

Welcome to Session 4 of DS Foundation Course!

Recap of Day 3

- Data Types
- Strings – Immutable
- Lists – Mutable
- Append vs Extend
- Dictionary – Your own indexes
- Loops – While vs For



Is this a valid Function?

- `def func():`
 `return 1,2,3,4,5`
- `ram,dam,sam,mam,nam = func()`
- `print (ram,dam,sam,mam,nam)`
- Output : 1,2,3,4,5

Statistics

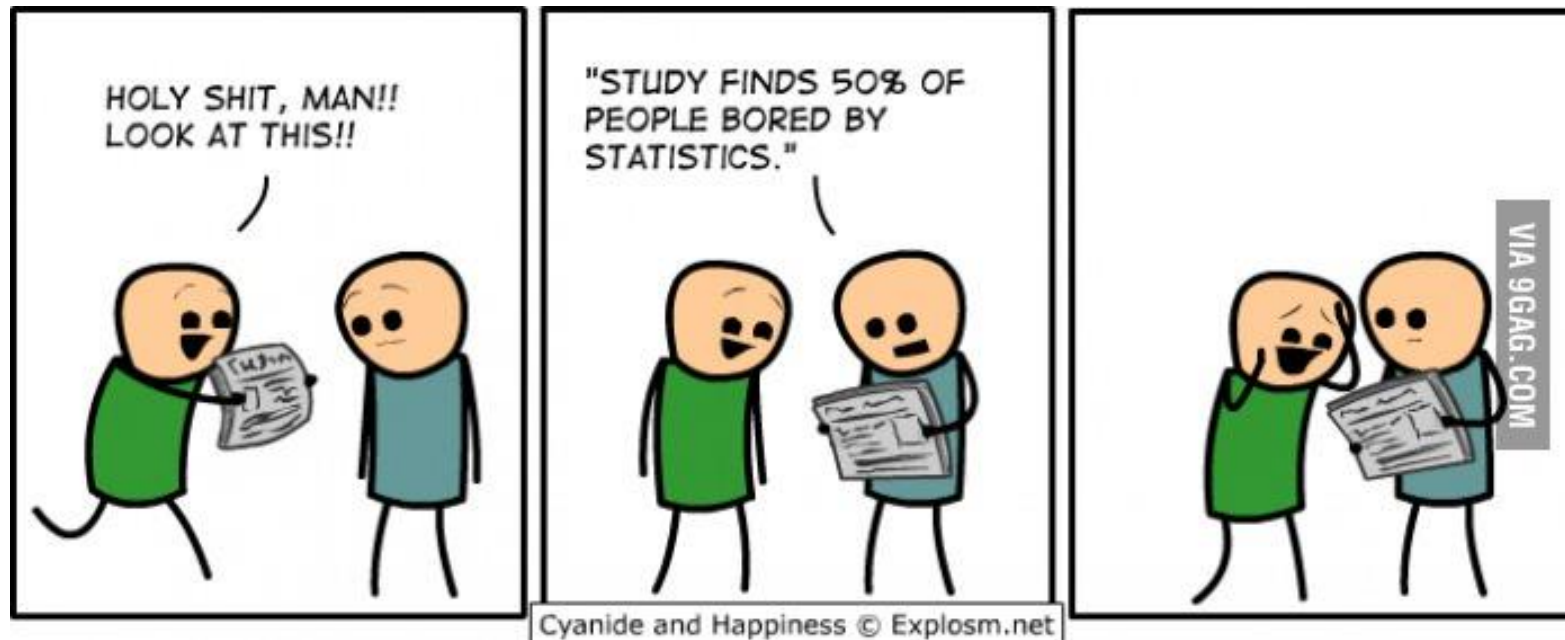
The Science of 'Us'





What is Statistics?

- Statistics is the science of conducting studies to collect, organize, summarize, analyze and draw conclusions from data.



Applications of statistical concepts in the business world

Finance – correlation and regression, index numbers, time series analysis

Marketing – hypothesis testing, chi-square tests, nonparametric statistics

Personel – hypothesis testing, chi-square tests, nonparametric tests

Operating management – hypothesis testing, estimation, analysis of variance, time series analysis

Types of Statistics

Descriptive Statistics

- Getting a better sense of data

Inferential
Statistics

- Drawing conclusions about the population based on sample data

Descriptive Statistics

The farthest most people ever get

Descriptive Statistics

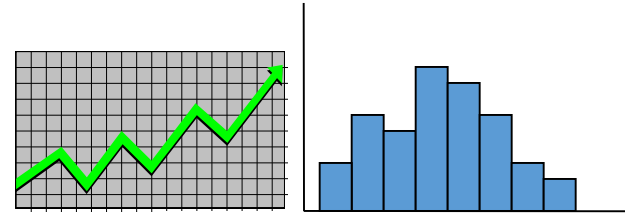
- Collect data

- e.g., Survey



- Present data

- e.g., Tables and graphs



- Summarize data

- e.g., Sample mean = $\frac{\sum X_i}{n}$

Topics

- ☐ Random Variables
- ☐ Sample vs Population
- ☐ Measures of central tendency
- ☐ Variance & Std. Deviation of Sample vs Population

