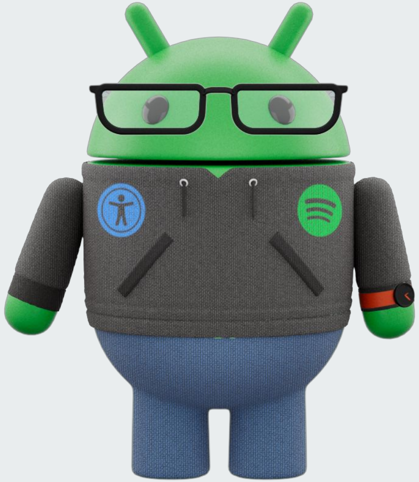
Design For Accessibility

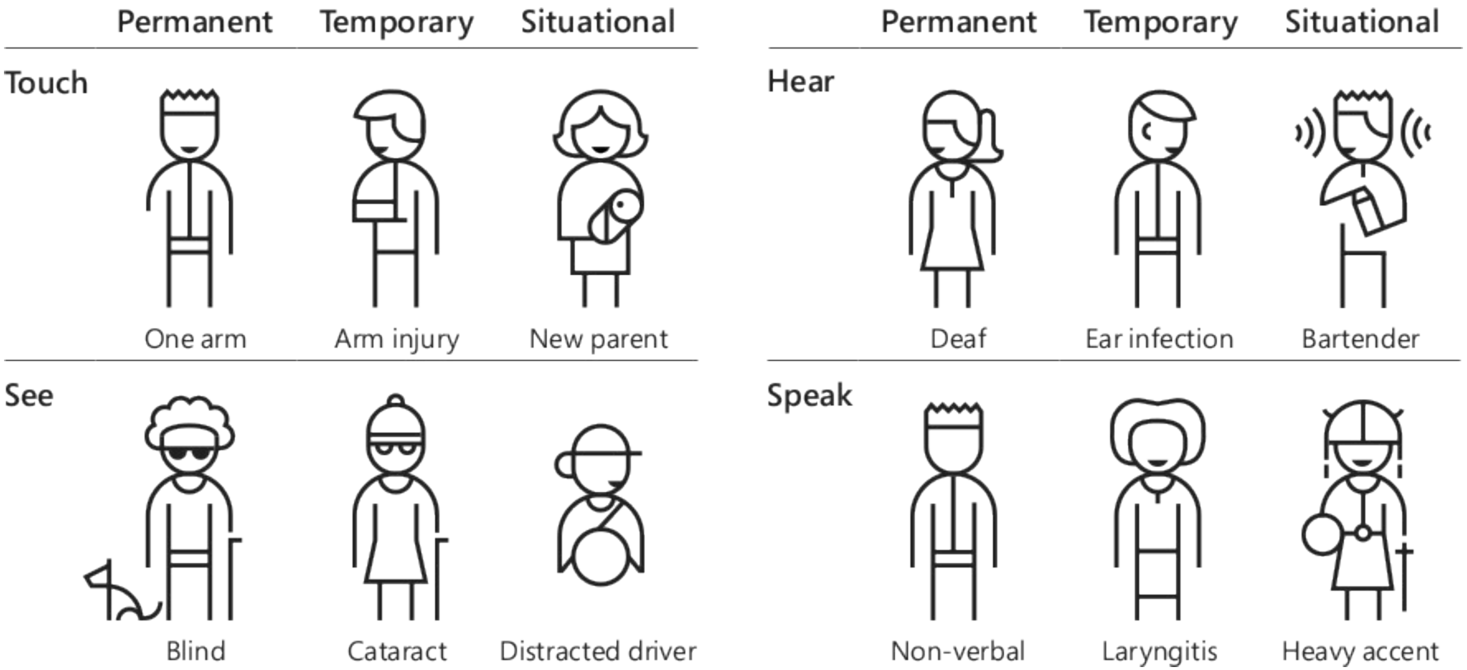
Getting accessibility right from the start



About me

- Android, Accessibility
- 8+ years financial programming experience
- 2+ years production support

What is accessibility?

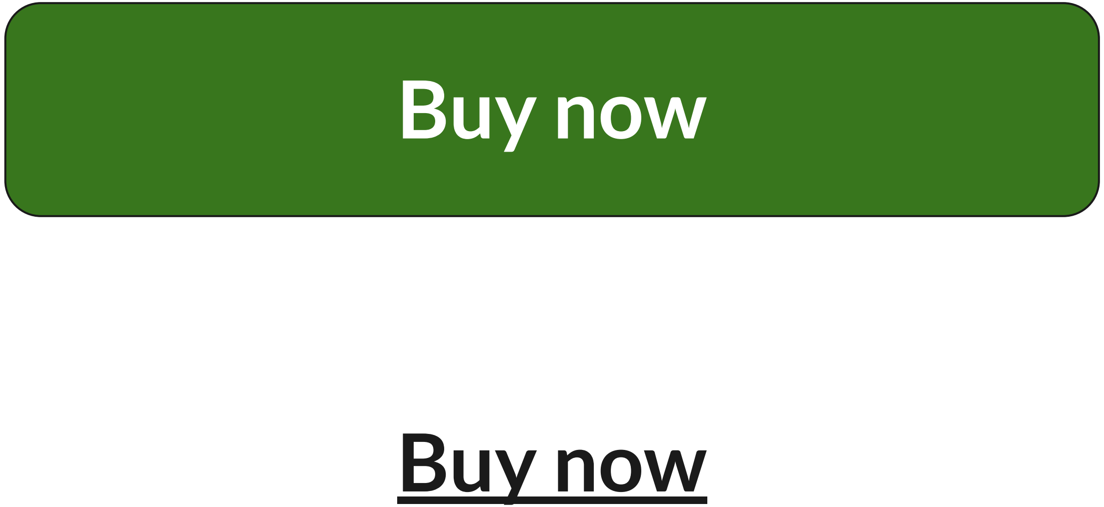


	Permanent	Temporary	Situational
Touch	One arm	Arm injury	New parent
See	Blind	Cataract	Distracted driver

