HTML & CSS CONTINUED, RESPONSIVENESS, MEDIA QUERIES

First, a warmup challenge...

(There will be more of these, maybe every week)

Based off the last two weeks, take 10 minutes to make a website that has:

- A header, primary section, and footer
- an ID for tag listed above
- a different background color for each part listed above
- some sort of text, with a color other than the default color
- an external stylesheet

If that was a struggle, be sure to review the last two week's slides

RESPONSIVE WEB DESIGN

What is that?

Responsive web design is an umbrella term we use to describe techniques and practices we use to ensure that our project functions and looks good on all devices.

When we design our project, we're really designing our project several times. Sometimes 3, sometimes 9, sometimes more, depending on our target audience and what standards we need to comply with.

Who can think of an example?

There's the obvious ones of smart phones, tablets, and desktop computers. But what if we break those down further?

There are old and new versions all of those devices. Every time a new phone comes out, the screen size changes. We also have change pixel densities now. A computer from 5 years ago has less pixel density than the latest 5k iMac.

We also have very small desktops and very large desktops now. A website that looks good on an 11 inch laptop will not look good on a 30 inch ultra wide display.

So our job becomes more difficult when trying to accomodate all of these variables.

The best way to deal with this is simply to plan ahead, make concrete decisions on how things will look, and stick to them.

Last week we introduced the CSS technique of a **flexbox**, which makes our content flexible and alters in real time according to the size of the browser window. This week we'll introduce CSS grids and media queries.

Before getting into that, let's talk about some pros and cons of fixed width layouts and responsive (or sometimes refered to as liquid) layouts

Fixed width layouts advantages:

- Accurate pixel values
- Designer has much better control over appearance
- Can consistently control widths
- Image sizes stay the same

Fixed width layouts disadvantages:

- You'll likely end up with gaps on the side of the site
- Users with extremely high resolution might see the site smaller with tiny text
- Often occupies more vertical space, which means more scrolling, and less likely the user will stay on the site

Responsive/liquid layouts advantages:

- Pages expand and contract according to the screen, less wasted space
- The designs are tolerant of user changes, like trying to increase font sizes
- Generally more flexible when rendering on devices that didnt exist when we built the site

Responsive/liquid layouts disadvantages:

- If you're not precise and don't do any quality assurance, the site can render in ways you did not intend or predict
- Super wide monitors may make the site too wide and hard to read/interact with
- If images are smaller/larger than the parent container, they may overflow or not occupy the intended space

It should be obvious that a cost/benefit analysis should be done to decide your approach.

At the very least all projects should be **responisve**, but that doesn't necessarily mean the layout is liquid

You can have a responsive fixed width layout by using media queries, which we'll cover later.

So for now, let's do a quick demo on a fixed width layout. After, with the same demo, we'll introduce media queries.

Questions so far?

When adding **media queries**, we should have mentioned the **viewport meta tag**. Let's expand on that.

From MDN:

"The browser's viewport is the area of the window in which web content can be seen. This is often not the same size as the rendered page, in which case the browser provides scrollbars for the user to scroll around and access all the content."

"Narrow screen devices (e.g. mobiles) render pages in a virtual window or viewport, which is usually wider than the screen, and then shrink the rendered result down so it can all be seen at once. Users can then pan and zoom to see different areas of the page. For example, if a mobile screen has a width of 640px, pages might be rendered with a virtual viewport of 980px, and then it will be shrunk down to fit into the 640px space."

"This is done because many pages are not mobile optimized, and break (or at least look bad) when rendered at a small viewport width. This virtual viewport is a way to make non-mobile-optimized sites in general look better on narrow screen devices."

Here's where that content was pulled from:

https://developer.mozilla.org/en-US/docs/Mozilla/Mobile/Viewport_meta_tag

And here's an extremely useful resource that has done the tedious job of collecting pixel dimension sizes for many of the most common devices used today:

https://css-tricks.com/snippets/css/media-queries-for-standard-devices/

Any other questions before moving to **CSS grids**?

