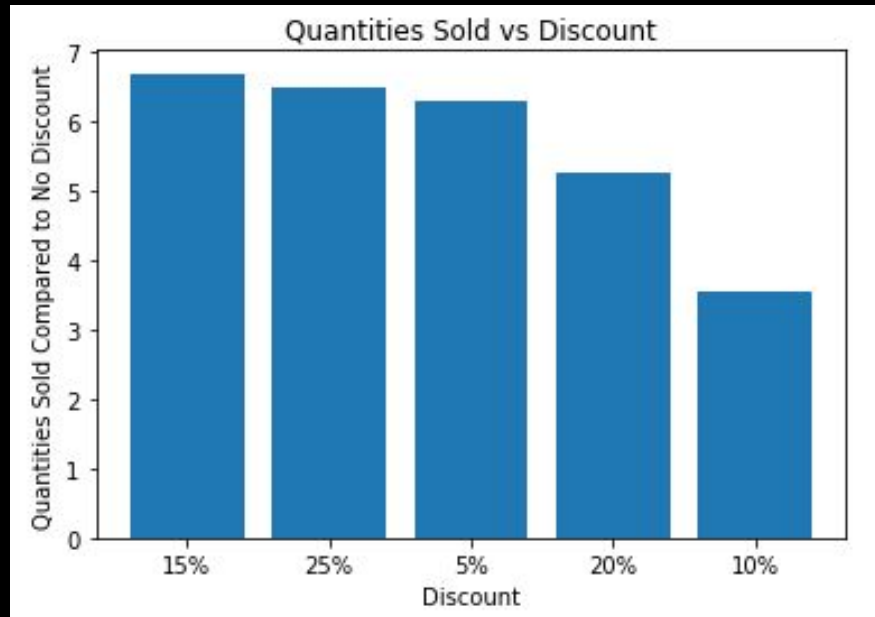
No discount: 21.5 items

Discount: 27.5 items



# Discounts

15% discounts are best!



Multiple Comparison of Means - Tukey HSD, FWER=0.05

| group1    | group2     | meandiff | lower   | upper   | reject |
|-----------|------------|----------|---------|---------|--------|
| 10Percent | 15Percent  | 3.1279   | 2.9531  | 3.3027  | True   |
| 10Percent | 20Percent  | 1.695    | 1.5201  | 1.8698  | True   |
| 10Percent | 25Percent  | 2.9244   | 2.7496  | 3.0993  | True   |
| 10Percent | 5Percent   | 2.717    | 2.5422  | 2.8919  | True   |
| 10Percent | NoDiscount | -3.5509  | -3.7257 | -3.3761 | True   |
| 15Percent | 20Percent  | -1.4329  | -1.6077 | -1.2581 | True   |
| 15Percent | 25Percent  | -0.2035  | -0.3783 | -0.0286 | True   |
| 15Percent | 5Percent   | -0.4108  | -0.5857 | -0.236  | True   |
| 15Percent | NoDiscount | -6.6788  | -6.8536 | -6.5039 | True   |
| 20Percent | 25Percent  | 1.2295   | 1.0546  | 1.4043  | True   |
| 20Percent | 5Percent   | 1.0221   | 0.8472  | 1.1969  | True   |
| 20Percent | NoDiscount | -5.2459  | -5.4207 | -5.071  | True   |
| 25Percent | 5Percent   | -0.2074  | -0.3822 | -0.0326 | True   |
| 25Percent | NoDiscount | -6.4753  | -6.6501 | -6.3005 | True   |
| 5Percent  | NoDiscount | -6.2679  | -6.4428 | -6.0931 | True   |