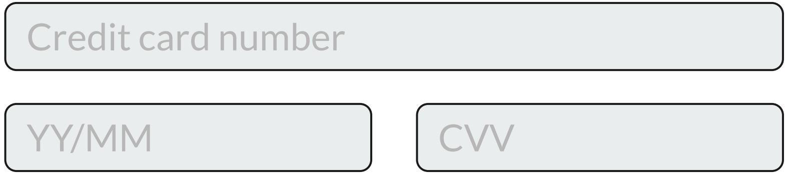
	Permanent	Temporary	Situational
Hear	Deaf	Ear infection	Bartender
Speak	Non-verbal	Laryngitis	Heavy accent

Source: Microsoft

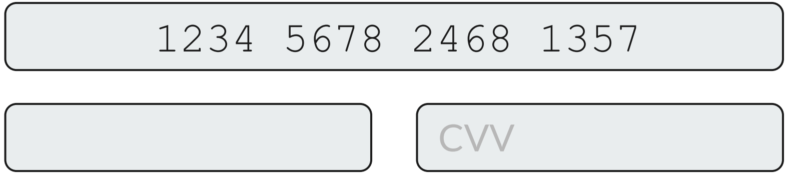
Examples



Examples



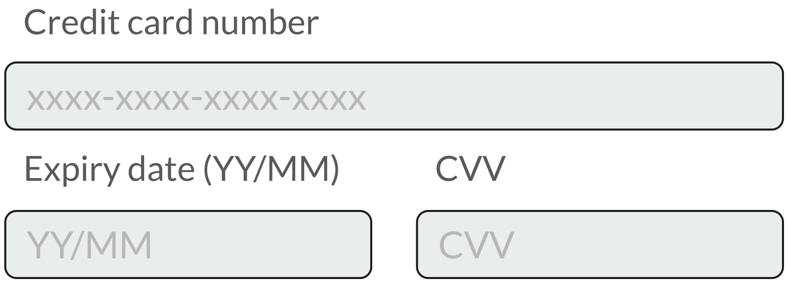
Examples



1234 5678 2468 1357

CVV

Examples



Credit card number

xxxx-xxxx-xxxx-xxxx

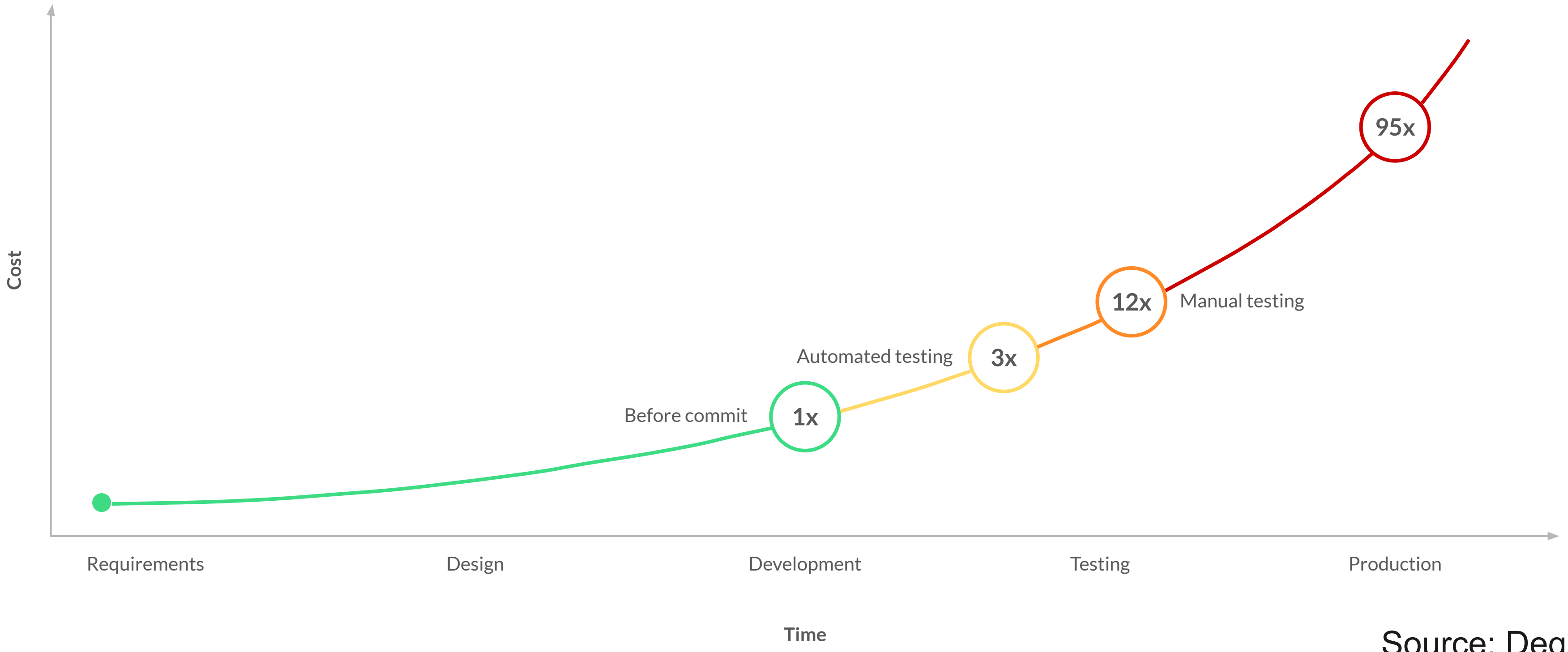
Expiry date (YY/MM)