CSS GRIDS

What I haven't explicitly said is that we've kind of moved historically through the different ways web developers have layed out websites.

We've gone from **absolute and relative positioning**, mentioned **floats**, **inline-block display**, and then finally **flexbox**.

Each method attempted to address particular issues at the time, but CSS grids is the most common and contemporary these days. If you focus on one CSS technique, focus on grids.

Last week we did a demo on **flexbox**, which is great, but **CSS grids** are more powerful and dynamic.

Flexbox definitely still has its place, but I use it more frequently for sections of a website rather than laying out an entire project.

Think **grids** for the whole project and maybe **flexbox** for a navigation or thumbnail image gallery.

One of the major reasons grids are dynamic (and also slightly more complicated) is because it's two-dimensional.

CSS grids make use of both **rows** and **columns**.

Working with grid layouts is as simple as applying CSS rules, just like we've done the past two weeks.

The rules need to be applied to both the **parent** and **child elements**, because the rules work in conjunction with each other.

If you're missing one or the other, the layout likely won't work.

So, the basics.

To get started you must define a **container/parent element** as a grid:

```
#parent {
        display: grid;
}
```

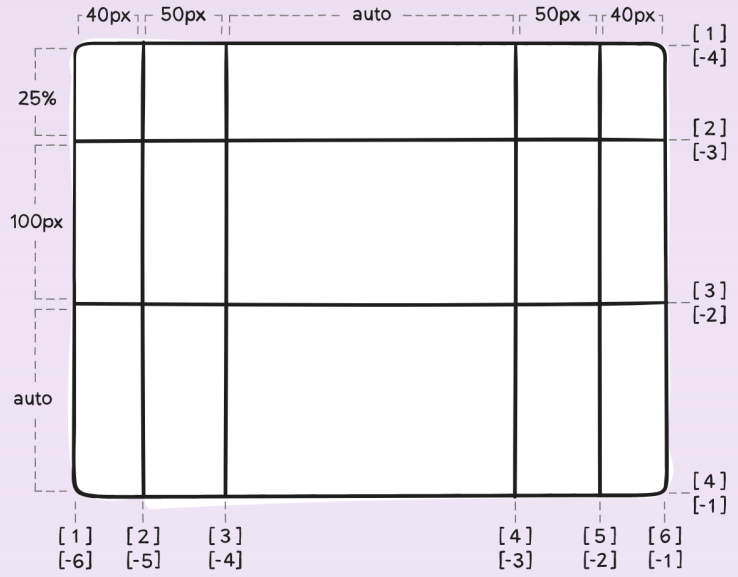
You must also set column and row sizes:

```
#parent {
        display: grid;
        grid-template-columns: 1fr 1fr 1fr 1fr;
}
```

```
#parent {
        display: grid;
        grid-template-columns: 1fr 1fr 1fr 1fr;
        grid-template-rows: 25% 100px auto;
}
```

