



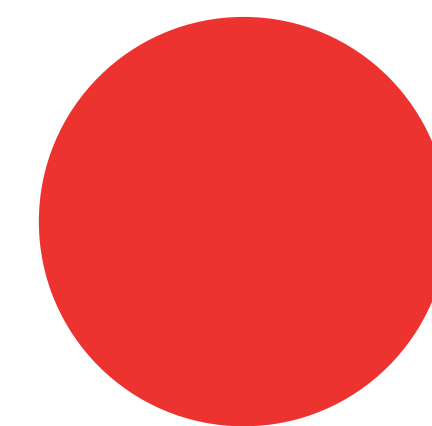
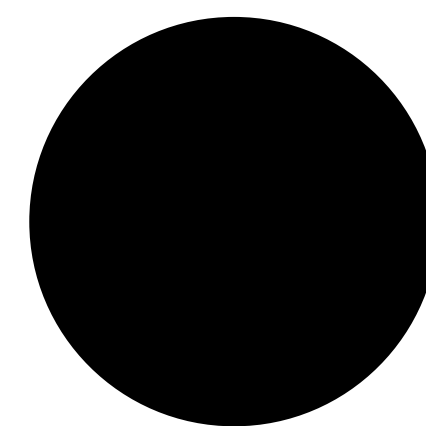
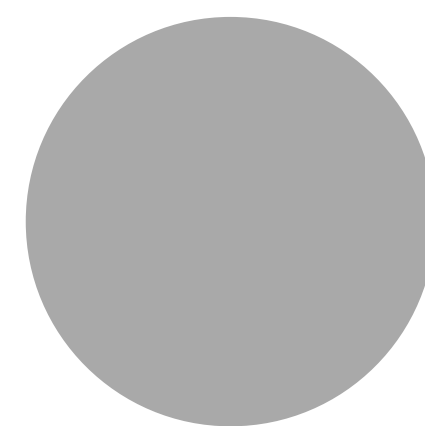
# Readable Code

---

Laura Savino



@#%&







# Readable Code

---

Laura Savino









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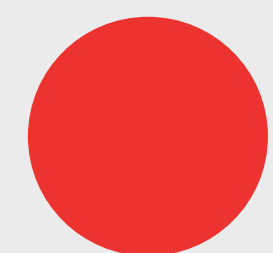




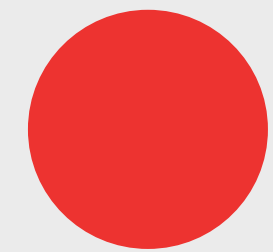
# ***01*** LANGUAGE && CODE

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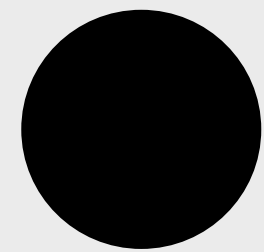




**“Hello, world!”**

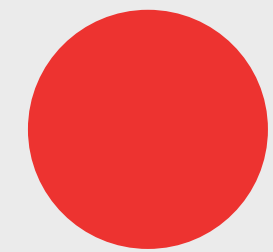


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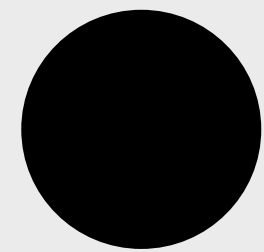


**“How have you been?”**

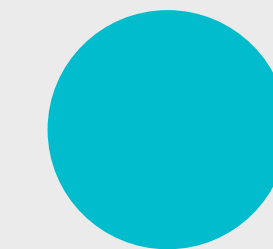




**“Hello, world!”**



**“How have you been?”**



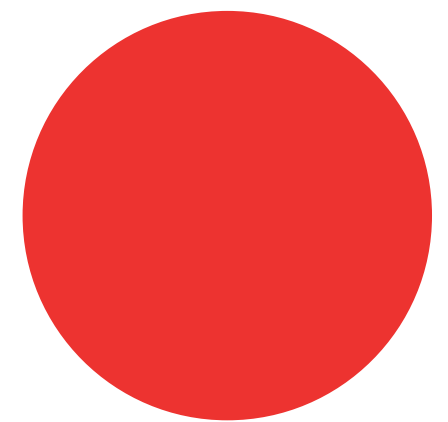
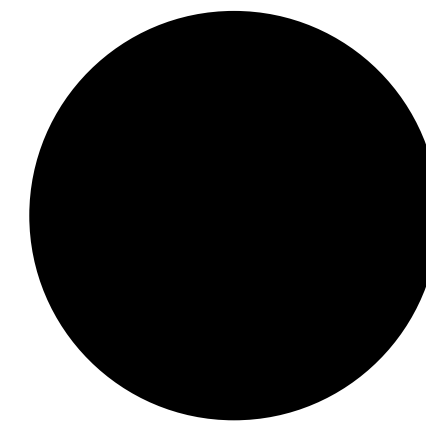
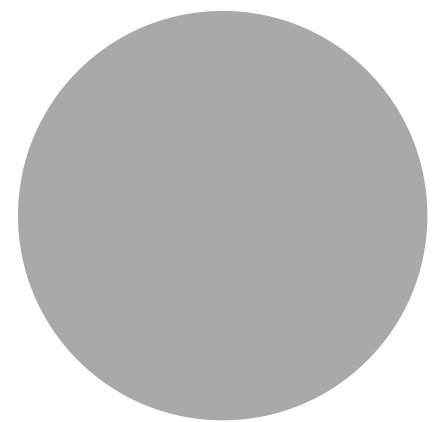
**“Let’s talk values...”**