YY/MM

CVV

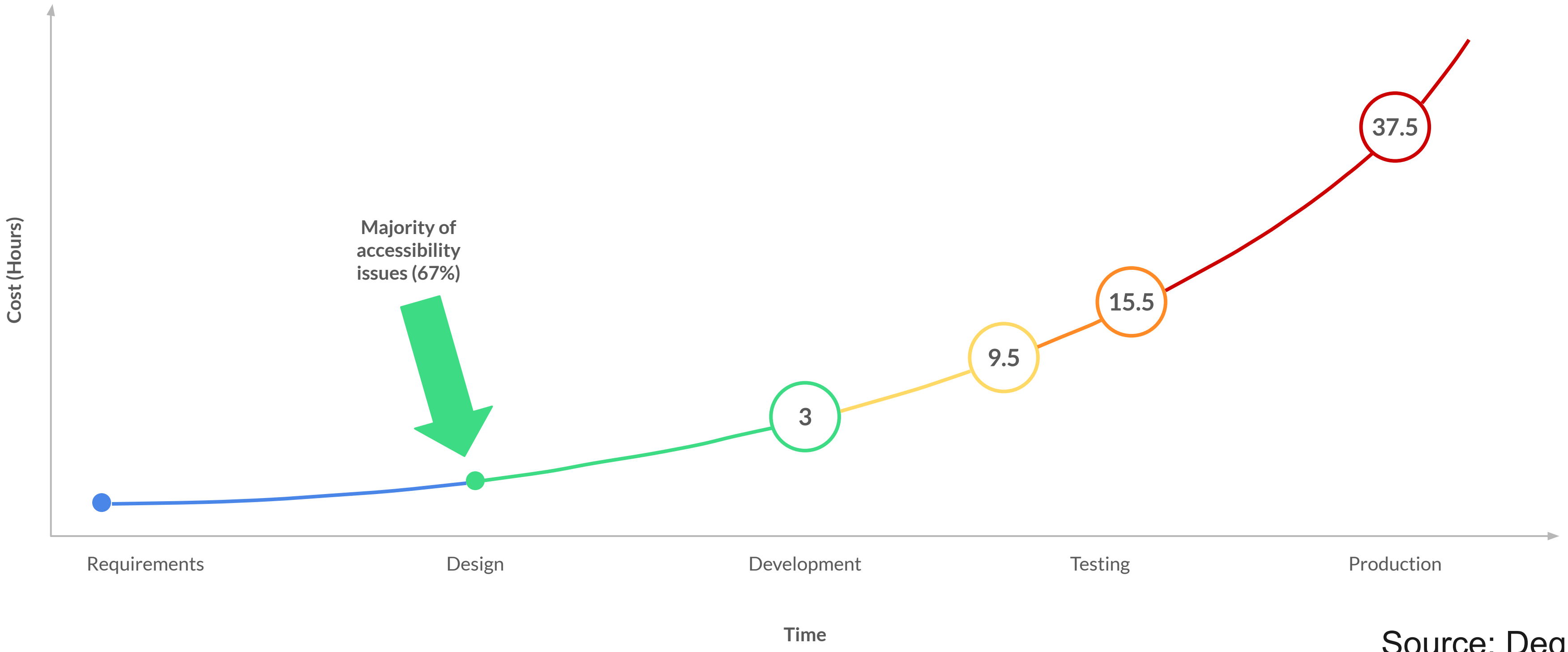
CVV

Measure twice, cut once



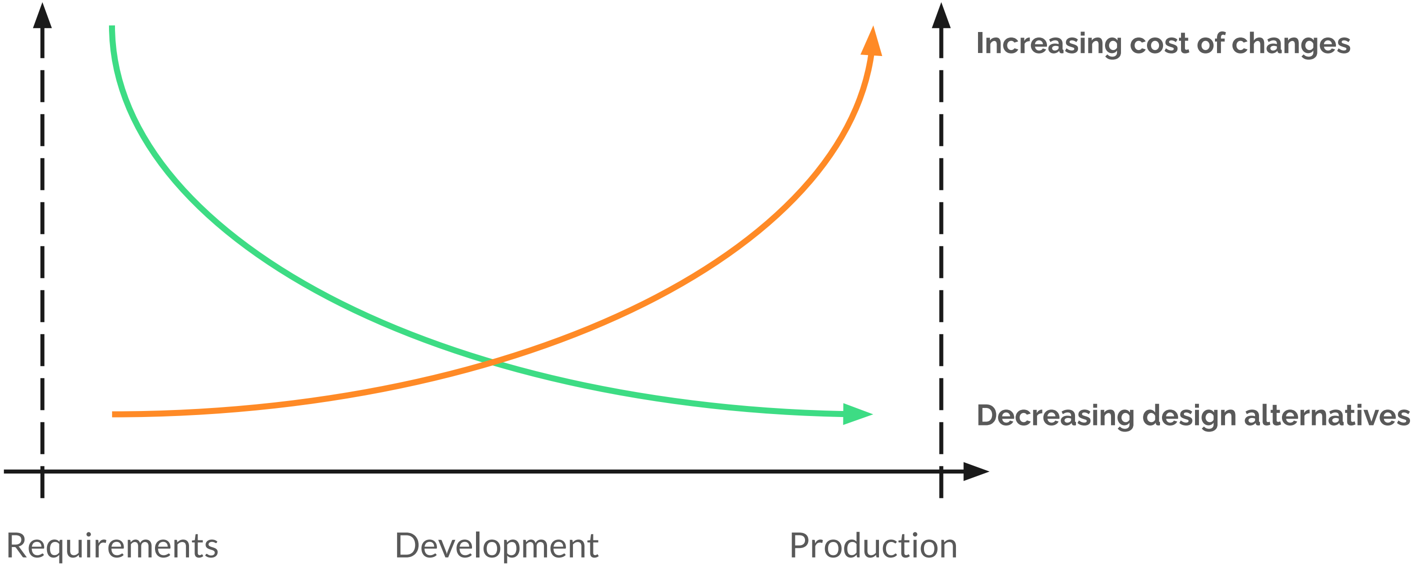
Source: Deque

