Hypothesis Testing

A form of inferential statistics that allows us to draw conclusions about an entire population based upon a representative sample.

Steps of a Hypothesis Test

0. Start Point

Question: An instructor claims that the average typing speed at CodeClan is higher than the national average.

Data: A sample of students and CodeClan employees took typing tests. Their average was 53 words per minute. The national average has been reported to be around 50 words per minute.

1. Define our test and significance level

Null Hypothesis:

$$H_0 : \mu - 50 = 0$$

The average typing speed of CodeClanners is **equal to** the national average.

Alternative Hypothesis:

$$H_A : \mu - 50 > 0$$

The average typing speed of CodeClanners is statistically significantly **greater** than the national average.

Significance Level:

$$\alpha = 0.05$$

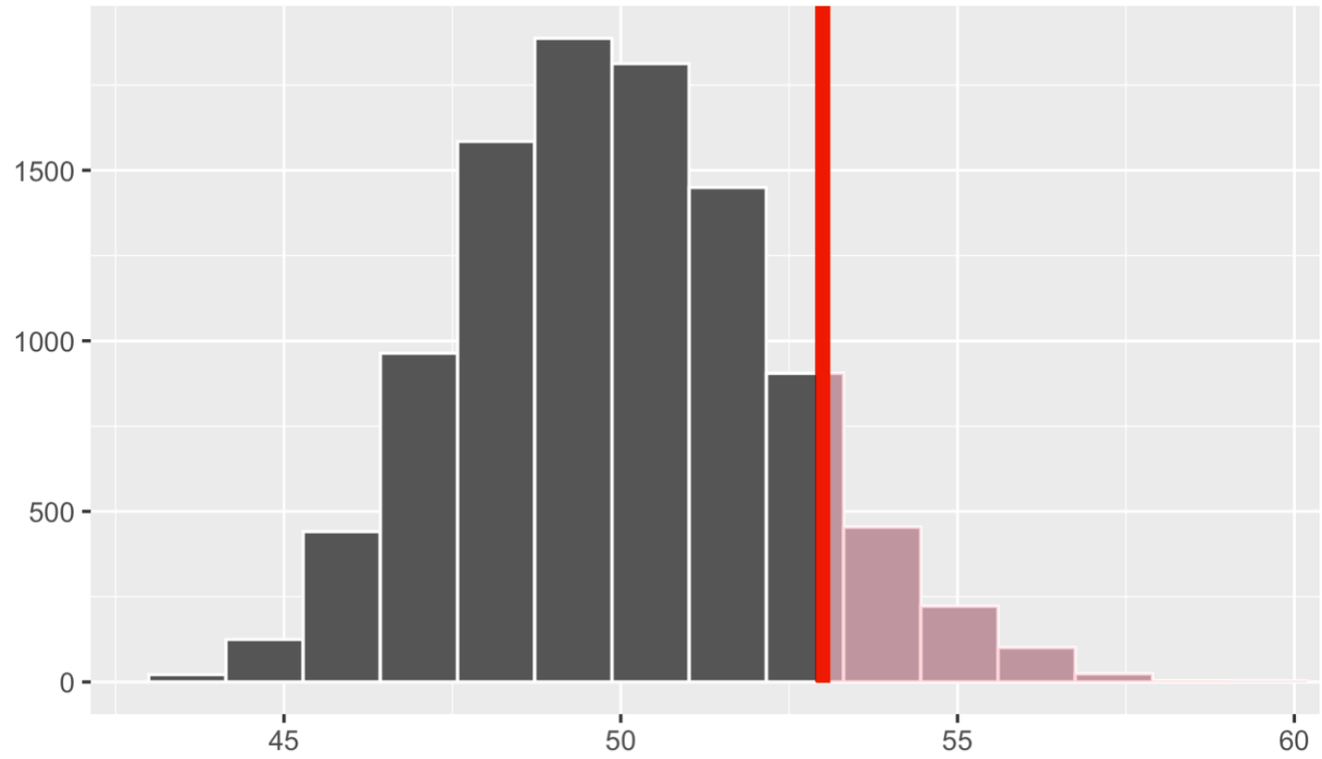
2. Calculate test statistic

$$\hat{x} = 53$$

3. Generate the null distribution

In this case by bootstrap resampling from our sample of students and CodeClan employees.