**LANGUAGE & CODE**

**Nuance, subtlety, & stereotypes**





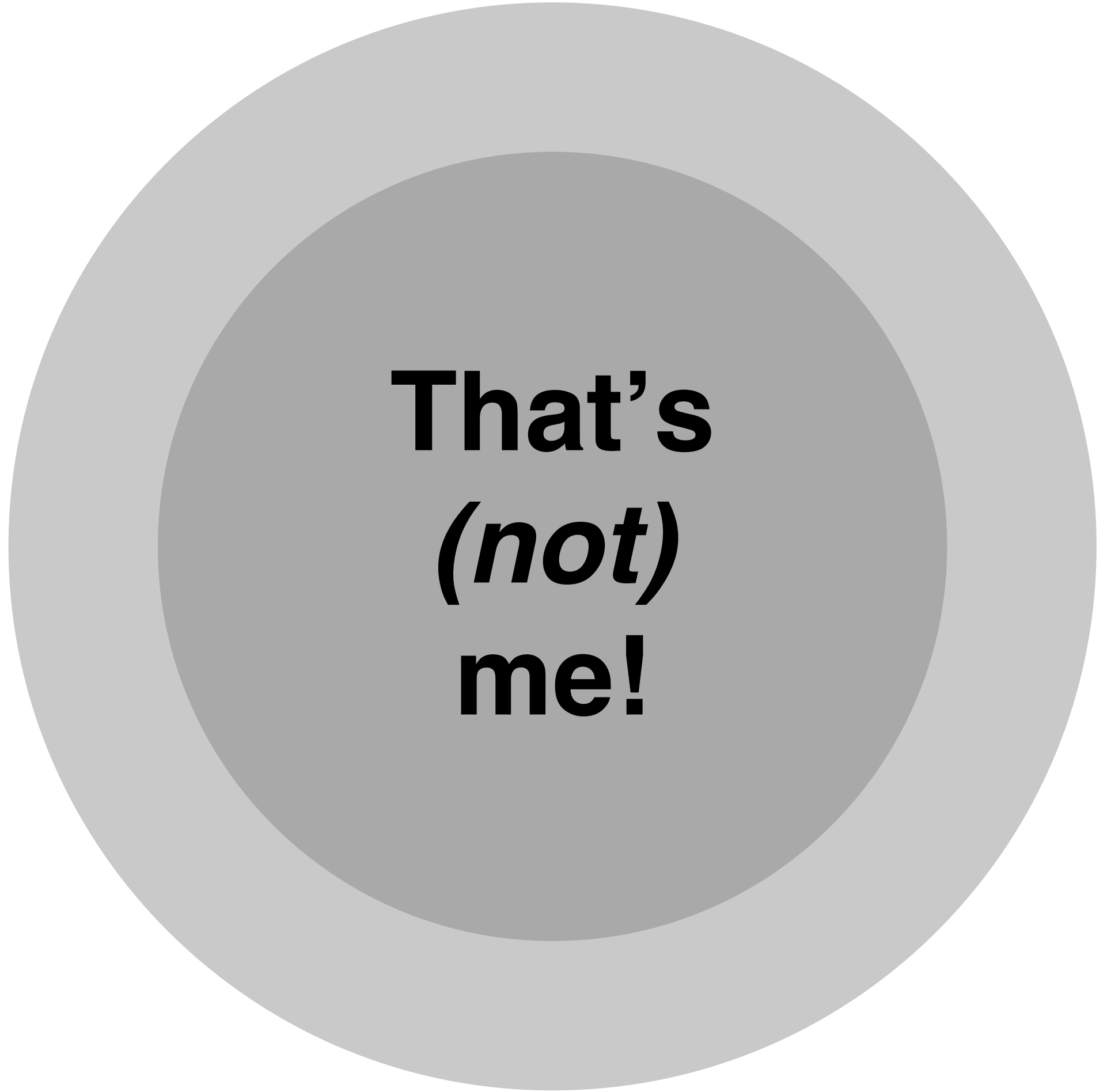
# LANGUAGE & CODE



**hi, y'all!**



# LANGUAGE & CODE



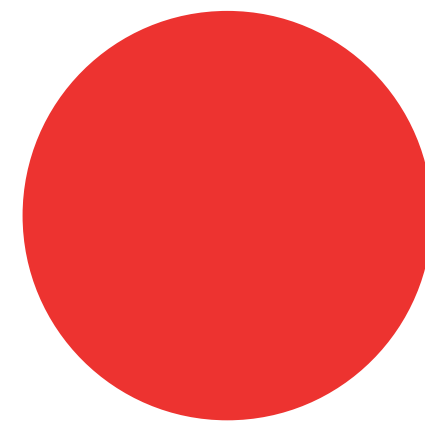
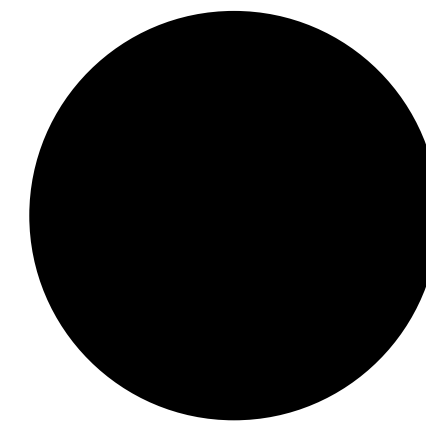
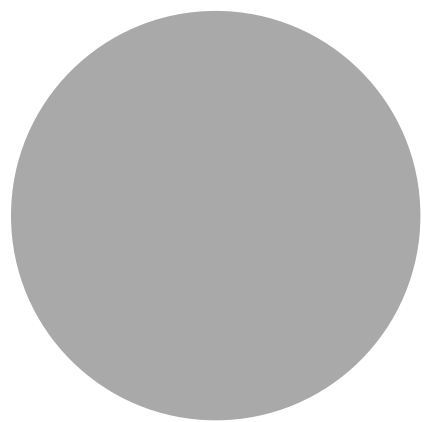
**That's  
*(not)*  
me!**





**LANGUAGE && CODE**

**Breaking expectations**







# LANGUAGE && CODE





**thank you**





## LANGUAGE && CODE

```
let baseCosts: [Double] = ...  
var totalCosts = [Double]()  
for cost in baseCosts {  
    totalCosts.append(cost * 1.15)  
}
```








## LANGUAGE && CODE

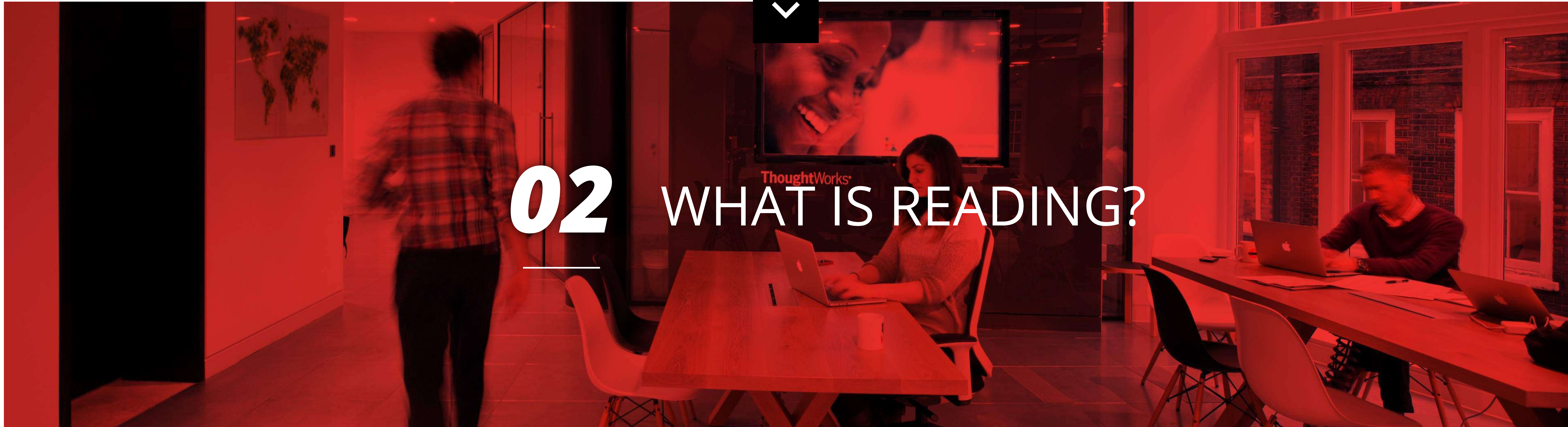
```
let baseCosts: [Double] = ...  
let totalCosts = baseCosts.map() {  
    $0 * 1.15  
}
```







# 02 WHAT IS READING?

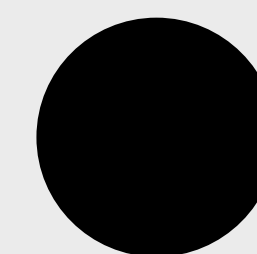




# WHAT IS READING?

● "I'm having trouble understanding this code."

"But it's more readable this way!"



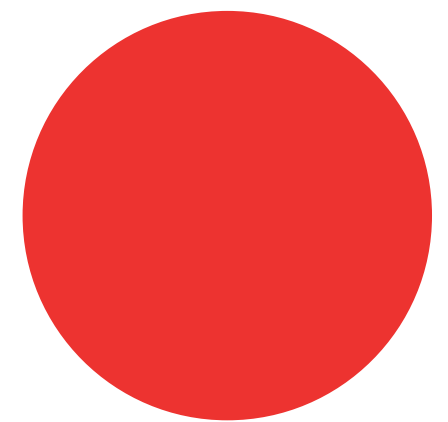
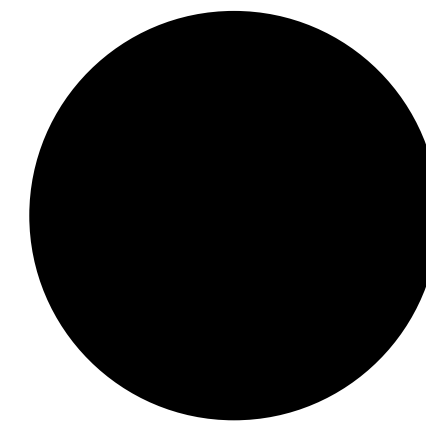
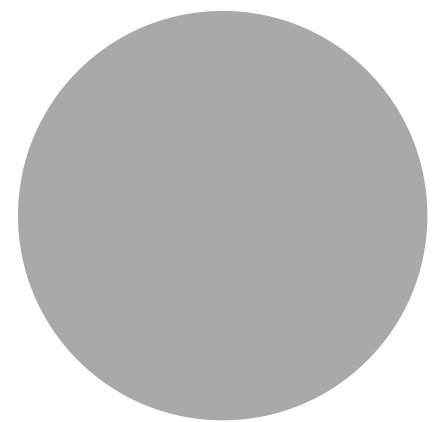
“Readable”