Measure twice, cut once



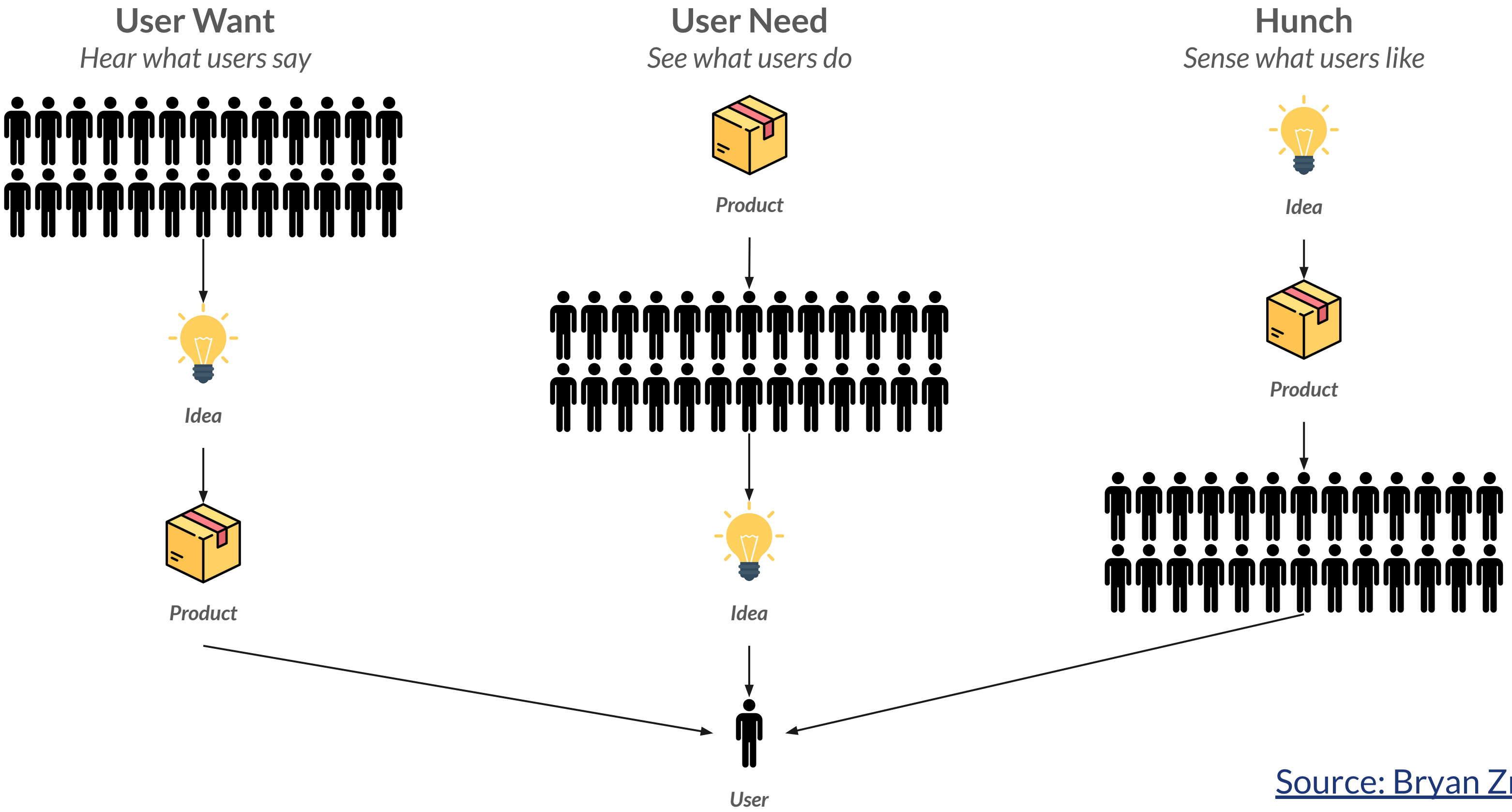
Source: Deque

Refinement is an opportunity



