



# Principles of GUI Design and Programming



Prototyping & Accessibility

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- ▶ Accessibility
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# Prototyping

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- ▶ **Prototyping is**
  - ▶ The rapid construction of all or part of something
- ▶ **Prototypes allow for**
  - ▶ Evaluating the strength of a design
  - ▶ Getting feedback on a design
  - ▶ Finding the flaws in a design
- ▶ **Since prototypes are fast and cheap**
  - ▶ We can build several of them until we are happy with the design
  - ▶ Prototypes often lack functionality



# Wireframing

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- ▶ These are low-fidelity tools
- ▶ They lack
  - ▶ Sophisticated graphics
  - ▶ Interaction
- ▶ They capture the look of the UI as wireframes
- ▶ They are good for working out your initial ideas



# Mockups

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- ▶ Mockups are the next stage in design
- ▶ They are like wireframes but
  - ▶ Add more sophisticated graphics
  - ▶ Look more like the final application
  - ▶ Are built after you like the look of the wireframe and now want to work out the look of the graphics



# Prototypes

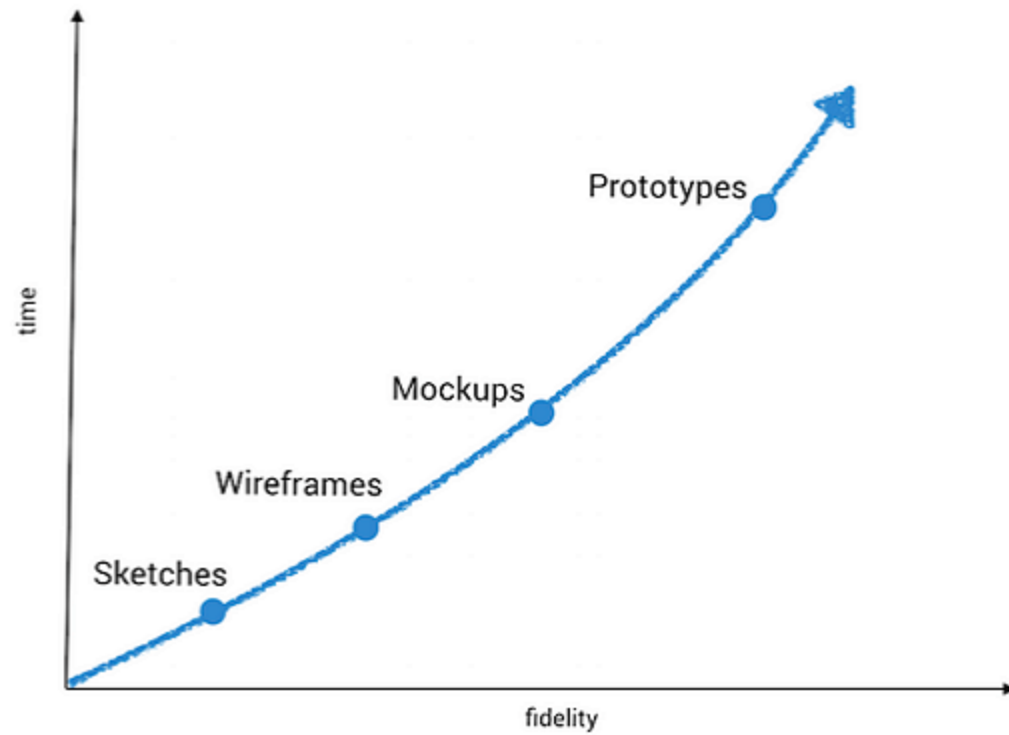
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- ▶ These are almost working products
  - ▶ They have interaction
  - ▶ They might have limited functionality
- ▶ They are built as the last stage before starting the development of the actual product



# Fidelity

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\*mockplus.com



# Prototyping tools

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- ▶ **Adobe Xd**
  - ▶ Popular tool for wireframes, mockups and limited prototypes
- ▶ **Visual Studio, JavaFX Scene Builder**
  - ▶ Full application builders
  - ▶ Have drag and drop GUI builders
  - ▶ Can be used to create
    - ▶ Wireframes
    - ▶ Mockups
    - ▶ Prototypes
- ▶ Can create sophisticated prototypes which can model a lot of the final functionality of the application





# Customization

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- ▶ Customization involves altering the user interface to meet the needs and preferences of the users
- ▶ This takes several forms
  - ▶ Personalization
    - ▶ This selects the content of a page based on the role of the user
    - ▶ A manager's page would be different than a worker's
  - ▶ Customization
    - ▶ This lets the user change
      - The layout of the page
      - The content of the page
      - The look and feel of the page