# Seasons

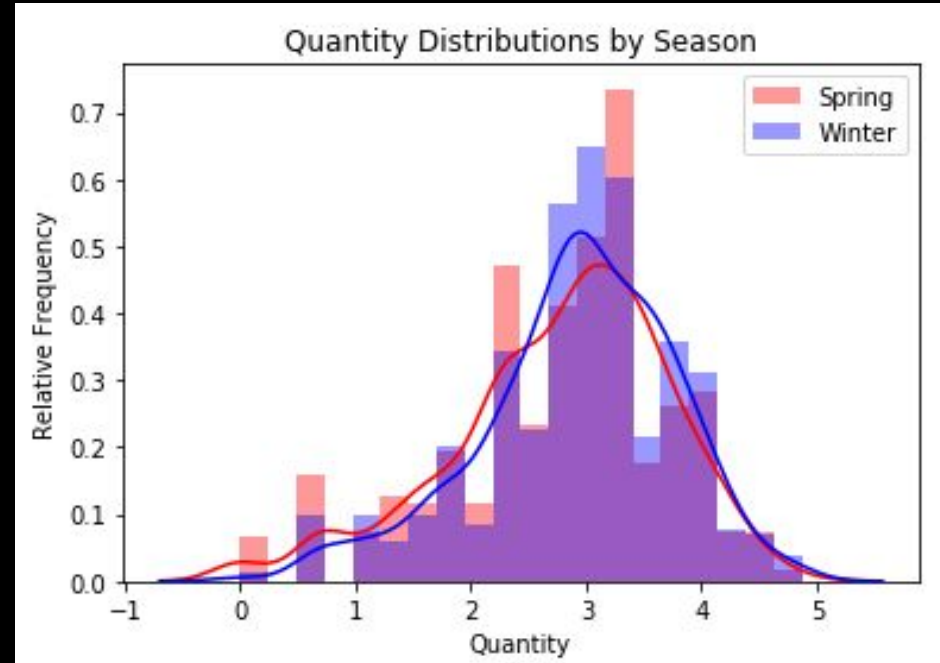
Spring and Winter:

- Have different amounts of sales

Spring: 2.78\*

Winter: 2.92\*

- Amounts are very similar

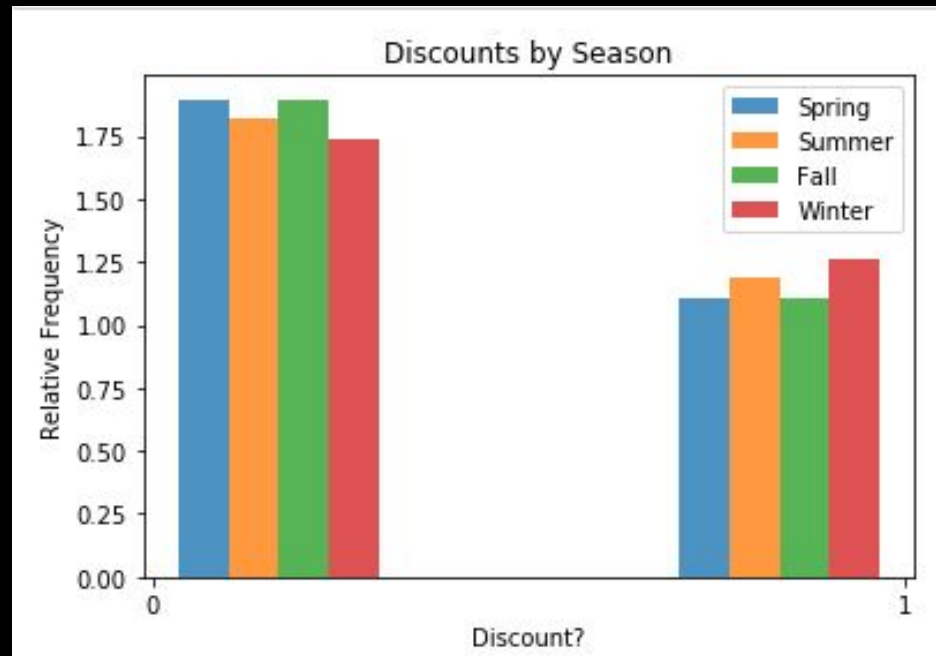


\*  $\log(\text{quantity})$

# Seasons

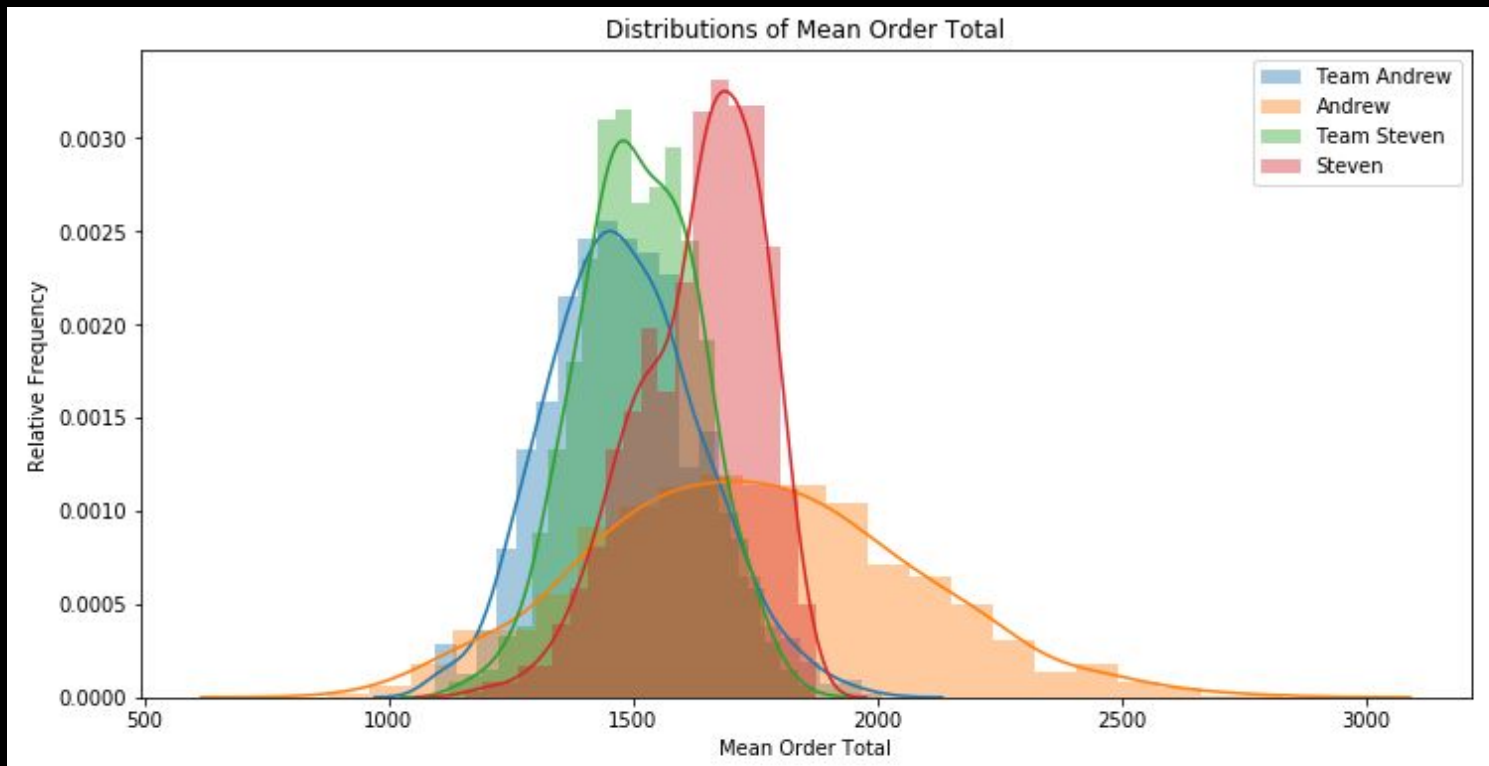
Winter:

- has relatively more discounts





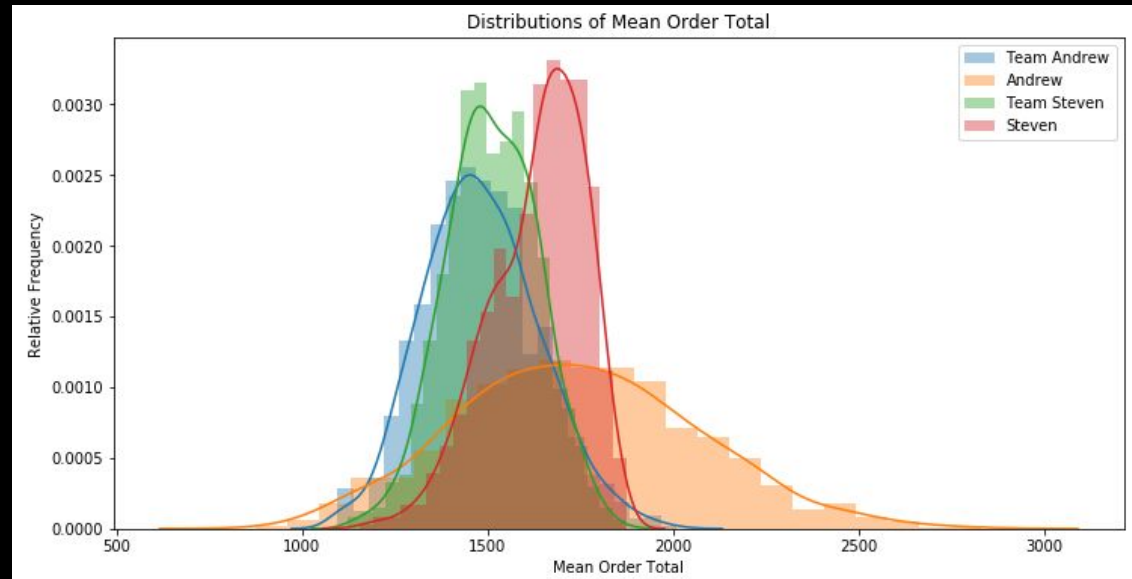
# Teams



# Teams

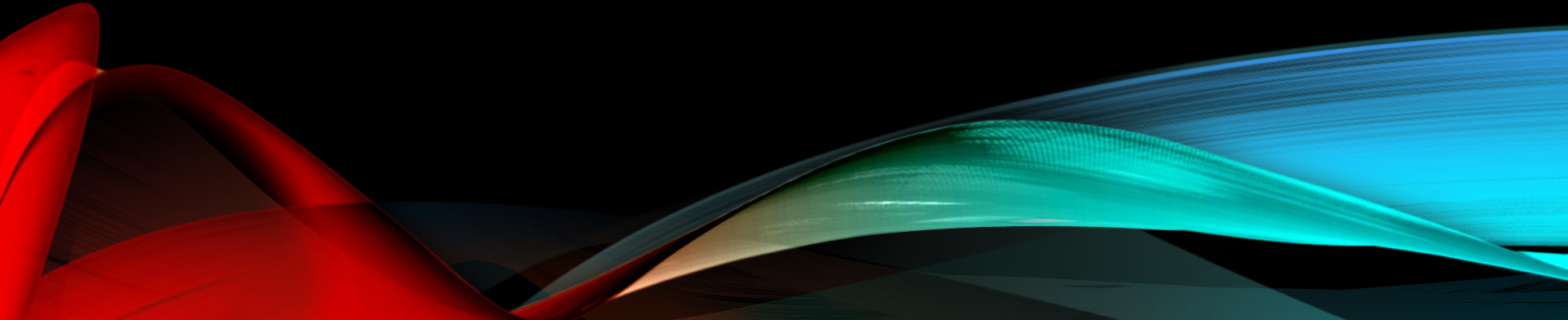
Andrew and Steven performed better than their teams