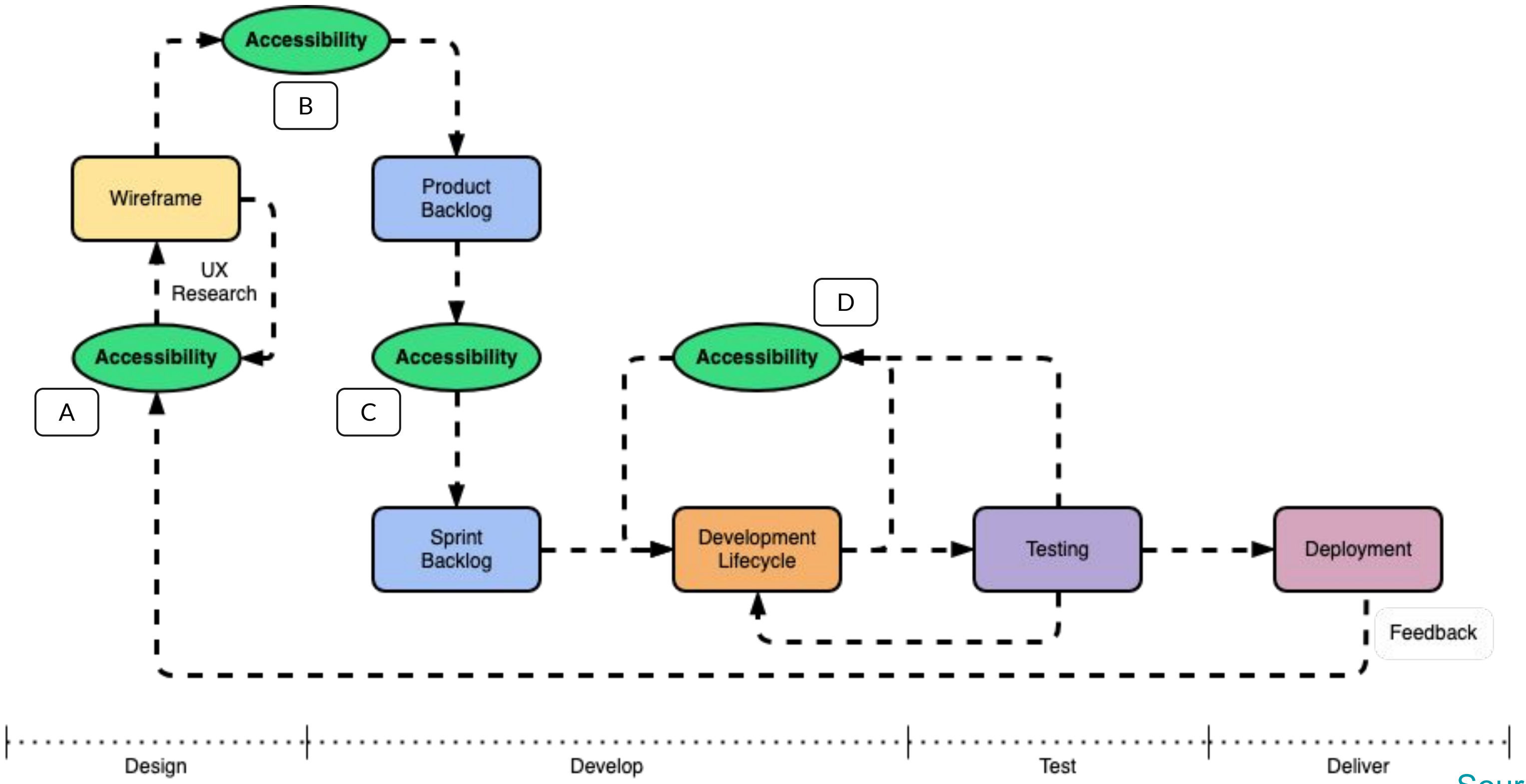
Source: Ehrlich and Rohn, 1994

Framing decisions



Source: Bryan Zmijewski

Where does accessibility fit in?