Random Variable

- A **random variable**, usually written X , is a variable whose possible values are numerical outcomes of a rand

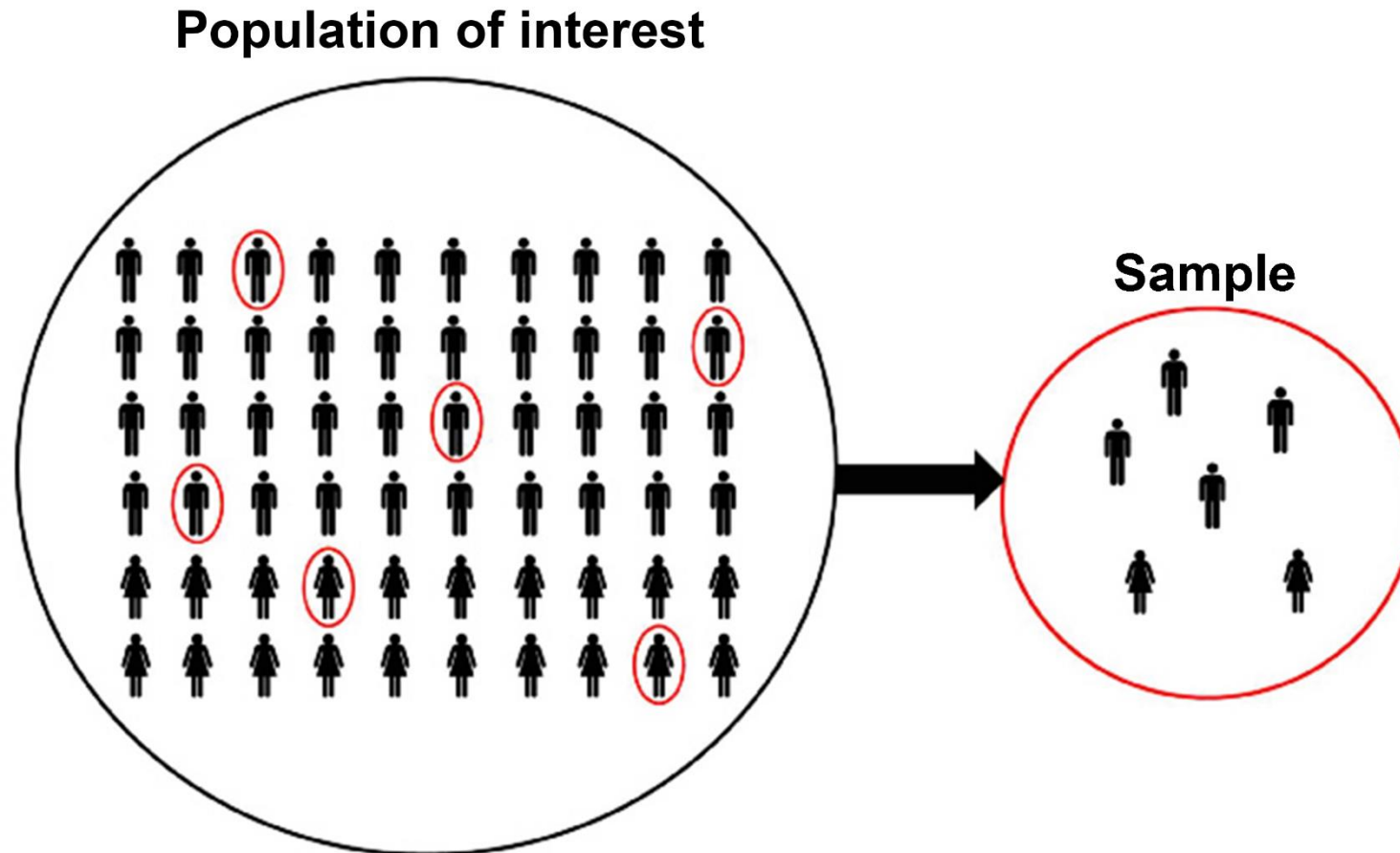


Dice can take any value from 1,2,3,4,5,6
Discrete Random Variable



Speed of the ball can take any value between some range
Continuous Random Variable

Sample vs Population



Measures of Central Tendency

- Mean
- Median
- Mode

Measures of Variability

- Range
- Variance
- Standard Deviation

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Crisis in Beaufort

Statistics to the rescue



Welcome to the Beaufort Police Department



Patrick

Data Scientist

Great with Programming and Statistics

Works in the Research Division



James

Chief of Police

Backs his instinct over numbers

Serving the state for 15+ years

The Crisis

Errr...Sure Chief

I want you to look at the data and
come up with a proposal to tackle
crime in the city.