4. Visualise where our calculated statistic falls on the null distribution



5. Calculate the probability of obtaining a statistic equal to or greater than our observed value

$$p = 0.1005$$

6. Use the results to determine if we may reject the null hypothesis

Our p-value is not less than our significance level so we **fail to reject** the null hypothesis.

Based on our sample of 20 CodeClanners, there is not sufficient evidence to suggest that people at CodeClan have faster typing speeds than the national average.

Three Column Layout: : CHEAT SHEET

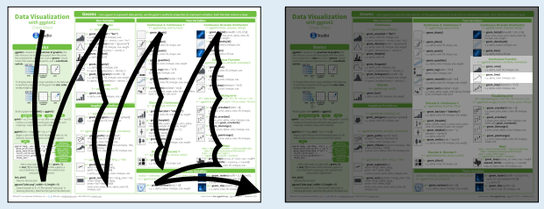
Basics

Thank you for making a new cheatsheet for R! These cheatsheets have an important job:

Cheatsheets make it easy for R users

Remember that the best cheatsheets are **visual**—not written—documents. Whenever possible use visual elements to make it easier for readers to find the information they need.

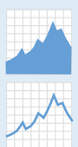
1. Use a **layout** that flows and makes it easy to zero in on specific topics.



2. Use **visualizations** to explain concepts quickly and concisely.

summary function

3. Use visual elements to make the sheet **scannable**.



i + geom_area()
x, y, alpha, color, fill, linetype, size

i + geom_line()
x, y, alpha, color, group, linetype, size

4. Use visual **emphasis** (like color, size, and font weight) to make important information easy to find.

dplyr::**lag()** - Offset elements by 1
dplyr::**lead()** - Offset elements by -1

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Layout Suggestions

Use headers, colors, and/or backgrounds to **separate or group together sections**.

Section 1 | Section 2 | Section 3

Create a visual hierarchy. Help users navigate the page with titles, subtitles, and subsubtitles

Title

SUBTITLE

SUBSUBTITLE

Manipulate Variables

Quickly identify content with a **package hexsticker** (if available)

Fit sections to content. Try several different layouts.

Use numbers or arrows to link sections if the order/**flow** is confusing.

Logistics

FONTS

This template uses several fonts: **Helvetica Neue, `Menlo`**, **Source Sans pro**, which you can acquire for free here, www.fontsquirrel.com/fonts/source-sans-pro, and **Font Awesome**, which you can acquire here, fortawesome.github.io/Font-Awesome/get-started/

To use a **font awesome** icon, copy and paste one from here fortawesome.github.io/Font-Awesome/cheatsheet/. Then set the text font to font awesome.

KEYNOTE

I make my cheatsheets in **Apple Keynote**, and not latex or R Markdown, because presentation software makes it much easier to tweak the visual appearance of a document

KEYNOTE TIPS

- **Select multiple elements** by holding down shift and then selecting each. Click on a selected element before letting go of shift to unselect it.
- To **group elements together.** Select them all , then click Arrange > Group
- To **evenly space multiple objects**, select them all then Right Click > Align objects or Right Click > Distribute objects
- Click on a table, then visit Format >Table > Row and Column Size to make **even width rows/columns**.

Useful Elements

CODE

Where possible, use **code that works** when run.

```
ggplot(mpg, aes(hwy, cty)) +
 geom_point(aes(color = cyl)) +
 geom_smooth(method ="lm")
```

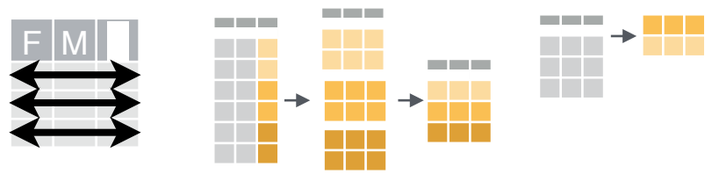
Word balloons

can help explain code

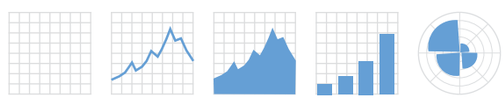
ICONS

These are just font awesome characters

MOCK TABLES



MOCK GRAPHS



TABLES

sub-option	description
citation_package	The LaTeX package to process
code_folding	Let readers to toggle the display of
colortheme	Beamer color theme to use

YOUR LOGO
(optional)