# Customization

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- ▶ This can be done by
  - ▶ Dialogs that change preferences
  - ▶ Changing the widgets used
  - ▶ Changing CSS for the widgets used
  - ▶ Change a content management system that is selecting the content for the page



# Accessibility

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- ▶ Accessibility enables people with disabilities to
  - ▶ Percieve
  - ▶ Understand
  - ▶ Navigate
  - ▶ Interact with
  - ▶ Web sites or user interfaces
- ▶ You should design for
  - ▶ Visual impairment
  - ▶ Hearing impairment
  - ▶ Cognitive impairment
  - ▶ Physical impairment






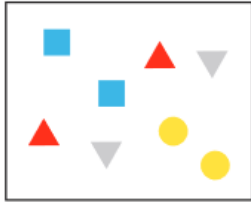
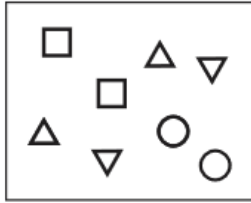



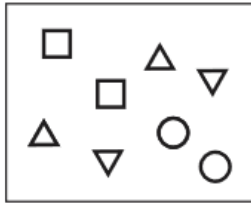


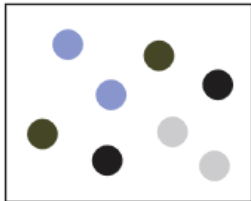
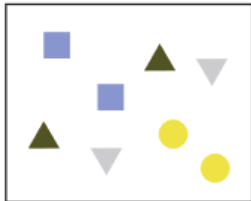
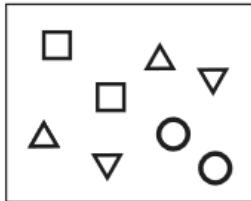
# Do not use colour as the only way of communicating information

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- ▶ Use dashed or dotted lines in addition to color
- ▶ Use bold, italics or gray as text instead of color
- ▶ Use textual labels in addition to color
- ▶ Use high contrast colors that can be easily distinguished on luminosity



# How the color blind see

	<b>Bad</b> <i>Hue Coding</i>	<b>Poor</b> <i>Vary Saturation</i>	<b>Better</b> <i>Shift Hue</i>	<b>Best</b> <i>Vary shape</i>	<i>Also best in Black &amp; White</i>
<b>Normal Vision</b> <i>Full color vision</i>					
<b>Deuteranopia</b> <i>Red-green confusion</i>					
<b>Protanopia</b> <i>Red-green confusion</i>					

\* Bernhard Jenny & Nathaniel Kelso

Read: Color Design for the Color Vision Impaired

# Accessible forms

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- ▶ Make the area with focus visually distinguishable from other inputs
- ▶ Use borders around input areas (current design trends are moving away from this)
- ▶ Clearly label input areas, don't just put sample text in them

Your name here

Name:



# Hovering

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- ▶ Hovering over things to reveal tooltips is invisible to blind people using screen readers.
- ▶ Instead
  - ▶ Use an info icon beside each item that a screen reader will see



# Images, audio and video

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- ▶ **Images**

- ▶ Provide alternative text for images

- ▶ **Audio**

- ▶ Provide transcripts or description of the content

- ▶ **Video**

- ▶ Provide transcripts
  - ▶ Provide captions





# Web content accessibility guidelines

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- ▶ <https://www.w3.org/WAI/WCAG21/quickref/?versions=2.0>
- ▶ This guide says web pages should be
  - ▶ Perceivable
  - ▶ Operable
  - ▶ Understandable
  - ▶ Robust



# Accessible Rich Internet Applications: Landmarks

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- ▶ ARIA lets you add a role attribute to HTML elements that provides the semantic meaning of that part of the page
- ▶ Accessible tools can use this to
  - ▶ Identify the purpose of a section (eg. Navigation)
  - ▶ Skip repeated section (eg. Banners)



# ARIA Landmarks

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Role	Description
Banner	Header
Complementary	Description added to main text
Contentinfo	Information about content such as copyright or authors
Form	Input form
Main	Main text content
Navigation	Navigation area
Search	Search area
Application	Web application



# Localization

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- ▶ **Different countries**
  - ▶ Have different languages
  - ▶ Different customs
  - ▶ Different cultures
  - ▶ Different money
  - ▶ Different measurement
- ▶ **Much of this is in the locale**
  - ▶ Number format
  - ▶ Money symbols
  - ▶ Date format
  - ▶ Language



# Localization

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- ▶ **Language**

- ▶ Have text identified by keyword and a file for each language

- ▶ **Locale**

- ▶ This will handle money, date, number format

- ▶ **Culture**

- ▶ Use colors appropriate for each culture
  - ▶ Use images appropriate for each culture
  - ▶ Use icons appropriate for each culture