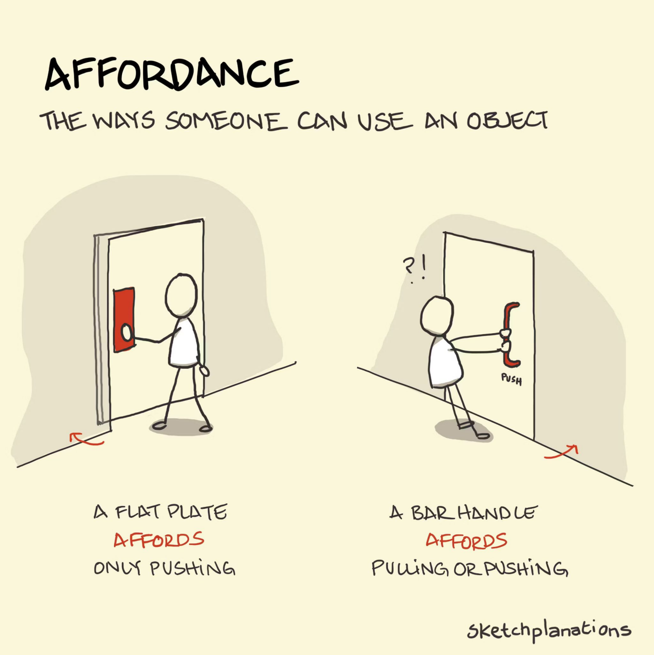
Source: J. Dippel

Universal design principles

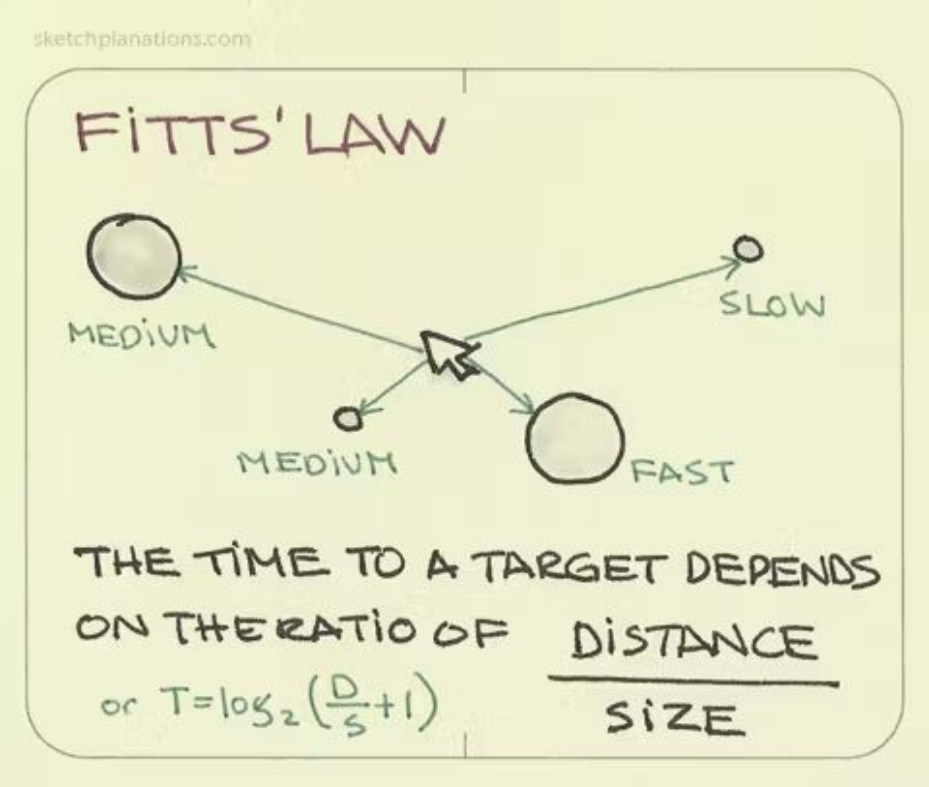
1. **Equitable Use:** *The design is useful and marketable to people with diverse abilities.*
2. **Flexibility in Use:** *The design accommodates a wide range of individual preferences and abilities.*
3. **Simple and Intuitive Use:** *Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.*
4. **Perceptible Information:** *The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.*
5. **Fault Tolerant:** *The design minimizes hazards and the adverse consequences of accidental or unintended actions.*
6. **Low Physical Effort:** *The design can be used efficiently and comfortably and with a minimum of fatigue.*
7. **Size and Space for Approach and Use:** *Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.*

Simple and intuitive

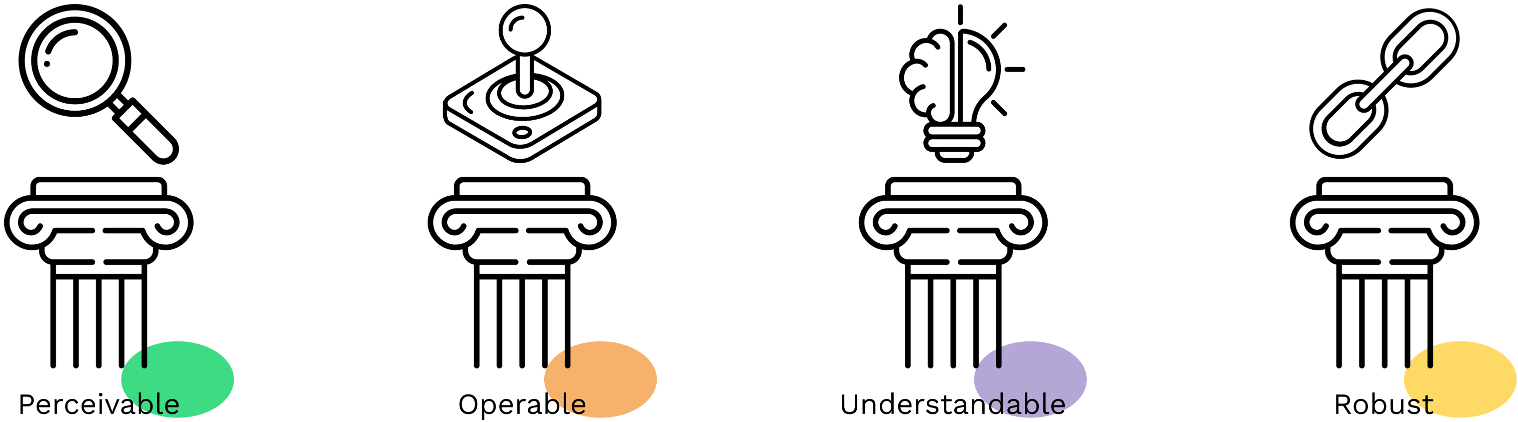
Affordance: An action possibility in the relation between user and an object.



Low Physical Effort


sketchplanations.com
FITTS' LAW
MEDIUM
SLOW
MEDIUM
FAST
THE TIME TO A TARGET DEPENDS ON THE RATIO OF $\frac{\text{DISTANCE}}{\text{SIZE}}$
or $T = \log_2\left(\frac{D}{S}+1\right)$

The four principles of digital accessibility



Perceivable

Operable

Understandable

Robust

… and some kind of prioritisation*

HIGH

Issues that could cause harm, distress, or otherwise make something unusable

MEDIUM

Where something may be difficult to use, but a workaround can be found

LOW

Additional features specifically targeted at making the experience pleasurable

* *my recommendations are purely advisory, you need to evaluate the situation for yourself in context*

Text

Perceivable

Make sure there is text associated with everything

- Alternative text / content description
- Captions

Except when:

- The image is decorative
- The same information is provided within an immediate context (same screen, same area)

