What is a form?

- User can enter data (text, checkbox, select)
- Data is sent to server, server returns new page

More advanced version:

- JS submits data
- Gets a response without a new page

We will not do the more advanced version (6250 topic)

- Implementation is less of a UI/UX concern
- Form HTML/CSS is same either way

Two ways forms are used

A Form can be used to search/read data

- Ex: Entering a Google search
- Ex: Searching for a product on Amazon
- Ex: Looking up a user on social media

A Form can be used to create/edit data

- Ex: Making a social media post
- Ex: Adding a Like/Reaction to a social media post
- Ex: Adding a question to a forum

Form Element

Foundation of a form:

```
<form action="/some/url/" method="POST">
  <button type="submit">Submit</button>
</form>
```

- Sends any data from form to `/some/url`
    - Fully Qualified/absolute/relative url
- Similar to a link (navigates)
- Form itself has no inherent UI (block)

Form Method

```
<form action="/some/url/" method="POST">
```

- `method` decided by server
    - `GET` to search/read
    - `POST` to change/edit
- `GET` sends data in url **query parameters**
    - `<a href="">` link is always a GET request
- `POST` sends data in **body** of request
    - Not visible in URL
    - Not secured from user!
- Both default to sending data as **url encoded**

URL Encoding

- Converts text to not break a url
- Forms CAN use other encodings
    - Particularly for file uploads
    - Url encoding appropriate for simple text data
- Easy test for URL encoding:
    - Have a form with GET action
        - Look at url afterward
    - Check Network request Payload in DevTools

How to URL Encode

- Forms do this automatically
- Manual process:
    - Form fields are `name=value` pairs (no spaces)
    - Multiple name=value pairs separated by `&`
    - Special chars become `%` then 2 digit hex ASCII
        - `+` is `%2b`
        - space becomes `%20` or `+`
        - `?` is `%3f`
        - `&` is `%26`
        - `%` is `%25`
        - `#` is `%23`

Input element

```
<input name="demo1" type="text"/>
<input name="demo2" type="checkbox"/>
<input name="demo3" value="cat" type="radio"/>
<input name="demo3" value="cats" type="radio"/>
```

When data is sent, it is sent as key/value pairs

```
demo1=whatwastyped
demo2=on
demo3=cats
```

url-encoded:

```
demo1=whatwastyped&demo2=on&demo3=cats
```

Input text field

```
<input name="demo1" type="text"/>
```

Notable attributes

- `type` (text is default)
- `name`
- `value`
- `placeholder`
- `disabled`
- `readonly`
- (validation covered later)
- (a11y covered later)

Other text-like inputs

Change `type` for related text-like inputs

- `password` (hides characters from view)
- `hidden` (hides field, passes value)

Recent(ish) additions:

- `color` (graphical input, textual value)
- `date` (text or cal input, textual value)
- `email`
- `number`
- ...and more

Checkbox

- Sends value (default "on") when checked
- Doesn't send field on submit at all if not checked
- `checked` attribute to pre-select

```
<input type="checkbox" name="it-is"/>
<input type="checkbox" name="already" checked/>
```

Radio buttons

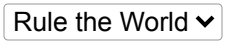
- Only one of same name can be selected
- Name didn't age well
- Uses `checked` as well
- No unselecting, only changing selection

```
<input type="radio" name="favorite" value="maru">
<input type="radio" name="favorite" value="nyan">
<input type="radio" name="favorite" value="grumpy">
<input type="radio" name="meh" value="labrador" checked>
<input type="radio" name="meh" value="poodle">
<input type="radio" name="meh" value="retriever">
```

Select dropdowns

- `<option>` tags inside a `<select>` element
- `name` of `<select>`, `value` of `<option>`
- `selected` attribute on `<option>`
    - Or first one (always a selection)
- `value` is sent, not content
    - unless no value (always have a value)

```
<select name="cats">
  <option value="rule">Rule the World</option>
  <option value="awesome">Are Awesome</option>
  <option value="inspire">Inspire Me</option>
</select>
```



Textarea element

- NOT an `<input>`
    - mostly same attributes
- Content is value, not `value` attribute
- Multiline input
- Default resizable (CSS `resize` can change)
- Is a natural `inline-block`
- `wrap` attribute (either "soft" or "hard") sets if newlines in value where it wrapped

```
<textarea name="blahblah"></textarea>
```

Label element

Form fields need text labels describing them

- Don't use `placeholder` for this

`<label>` element has the text

Two ways to associate `<label>` with a field

- Explicit: `for` attribute w/value of field `id` attribute
- Implicit: label is ancestor of the field
    - No `for` needed (but you should anyway)

Not only text, but selecting label selects the field

- Great for accessibility, esp on mobile!

More on label

- You should always have `<label>` elements
    - Important for a11y and usability
- If `<label>` separate from field element
    - MUST have `for` attribute on label
    - MUST have matching `id` on field element
- If field element inside `<label>`
    - `for`/`id` not required (but should anyway)
    - Consider a `<span>` around the text
- Choice heavily impacts how to style!