## WHAT IS READING?

**Readability** needs a reader.

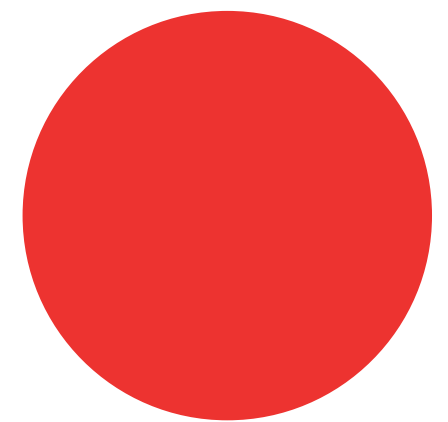
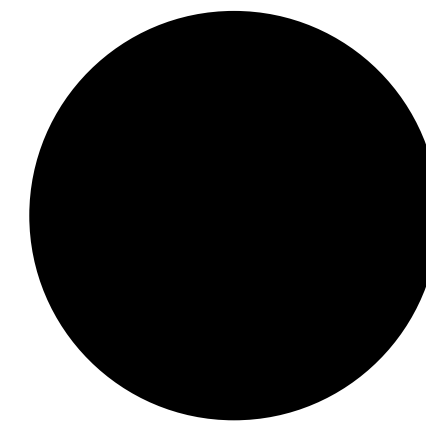
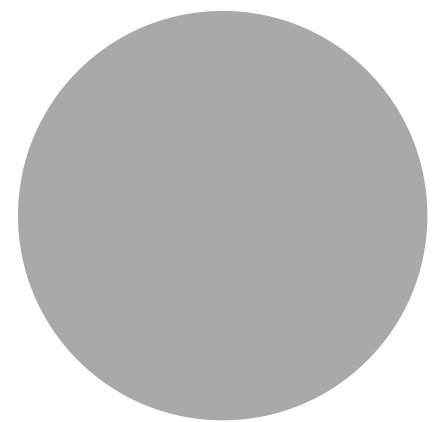






## WHAT IS READING?

**Fluency uses experience.**

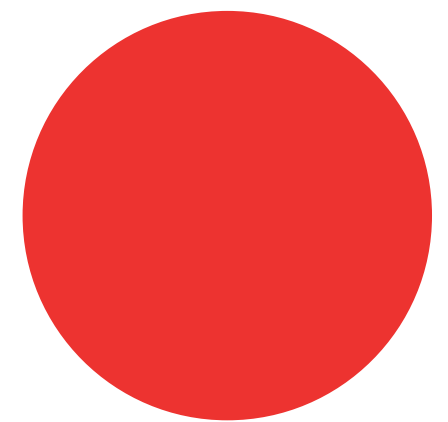
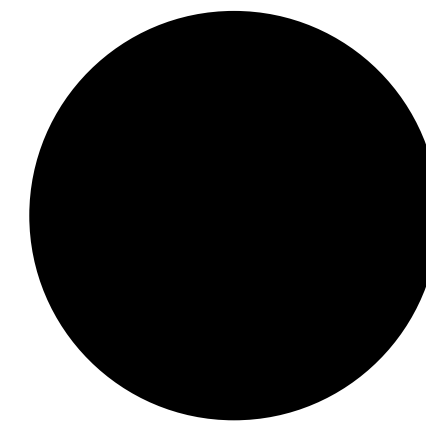
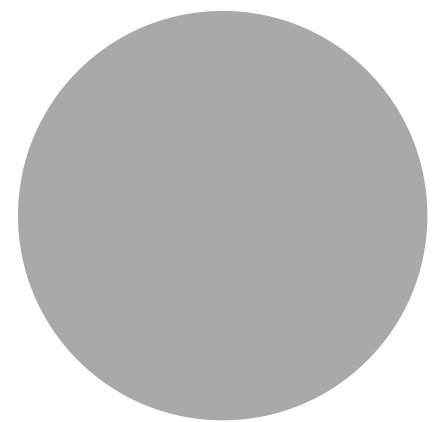






**WHAT IS READING?**

**two *very* different readers...**

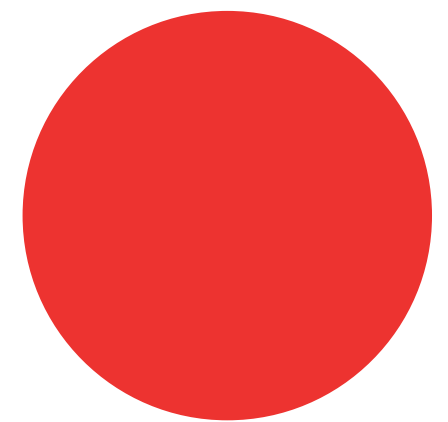
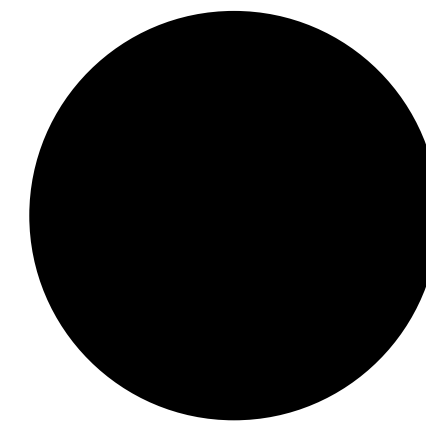
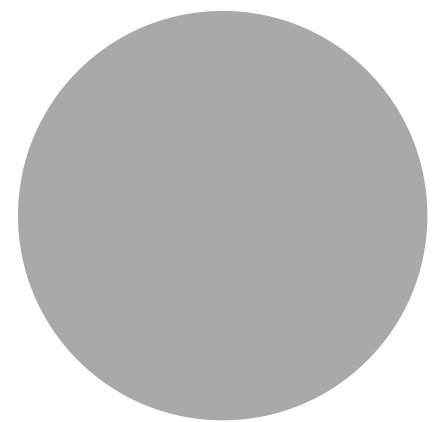






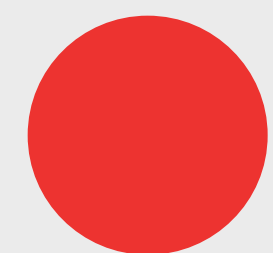
**WHAT IS READING?**

**What about  
comments?**



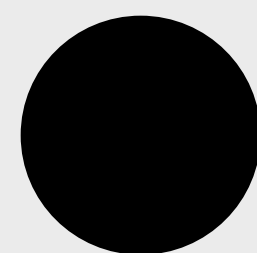


# USE PATTERN MATCHING



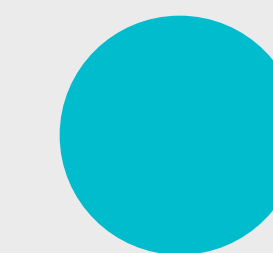
**This makes some sense**

```
// NEVER CHANGE VARIABLES X AND Y  
perimeter = x * 2 + y * 2
```



**Starting to diverge:**

```
// NEVER CHANGE VARIABLES X AND Y  
perimeter = width * 2 + height * 2
```



**Oh, dear.**

```
// NEVER CHANGE VARIABLES X AND Y  
perimeter = radius * radius * pi
```



# What about comments?

(No one reads the manual.)

## INTRODUCTION

Thank you for purchasing our "Essentials" Hair dryer. Each unit has been manufactured to ensure safety, reliability, and ease of use. Before use, please read these instructions carefully and keep them for future reference.

## IMPORTANT SAFEGUARDS

When using any electrical appliance, basic safety precautions should always be followed, including:

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they are supervised or have been given instruction concerning the use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- Always ensure that the voltage on the rating label corresponds to the voltage in your home.
- Check the power cord and plug regularly for any damage. If the cord or the plug is damaged, it must be replaced by the manufacturer or a qualified person in order to avoid an electrical hazard.
- This appliance is intended for household use only. Industrial or commercial use will void the warranty, and the supplier can not be held responsible for injury or damage caused when using the appliance for any other purpose than that intended.
- Incorrect operation and improper use can damage the appliance and cause injury to the user.
- Do not use the appliance if it has been dropped or damaged in any way. In case of damage, take the unit in for examination and/or repair by an authorized service agent.
- To reduce the risk of electric shock, do not immerse or expose the motor assembly, plug or the power cord to water or any other liquid.
- Never immerse the unit in water or any other liquid for cleaning purposes.
- Remove the plug from the socket by gripping the plug. Do not pull on the cord to disconnect the appliance. Always unplug the unit when not in use, before cleaning or when adding or removing parts.