HIGH

Colour

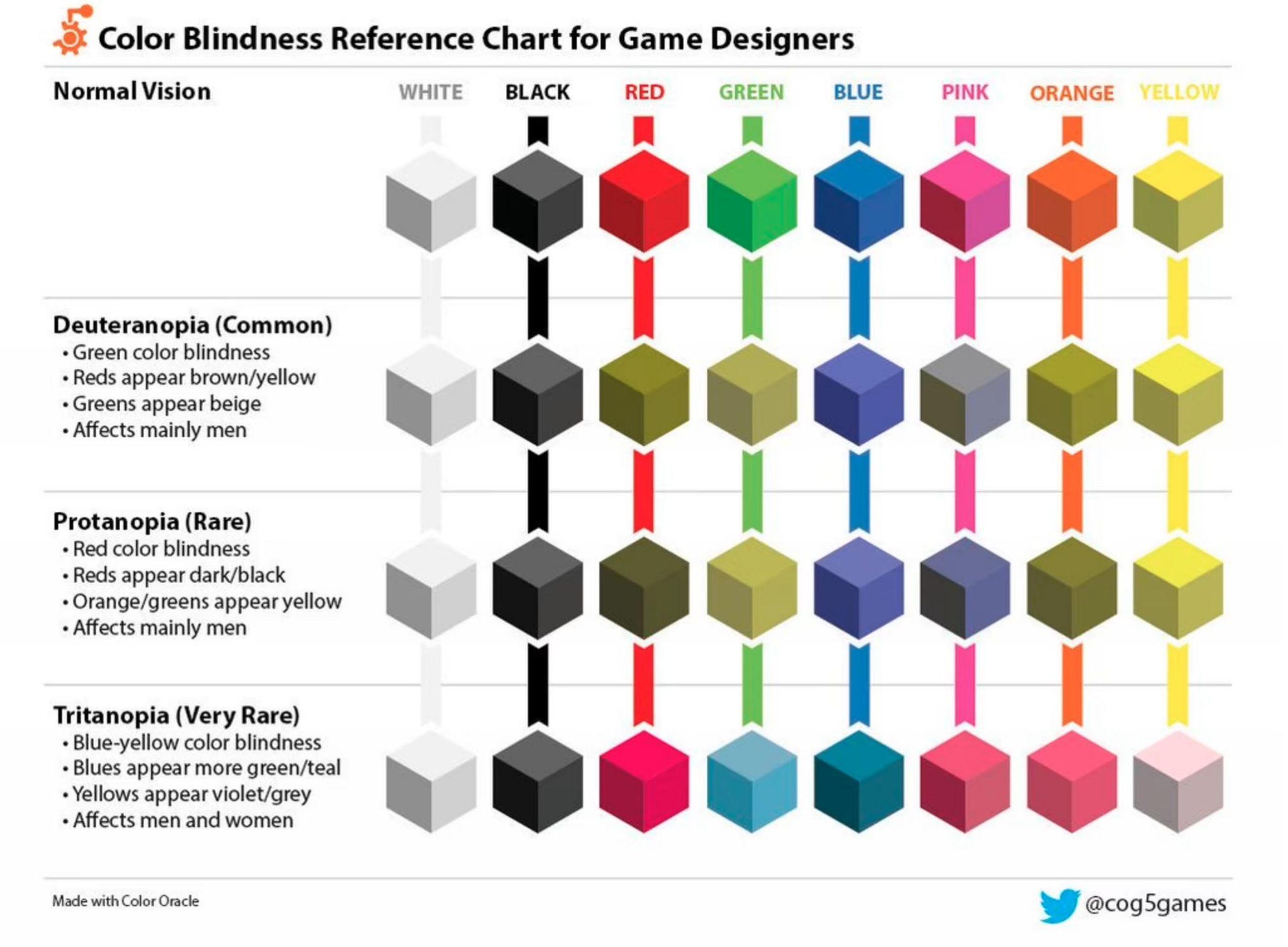
Percevable

- Color should not be the only mechanism by which something is identified.
- Elements to consider:
  - Links
  - Graphs
  - Tabs
  - Elements that have an internal state
- Contrast is not a requirement on disabled controls

HIGH

Colour

Percevable



Color Blindness Reference Chart for Game Designers

Deuteranopia (Common)

- Green color blindness
- Reds appear brown/yellow
- Greens appear beige
- Affects mainly men

Protanopia (Rare)

- Red color blindness
- Reds appear dark/black
- Orange/greens appear yellow
- Affects mainly men

Tritanopia (Very Rare)

- Blue-yellow color blindness
- Blues appear more green/teal
- Yellows appear violet/grey
- Affects men and women

Made with Color Oracle

@cog5games

Keyboard accessible

Operable

Keyboards are the most versatile input types

Make sure users can

- Reach everything via tab presses
  - Build focus order into the structure rather than manipulating it with code!
- Interact by pressing space or enter
- Have access to the same features provided by all gestures
- The focus highlight is clearly visible

HIGH

Font size

Perceivable

- Allow for font scaling
- Be careful how containers are sized
- Scale up to ***200%*** without the loss of
  - Content: Give users the ability to expand when content is contracted
  - Functionality: Make sure views are scrollable

MEDIUM

Orientation

Percevable

Support both landscape and portrait mode

- Allow rotation in the midst of flows

MEDIUM

Headings

Operable

- Usually some kind of semantic sugar
  - Not just bold and big!
- Used as navigational hooks for users

MEDIUM

Pause, stop, hide

Operable

Anything that plays:

- Must be able to be paused
- Respect user settings like reduced motion / animations off

HIGH

Enough time

Operable

Ensure users have enough time to complete an action

- Allow users to inform the system if they need additional time
- Android has a “time to take action” setting built in

LOW

Target size

Operable

Make sure components are large enough to be interacted with

- iOS: 44 x 44
- Android: 48 x 48dp
- Web: 44 x 44 CSS pixels

MEDIUM

Actions

Operable

In a list of elements where each element has several different interactable components, use actions:

- Allow streamlined iteration over the list
- Avoid repetitive unwanted focus

MEDIUM

Error identification

Understandable

Use a combination of colours and icons!