Label HTML Structure

```
<form action="..." method="...">
  <label for="name">Name:</label> <!-- Explicit -->
  <input id="name" name="name">
  <button type="submit">Submit</button>
</form>
```

```
<form action="..." method="...">
  <label> <!-- Implicit -->
    <span>Name:</span>
    <input name="name">
  </label>
  <button type="submit">Submit</button>
</form>
```

```
<form action="..." method="...">
  <label for="name"> <!-- Implicit AND Explicit -->
    <span>Name:</span>
    <input id="name" name="name">
  </label>
  <button type="submit">Submit</button>
</form>
```

Checkboxes are visually complicated

- Text inputs have labels above or on left (in English)
    - **https://developer.mozilla.org/en-US/docs/Web/HTML/Element/input/text**
- Checkboxes and Radio buttons are…different
    - Often labels on right of fields
    - **https://developer.mozilla.org/en-US/docs/Web/HTML/Element/input/checkbox**

Do you change your HTML to match?

- Or fix with only CSS?
- No great answer, usually HTML to match

Fieldset and legend

- A `<fieldset>` element groups 1+ labels and fields
- A child `<legend>` element labels the fieldset

Styling these in different browsers can be challenging

- `flexbox` and `grid` haven't always worked on these
- Assorted a11y labelling problems
- Investigate before committing to it

What to consider with a form

Communication

- What is this form? This field?
- What is required?
- What is the expected value?

Validation

- Why hasn't this submission finished?
- What did I do wrong?
- What do I fix it?
- Where is it?

What to consider with form a11y

Accessibility

- Are fields identifiable?
    - Limit space between label and field
- Do visuals translate?
    - Are you requiring visual context?
    - Are you relying on color?
- Are controls usable?
    - Too small?
    - Can a keyboard be used?

Form Communication

What is required?

- Require more, have more people give up
- Don't assume they know what `*` means!

What is the expected value?

- Syntax?
- Data type in general

Form Validation

Ensuring data is acceptable

- May be done before data is sent
    - HTML-based validation
    - JS-based validation
- MUST done after data is sent
    - Front end cannot provide security!
    - Server returns a form requesting changes

Make sure they know what to fix and how to fix!

- Per field hints is best
- Often a top-level indication that fixes are needed

Bad Validation is the worst UX!

- Can leave user unable to proceed
- Names are just one example:
    - **https://shinesolutions.com/2018/01/08/falsehoods-programmers-believe-about-names-with-examples/**
- Consider "O'Brian"
    - Very common last name
    - Very commonly stopped by forms

Validation should **help** the user

- Don't guess at what should be allowed

Form Accessibility

Forms are often most important part for usability

- Often the worst accessibility

Great visuals may not translate well!

- Don't fall in love with effect until you are sure

Screen readers read text

- Do they know what to read?
- Does it have the necessary context?

More on a11y later

Styling Forms

- Surprisingly complex
- Makes sense:
    - Both Input and Output
    - More active communication
- Whitespace very important!
- Indentation(`margin`), `line-height`

Columns

- Need to associate text labels with input
- 2 major approaches:
  - Two column (horizontal)
  - One column (vertical)
- Here "column" = place for label OR field
  - **NOT Grid Columns!**
  - Confusing, but we are talking about if labels/fields are in same column or not

Form Layout: 2 Column

https://www.nngroup.com/articles/web-form-design/

- Labels on one side (column)
- Fields on other side (column)
- Arguably better for longer forms
    - But long forms themselves are poor UX
- Usually tests as poor UX

Important details:

- Avoid big gaps between label and field
- Checkboxes/Radio are exceptions!

Form Layout: 1 Column

https://www.nngroup.com/articles/form-design-white-space/

- Labels above fields
    - Except for checkboxes/radio
- Field closer to label text
    - Better comprehension
    - Better "conversion rates"
- Checkboxes still a pain

How to create "columns"?

- DO NOT USE `float`
    - Lots of bad examples out there
- Otherwise, many answers
    - `inline-block` with `width`
    - `flex`
    - `grid` with various `grid-column: span X`
- Checkboxes and Radio can change things!
- `<label>` containing or sibling of `<input>`?

Learn how to layout anything

- Not one way to do it

Other Form variations

- Multi-step form
    - Break form (in any layout) into multiple forms
    - Can "breadcrumb" or "step" navigation
    - Lulls the user (or lulz the user, ha!)
- Accordion or Folding form
    - Form in one page, but broken among collapsible sections.

HTML Form Validation

Making sure the data entered is correct

- Server side
    - MUST HAPPEN!
    - Can be slow
    - Backend devs are less UI oriented
- Client side
    - For convenience, not security
    - Faster
    - Can be HTML-based or JS-based

HTML-based Form validation

- Enforced by browser
    - Default behavior not great
    - Limited intelligence/combinations/UI
- CSS can alter/extend appearance

Example: `required` attribute

- What if you have multiple required fields?

regex pattern validation

`pattern` attribute validates field content

- Using a "Regular Expression" (Regex)
- A lot of hate in the world against Regex
    - A powerful syntax to describe text patterns
- Many like various "regex tool" websites to help
    - I prefer to learn the actual rules
- HTML validation errors do NOT give details
    - Use `title` attribute to help
    - Additional a11y requirements later

See readings for more on Regex

CSS for validation

`:required` pseudo-selector matches required inputs

- e.g. `input:required` or `.name:required`

`:invalid` pseudo-selector matches invalid inputs

- e.g. `input:invalid` or `.name:invalid`
- Even if you've never had a chance to enter them
    - This limits the usefulness without JS

JS can read the state of fields

- Can add/remove classes to offer detailed styling
- More later