2

- The use of accessory attachments that are not recommended or supplied by the manufacturer may result in injuries, fire or electric shock.
- Do not let the cord hang over the edge of a table or counter. Ensure that the cord is not in a position where it can be pulled on inadvertently.
- Do not allow the cord to touch hot surfaces and do not place on or near a hot gas or electric burner or in a heated oven.
- Use of an extension cord with this appliance is not recommended. However, if it is necessary to use an extension lead, ensure that the lead is suited to the power consumption of the appliance to avoid overheating of the extension cord, appliance or plug point. Do not place the extension cord in a position where it can be pulled on by children or animals or tripped over.

## KNOW YOUR HAIR DRYER

**A: Concentrator**

**B: Main body**

**C: Rear cover**

**D: 2 Speed / Heat setting**

**E: Hanging Loop**

## SPECIFICATIONS

Voltage : AC 230V 50Hz  
Wattage : 1200W  
Cord : 2 round pins plug.

## USING YOUR HAIR DRYER

**READ ALL INSTRUCTIONS CAREFULLY BEFORE USING THIS APPLIANCE**  
**WARNING-To reduce the risk of burns, electrocution, fire or injury to persons:**

1. An appliance should never be left unattended when plugged in.
2. Close supervision is necessary when this appliance is used by, on, or near children or invalids.
3. Use this appliance only for its intended household use as described in this manual. Do not use attachments which are not recommended by the manufacturer.
4. Never operate this appliance if it has a damaged cord or plug, if it is not working properly, if it has been dropped or damaged or dropped into water. Return the appliance to a Service Center for examination and repair.



6. Never block the air openings of the appliance or place it on a soft surface, such as a bed or couch, where the air openings may be blocked. Keep the air openings free of lint, hair etc.
7. Never use while sleeping.
8. Never drop or insert any object into any opening and hose.
9. Do not use outdoors or operate where aerosol (spray) products are being used or where oxygen is being administered.
10. Do not aim hot air directly toward eyes or other heat sensitive body parts.
11. Attachments may become hot during use. Allow them to cool before handling.
12. For additional protection the installation of a residual current device (RCD) with a rated residual operating current not exceeding 30mA is advisable in the electrical circuit supplying the bathroom. Ask your electrician for advice.

## TO USE YOUR HAIR DRYER

- There is a changeable voltage switch. Check if the voltage indicated on the appliance corresponds to the local voltage of your home before you connect the appliance.
- Always ensure the switch is set The OFF position before plugging the unit into the electric outlet
- Use the high setting for drying hair, and use the low setting for styling hair
- Should the hair dryer stop for any reason, turn it off at once and let it cool down.
- Adjust the desired blowing strength:  
Position 0: OFF  
Position 1: Half power, medium temperature for gentle drying and styling  
Position 2: Full power, high temperature for quick drying

## CARE AND CLEANING

- **IMPORTANT:** Always ensure that hair dryer is disconnected from the electric outlet before cleaning. Use a damp cloth for cleaning and then wipe it dry. This will help preserve the original finish of your hair dryer. Abrasive cleaners should not be used.
- **WARNING:** Never immerse the hair dryer in water and always ensure that the plug is kept dry.  
Frequently clean out any hair or fluff that becomes stuck in the air intake filter. To clean the filter, vacuum or dry brush clean, never immerse the filter in water. Failure to keep filter clean may result in overheating.

4



# What about comments?

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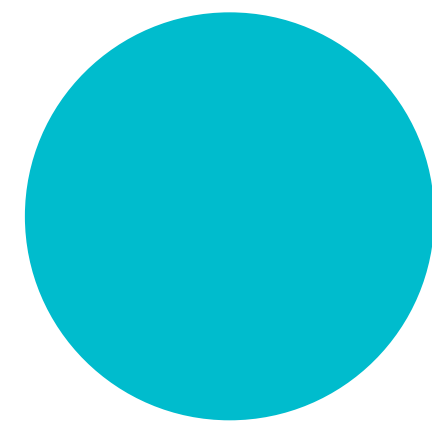
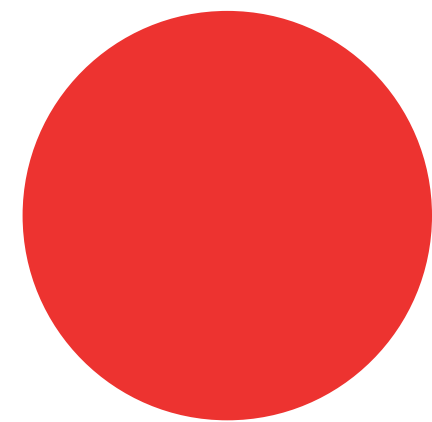
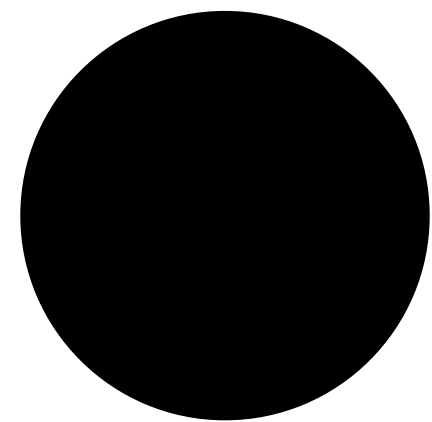
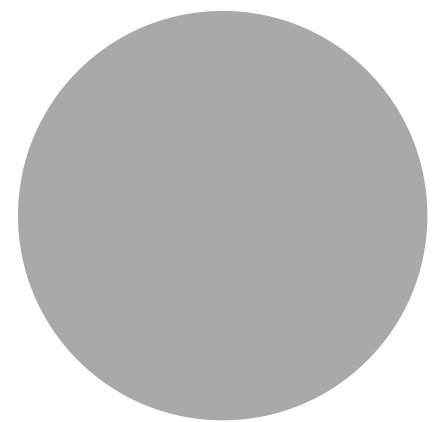
4





## WHAT IS READING?

**Working memory**

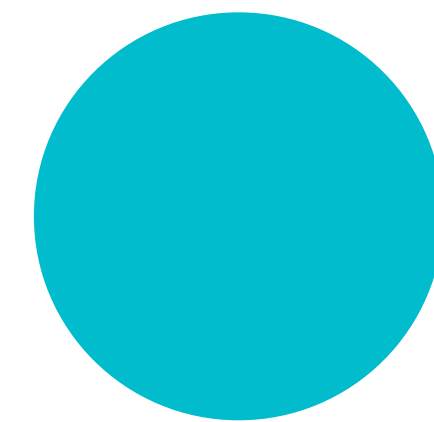
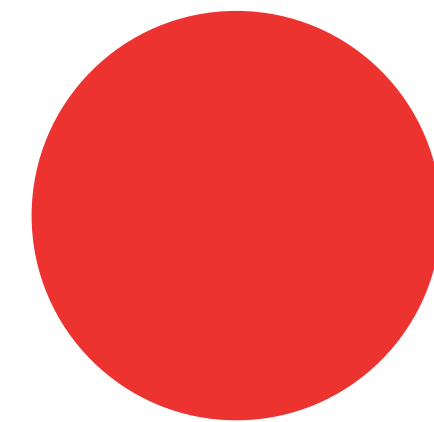






## WHAT IS READING?

# Working memory



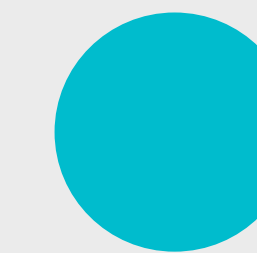
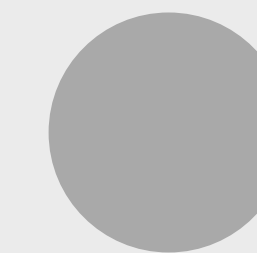
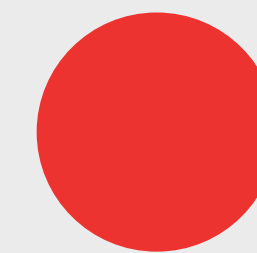
supercalifragilisticexpialidocious