Patrick gets to work



Identify the
different 'Crime'
categories

Gather data for
the past 10 years

Analyze the data
for any trends

Report his findings
to James

Step 1: Identify the different 'Crime' Categories



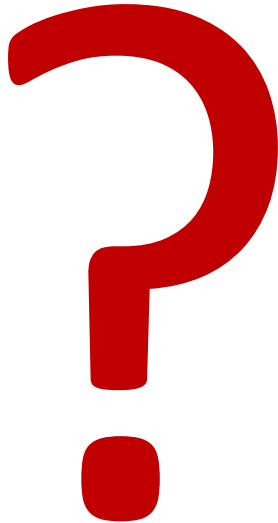
Step 2: Gather Data of all the Car Theft incidents

Total Car Theft Incidents in the past decade : 1500

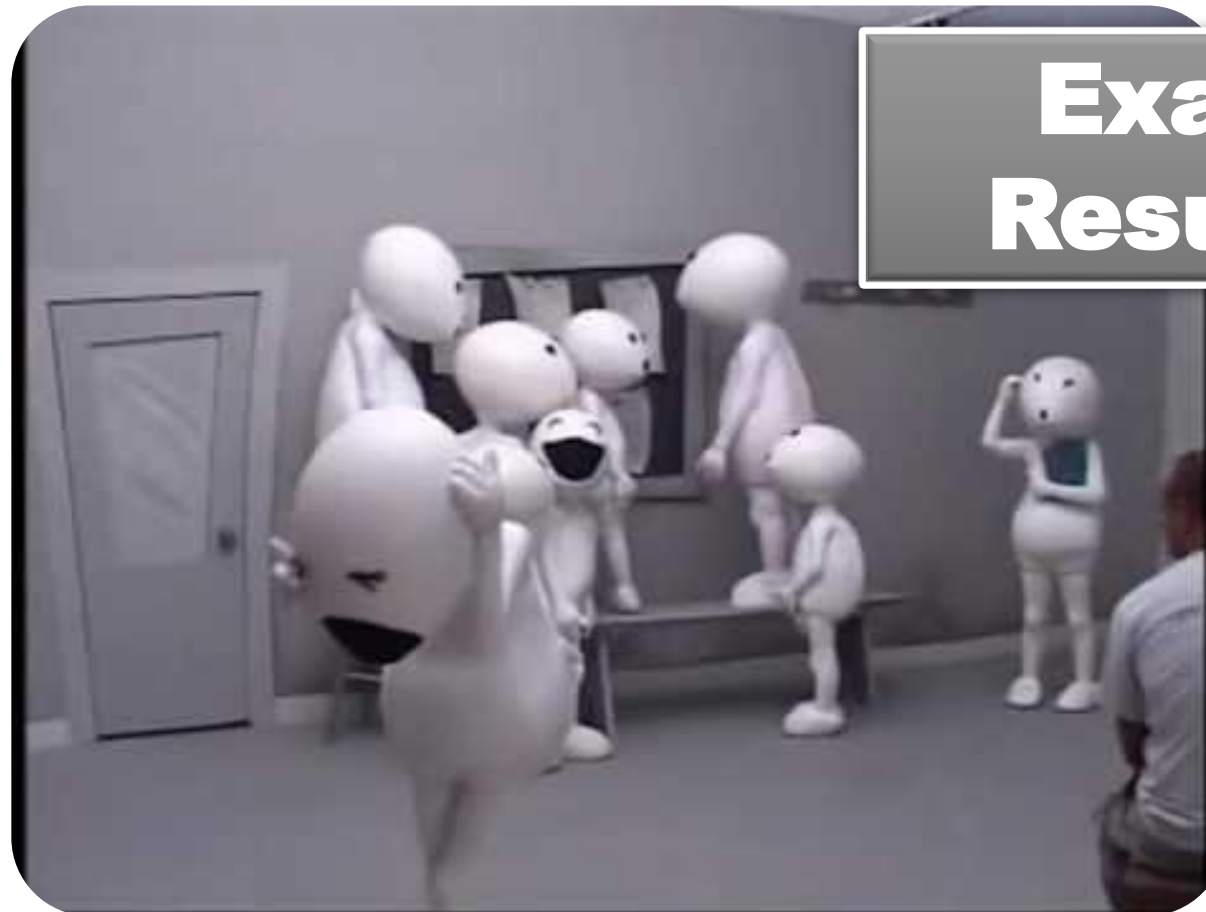


Car Thefts in Beaufort in 2017	
Jan	8
Feb	14
March	21
April	25
May	33
June	?

Car Thefts in Beaufort	
2008	151
2009	158
2010	161
2011	148
2012	155
2013	194
2014	140
2015	169
2016	172



Central Tendency



**Exam
Results**

How good is Ram?

Section A	Quiz 1	Quiz 2	Quiz 3
Ram	3	3	3
John	3	4	2
Rahman	3	4	2
Rivera	3	4	2
Lucy	3	5	1

Section B	Quiz 1	Quiz 2	Quiz 3
Ganesh	2	3	1
Alan	5	1	3
Sujatha	3	5	2
Murthy	3	2	5
Bindu	1	5	1