- Andrew: 1748
- Steven: 1639
- Team Steven: 1512
- Team Andrew: 1484



# Decreasing Cost

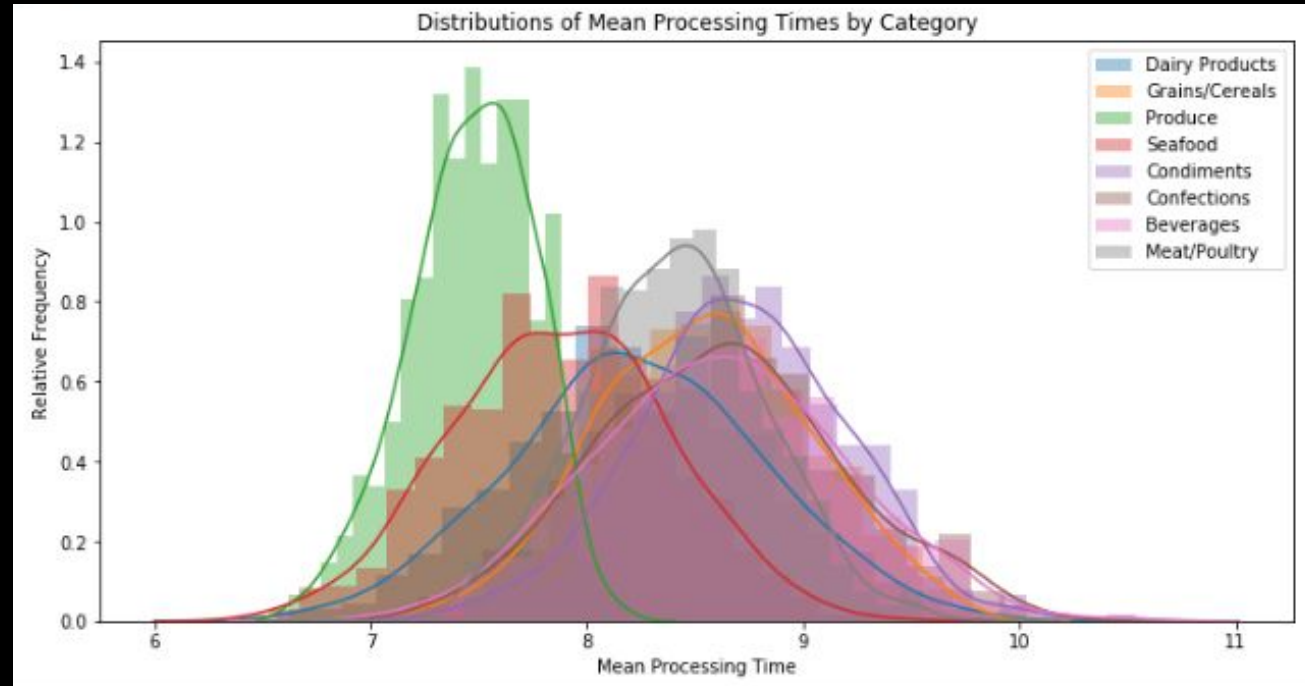
Processing



# Processing

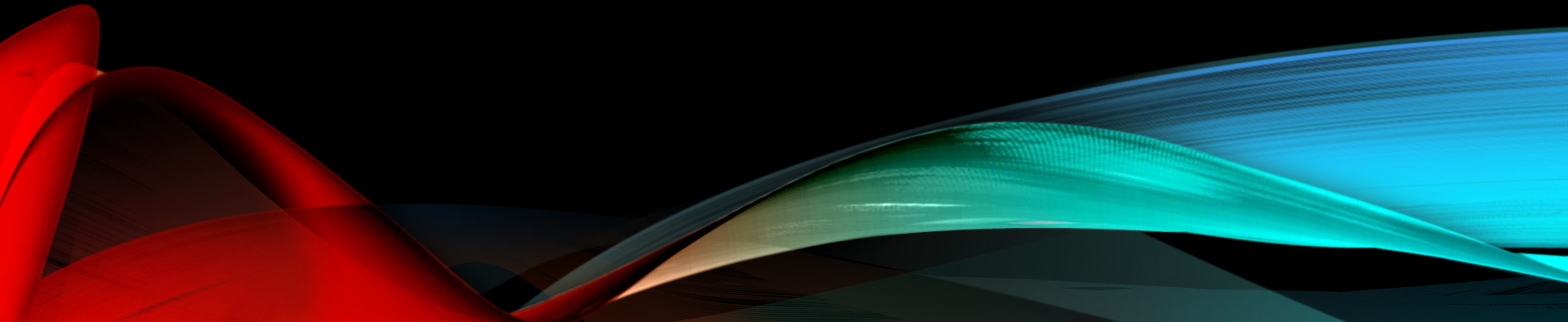
Shortest  
Processing  
Times:

Produce  
and  
Seafood



# Summary

Present, Future





# The Present

## Increase Revenue

- Offer 15% or 25% discount
- Continue offering discounts in the winter
- Have Andrew and Steven's trainers train the other employees

## Decrease Cost

- Streamline shipping process
  - Ship beverages and condiments faster
- Continue shipping produce and seafood quickly

# The Future

- Determine which items benefit from discounts
- Investigate intervals and durations of discounts
- Experiment with discounts during different seasons
- Determine if shipping items separately improves processing time and customer satisfaction
- Compare shipping process for produce vs beverages to shorten beverage shipping time
- Investigate the differences between Andrew's and Steven's teams to determine best practices





# Thank you!

[github.com/alvacat](https://github.com/alvacat)