NSURLErrorRedirectToNonExistentLocation



# WHAT IS READING?

● **Chunking**

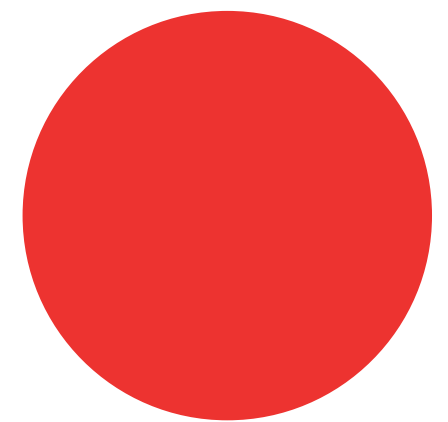
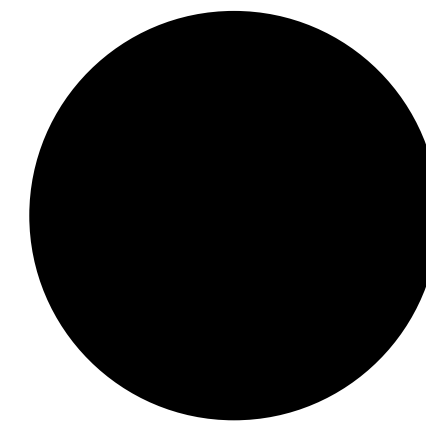
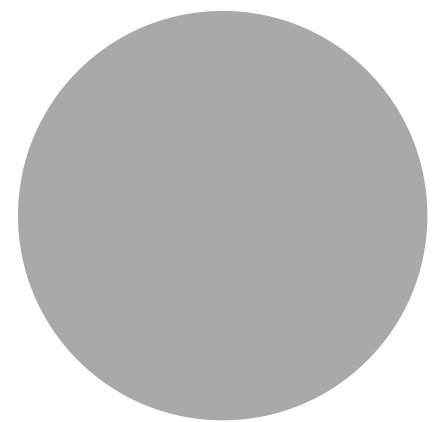






**WHAT IS READING?**

**A moment  
for poetry**





# e. e. cummings

when serpents bargain for the right to squirm  
and the sun strikes to gain a living wage -  
when thorns regard their roses with alarm  
and rainbows are insured against old age

...

then we'll believe in that incredible  
unanimal mankind(and not until)



# e. e. cummings

when serpents bargain for the right to squirm  
and the sun strikes to gain a living wage -  
when thorns regard their roses with alarm  
and rainbows are insured against old age

...

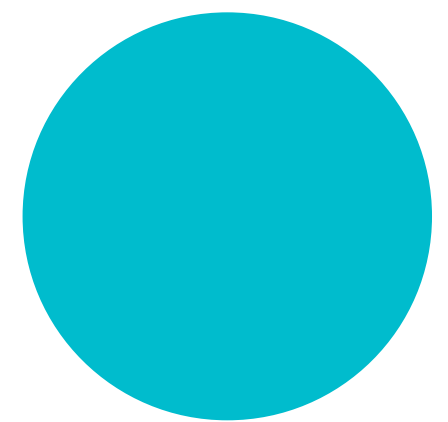
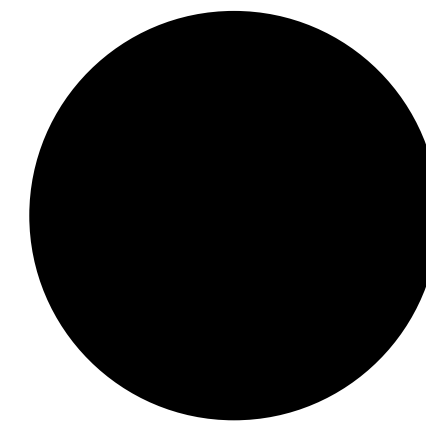
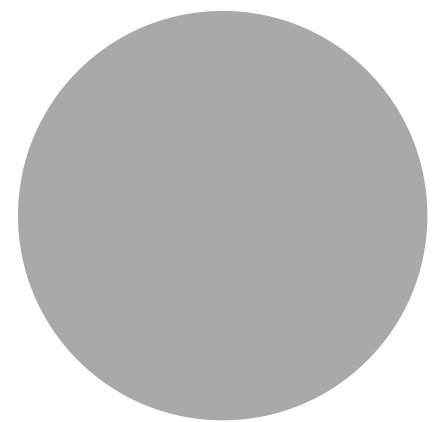
then we'll believe in that incredible  
unanimal mankind(and not until)





**WHAT IS READING?**

**You can decipher,  
with tools**

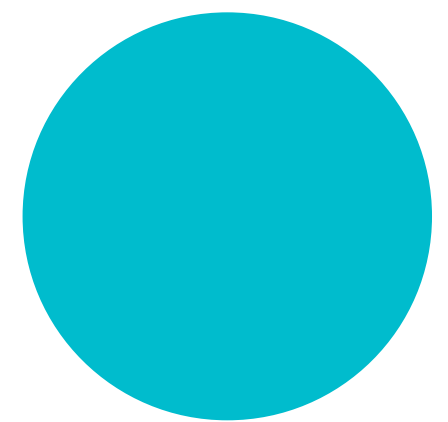
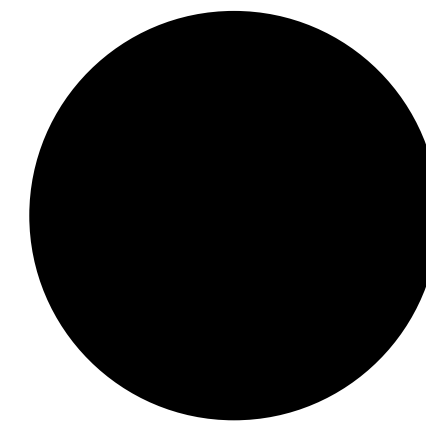
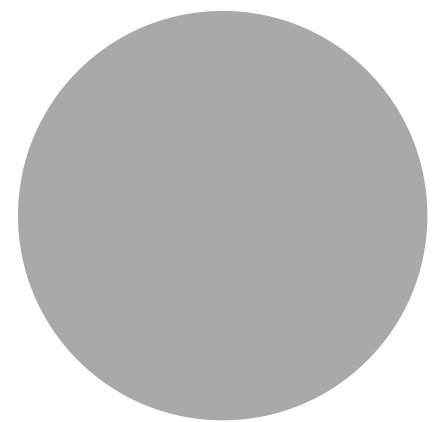






## WHAT IS READING?

**Deciphering is not reading**

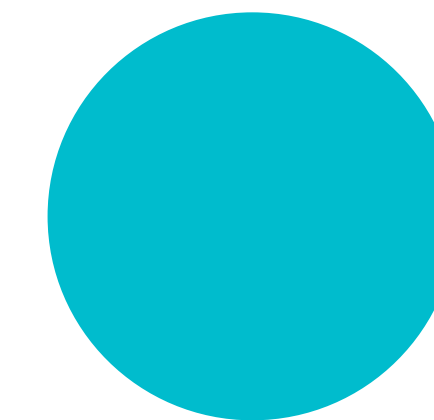
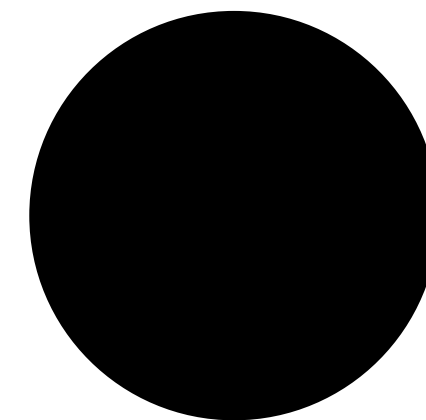
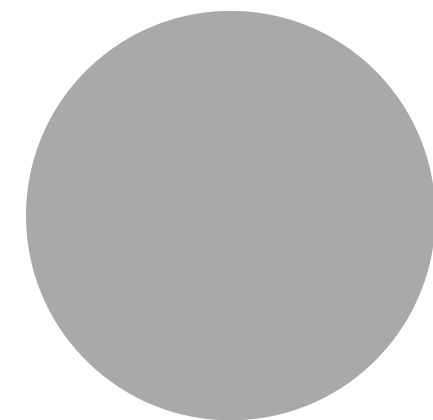