Tell assistive tech that this updates frequently:

- iOS: `updatesFrequently`trait
- Android: `liveRegion`

HIGH

Labels and instructions

Understandable

Inputs require either:

- Labels
- Instructions

So users know what input data is expected

HIGH

Role, name, value

Robust

Role:

- The type of element, e.g. button, label, check box

Name:

- A **unique** name of the element on the screen, e.g. submit, play, etc.

Value:

- The current state of the element, e.g. disabled, checked, selected, 25%
- A description of what will happen when activated

HIGH

Putting it all together

Perceivable

Text descriptions

Colour supported

Font scale

Orientation

Operable

Target size

Actions

Headings

Pause, stop, hide

Enough time

Keyboard accessible

Understandable

Error identification

Input labels or instructions

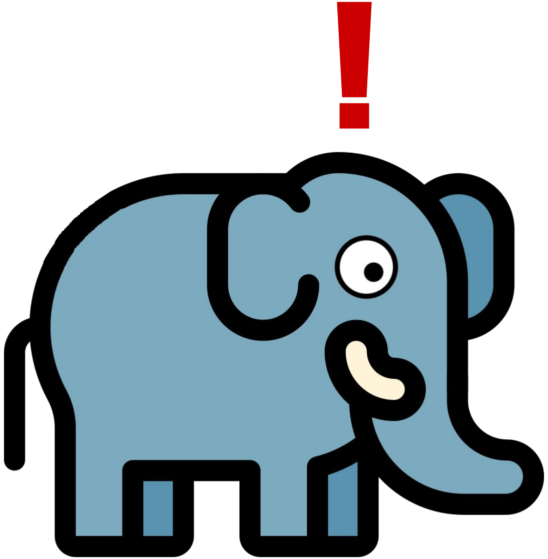
Robust

Role, name, value

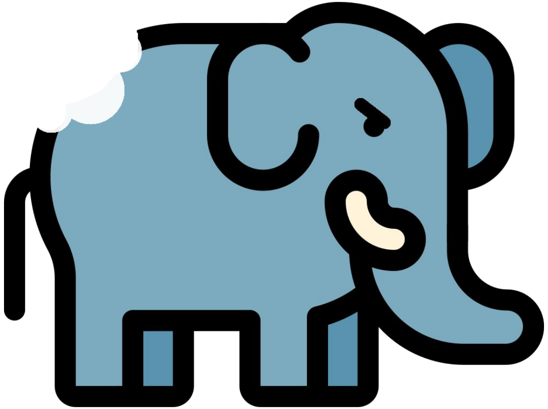
Communication skills

- Assume good intent*
- There are three kinds of money:
    - Smart: work on known potential issues (i.e. accessibility) before development
    - Good: make it work for everyone
    - Bad: deal with regressions, complaints and lawsuits
- Accessibility is about human beings, not about numbers
    - It’s a discipline akin to security, performance and safety
    - Disabled people are impacted the most, however a lot of features we should support help more than just disabled people
    - Just because you need a feature doesn’t make you disabled
    - Exact numbers are impossible to obtain, and would be even harder to maintain
        - If we start by giving numbers, we create an unmaintainable precedent
- You do not need to ask for permission to do a good job

How do you eat an elephant?



How do you eat an elephant?



… one bite at a time

Conclusion

- A lot of issues can be resolved before development takes place
- Benefits of catching issues early:
  - Saves the business money
  - Less time dedicated to
    - Doing the wrong thing
    - Doing the thing wrong
    - Fixing regressions (firefighting)
  - Effort per user ratio is minimized
  - We know what the potential issues are in advance
- For ~ 70 criteria reducing to principles can be helpful
  - Identify silos and increase communication

A short story: Whose job is it?

There was an important job to be done

Everybody was sure that Somebody would do itç

Anybody could have done it

but Nobody did it

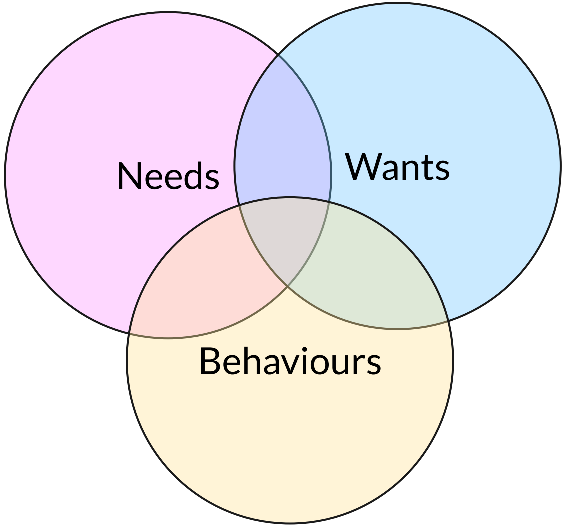
Somebody got angry about that

because it was Everybody’s job

Everybody thought Anybody could do it

but Nobody realized that Everybody wouldn’t do it

User research business drivers



Source: Bryan Zmijewski