**WHAT IS READING?**

**Cerebral poetry has no place  
in production software.**







WHAT IS READING?

blue  
black  
red



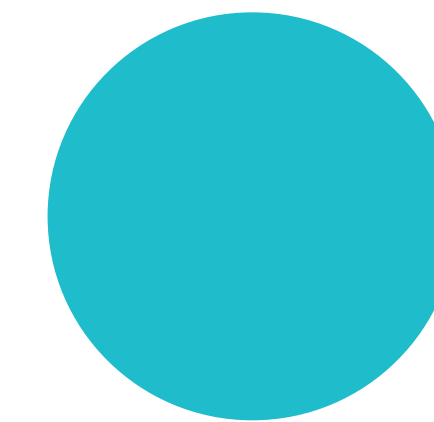
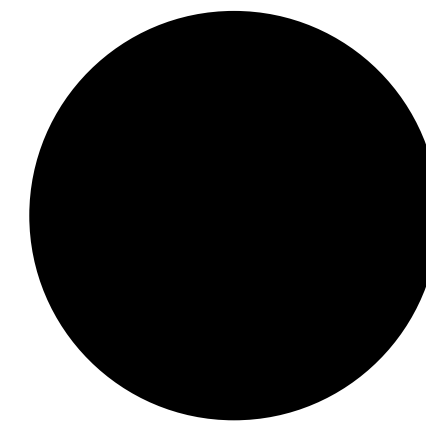
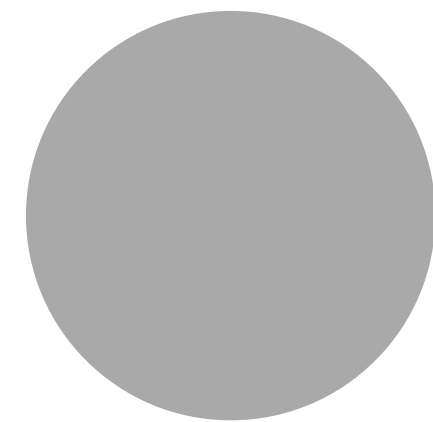
青  
黒  
赤





## WHAT IS READING?

**Fluent reading is**  
**quick, correct understanding.**







# **03** WHY TO WRITE READABLY



# OBJECTIONS TO READABILITY

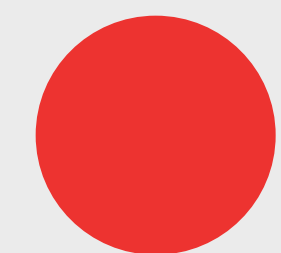


**“You’re a professional – figure it out!”**

Part of a programmer’s job is to understand code written by their colleagues.

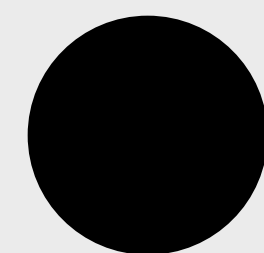


# OBJECTIONS TO READABILITY



**“You’re a professional – figure it out!”**

Part of a programmer’s job is to understand code written by their colleagues.

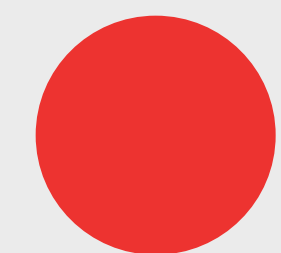


**“Fluent people write faster.”**

People who know a language well use it more quickly than beginners.

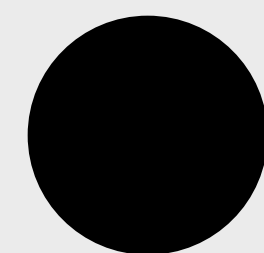


# OBJECTIONS TO READABILITY



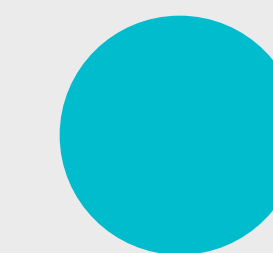
**“You’re a professional – figure it out!”**

Part of a programmer’s job is to understand code written by their colleagues.



**“Fluent people write faster.”**

People who know a language well use it more quickly than beginners.



**“Our vocabulary keeps changing.”**

Programmers constantly define new terms in a codebase – it’s not possible to instantly learn every new symbol.



# OBJECTIONS TO READABILITY

**But.**



**Willpower:**  
**You** vs. **Radishes**



## WHY WRITE READABLE CODE?

Fluency & focus



**Save your teammates' energy.**





# **04** HOW TO WRITE READABLY

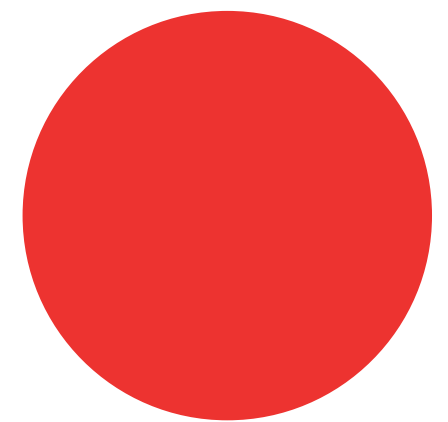
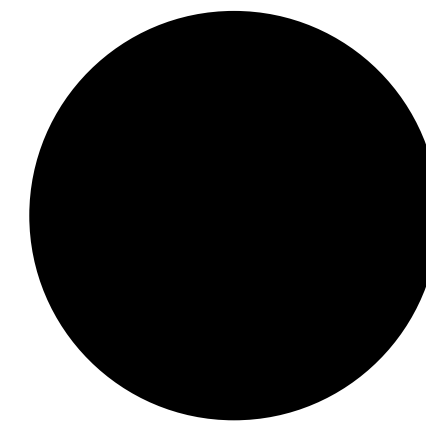
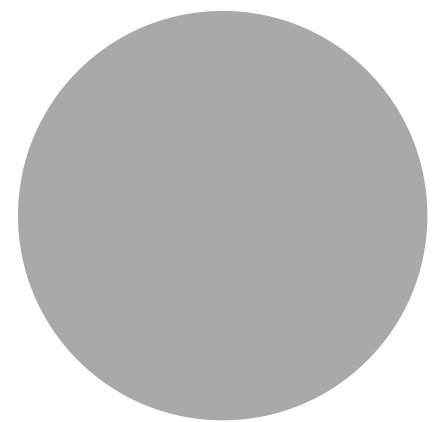
---





## HOW TO WRITE READABLY

**Make allowances  
for non-fluent speakers**





## **AVOID SLANG**

"You rock my  
socks."

"You are really great."



`releaseTheHounds()`

`beginAppSetupNetworkRequests()`



“Jeetchheet?”

“Did you eat yet?”



# ENUNCIATE CLEARLY

```
a = ks.filter{...}.map{...}
```

```
newOrders = items.filter({...})
```

```
newAddresses = newOrders.map({...})
```



## INTRODUCE REGIONALISMS SLOWLY

"Y'all come  
back now!"

"I hope you all visit again!"



# INTRODUCE REGIONALISMS SLOWLY

```
scaled = array >>= {[$0 * scale]}
```

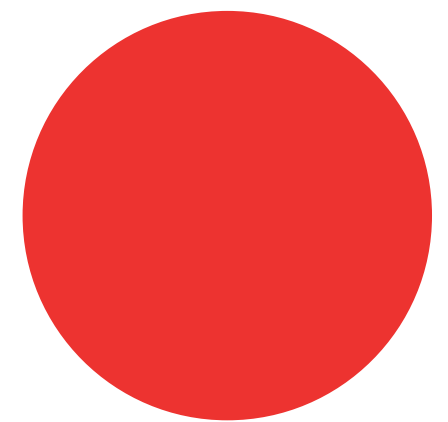
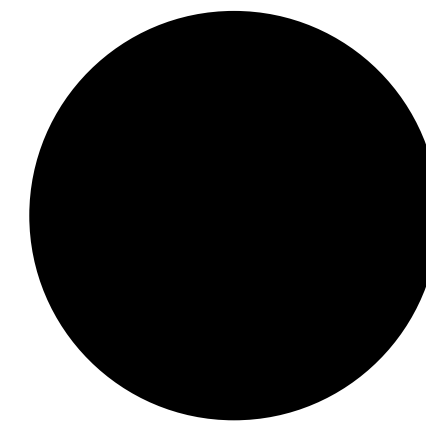
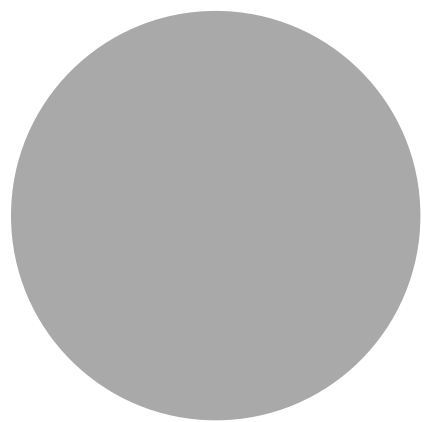
```
scaled = array.flatMap(){ $0 * scale }
```





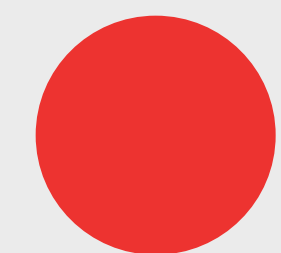
## HOW TO WRITE READABLY

**Use pattern matching**



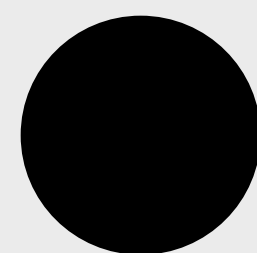


# USE PATTERN MATCHING



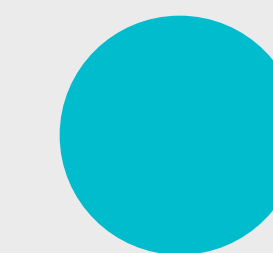
**Are these related?**

```
goodIdeaText = "An ideal choice"  
detailsOfBadIdea = "Oh no."
```



**Ah yes, here's a group:**

```
ideaTextGood = "An ideal choice"  
ideaTextAwful = "Oh no."  
ideaTextImpish = "Fun!"  
ideaTextDull = "Pedestrian."
```



**This is scannable!**

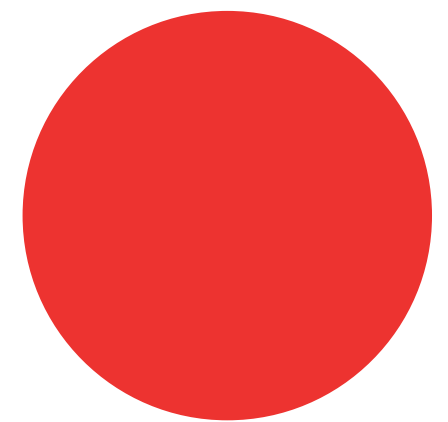
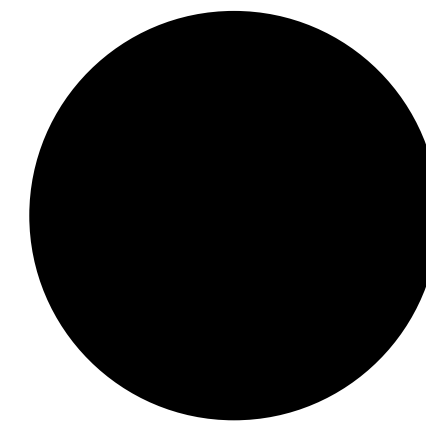
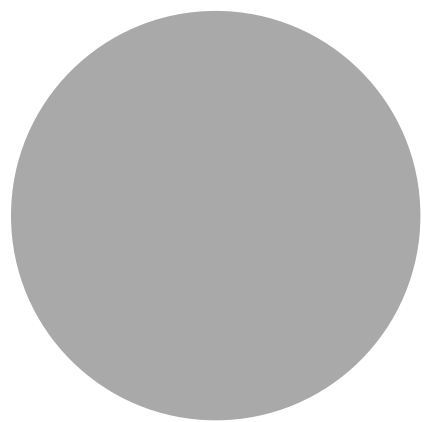
```
ideaTextGood    = "An ideal choice"  
ideaTextAwful   = "Not on my watch"  
ideaTextImpish  = "Fun!"  
ideaTextDull    = "Pedestrian."
```





## HOW TO WRITE READABLY

# Squint Test





# SQUINT TEST

Which parts are **action**?

Which parts are **setting up**?

Which parts could be  
**abstracted**?

```
1 // Moving bottom
2 // Move it to
3 // Create top-left object
4 // Top-left = new TopLeft(x, height/2, width, height/2, 0, 0);
5
6 // Draw it
7 // Background(x, y, 255, 255);
8
9 // Draw water
10 // TopLeft.draw();
11
12 // For i = 0; i < water.length; i++
13
14 // Do the Water at the TopLeft
15 // TopLeft.compositeWater(i, 0);
16 // Calculate drag force
17 // dragForce = TopLeft.calculateDragForce(i);
18 // Apply drag force to Water
19 // water[i].applyForce(dragForce);
20
21
22 // Gravity is applied to Water
23 // gravity = new PVector(0, 0.000001 * water[i].mass);
24 // Apply gravity
25 // water[i].applyForce(gravity);
26
27 // Update and display
28 // water[i].update();
29 // water[i].display();
30 // water[i].showEdges();
31
32
33 // End of the Water
34 // water[i].moveTo(x, y, 255, 255);
35
```



# anti-pattern matching



!



```
if isOurLoveTrue &&  
    !IllFatedStar.willShine(tonight) {
```



**! I 1 1**



if portentsOfIllWill! [yourSign]



11! [



**check for camouflage**



**Help us pattern match.**



**know your readers**



**believe your readers**



```
var settingsInteractor: SectionSettingsInteractor?
```



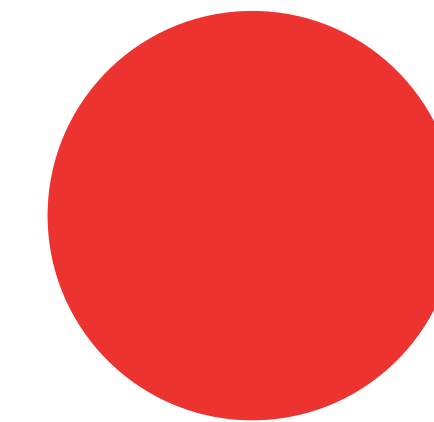
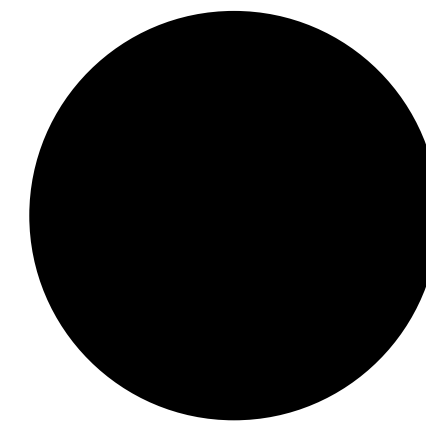
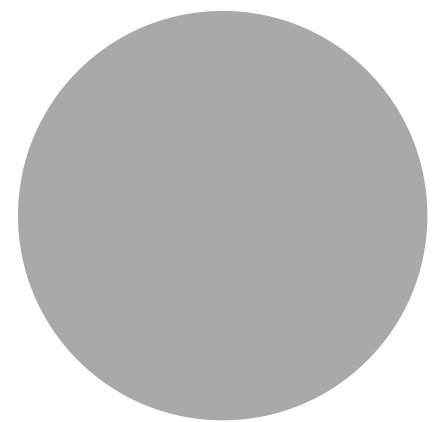
```
// Keep a reference to this interactor as long  
// as the tab bar controller's alive  
var settingsInteractor: SectionSettingsInteractor?
```



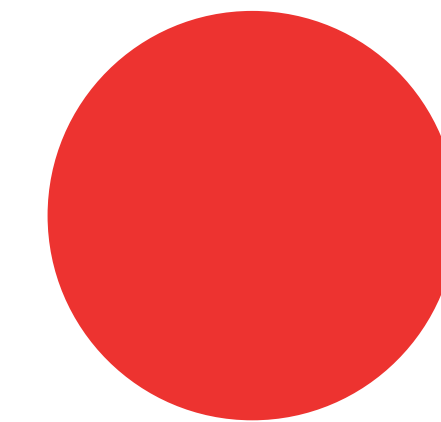
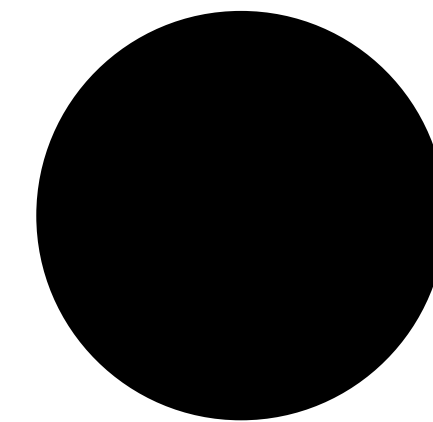
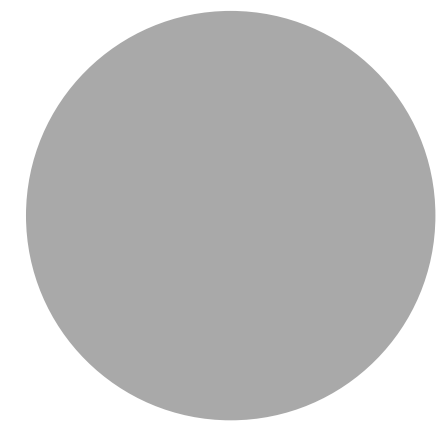
```
// Keep a strong reference to this interactor  
// so it doesn't get deallocated while the tab  
// bar controller's alive  
var settingsInteractor: SectionSettingsInteractor?
```



**“What's wrong with them?  
Why can't they read this code?”**



**“What information are they missing  
that’s making it hard to read this code?”**

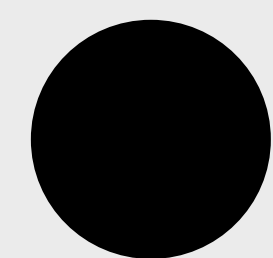




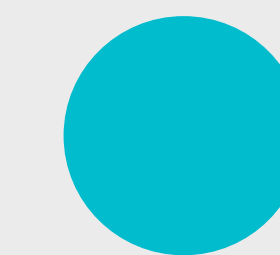
# HOW TO WRITE READABLE CODE?



**Treat confusion as data.**



**Be predictable.**



**Empathize.**



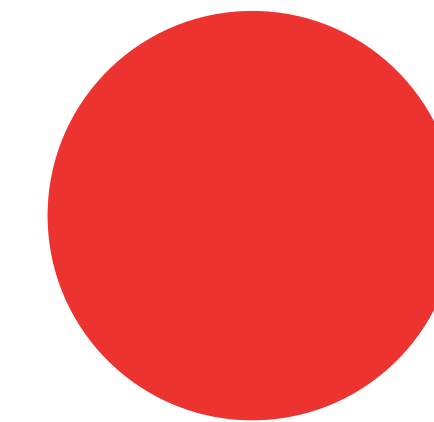
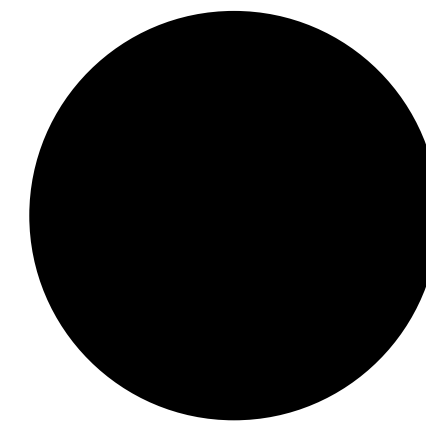
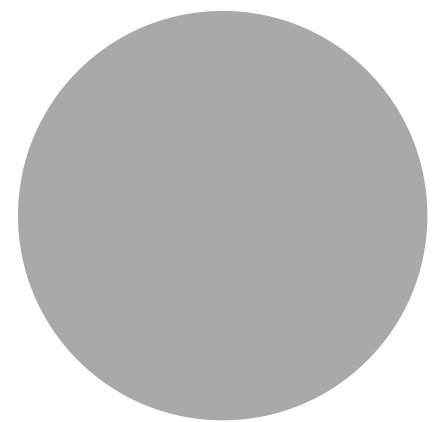


# ***05*** WHEN TO WRITE READABLY

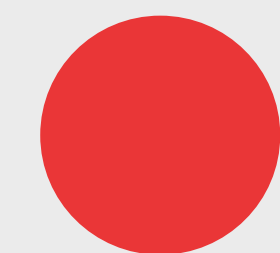
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**“I’m sorry for the long letter...  
I didn’t have time to write a short one.”**



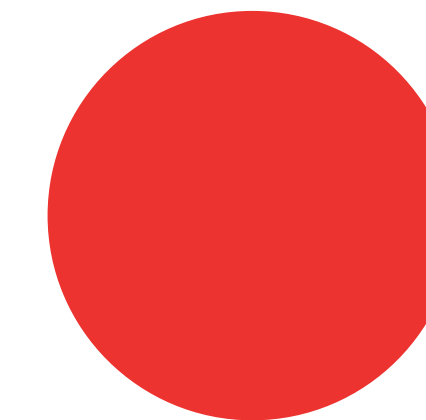
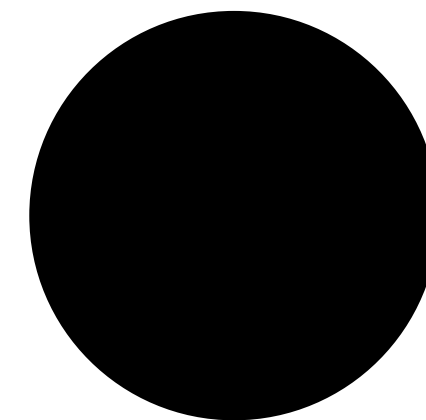
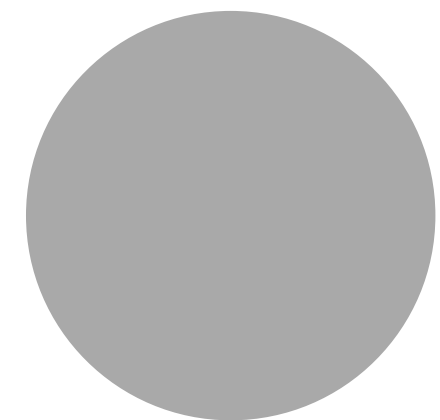
**“Mission critical code  
should not just be **arguably**,  
but **trivially correct**.”**



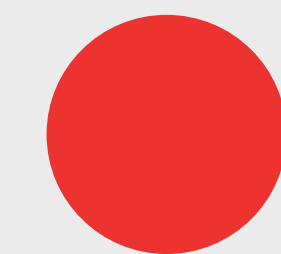
JPL Institutional Coding Standard for the C Programming Language



# Blocked fire escapes



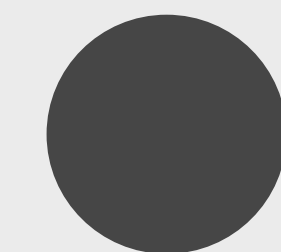
## TALK IT OUT



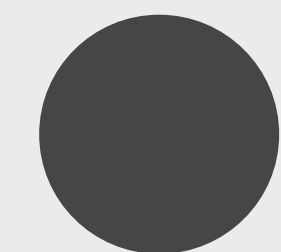
**cognitive overhead**



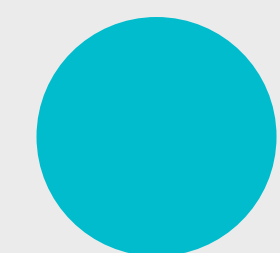
**working memory**



**tools for deciphering**



**patterns & intuition**



**critical code paths**



Decipher less.  
**Create more.**





THANK YOU

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