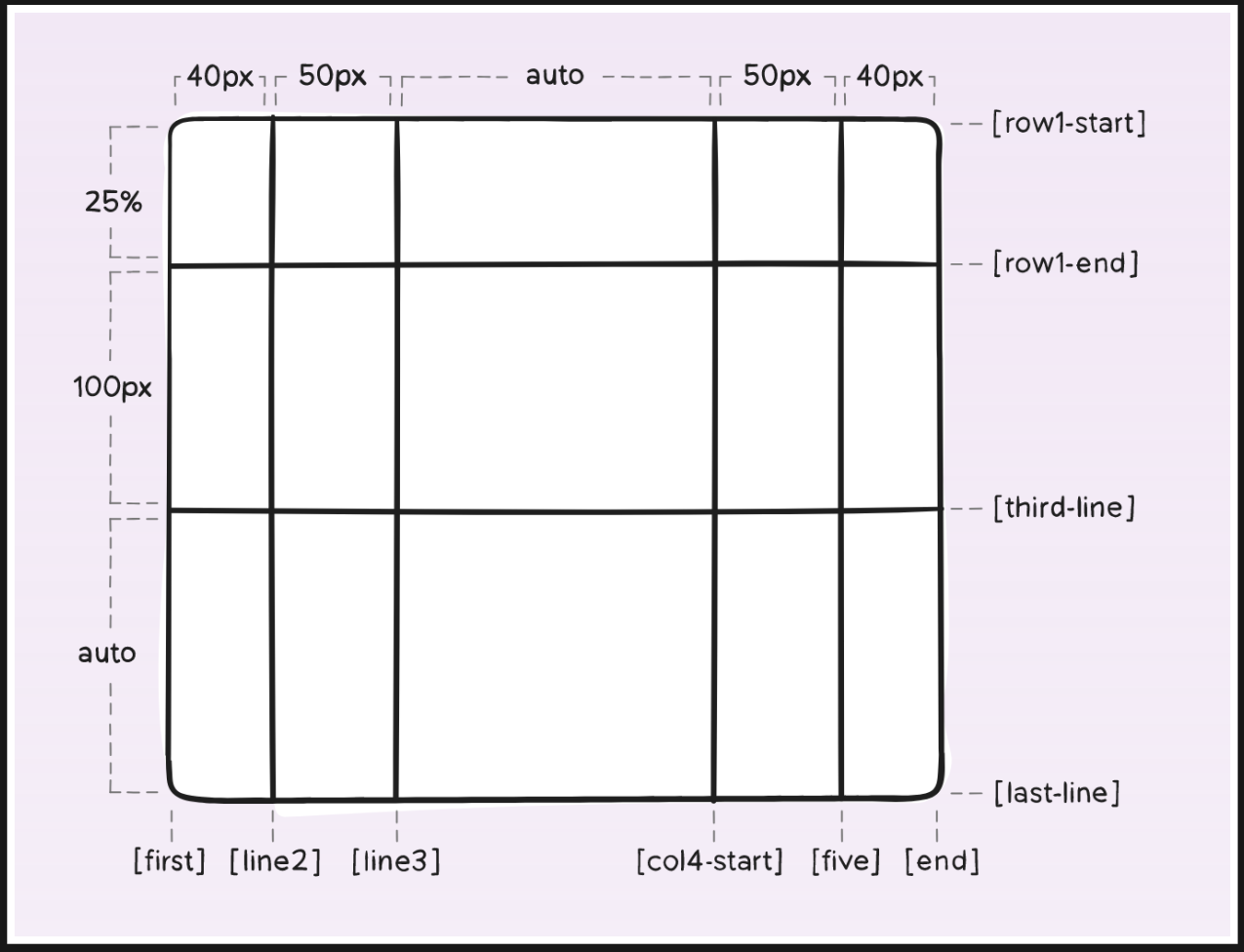
fr is a unit of measurement, meaning fraction of the free space.

```css
.container {
  grid-template-columns: 40px 50px auto 50px 40px;
  grid-template-rows: 25% 100px auto;
}
```



You can see in the example that the lines are automatically assigned positive and negative values. But you can actually name the lines yourself.

```
#parent {
        display: grid;
        grid-template-columns: [first] 40px [line2] 50px [line
        grid-template-rows: [row1-start] 25% [row1-end] 100px
}
```


40px
50px
auto
50px
40px
[row1-start]
25%
[row1-end]
100px
[third-line]
auto
[last-line]
[first]
[line2]
[line3]
[col4-start]
[five]
[end]

Why would we care about that? It may make it easier for us to place our **child elements**.

When placing **child elements**, we have several options:

```
.child {
        grid-column-start: <number> | <name> | span <number> |
        grid-column-end: <number> | <name> | span <number> | s
        grid-row-start: <number> | <name> | span <number> | sp
        grid-row-end: <number> | <name> | span <number> | span
}
```

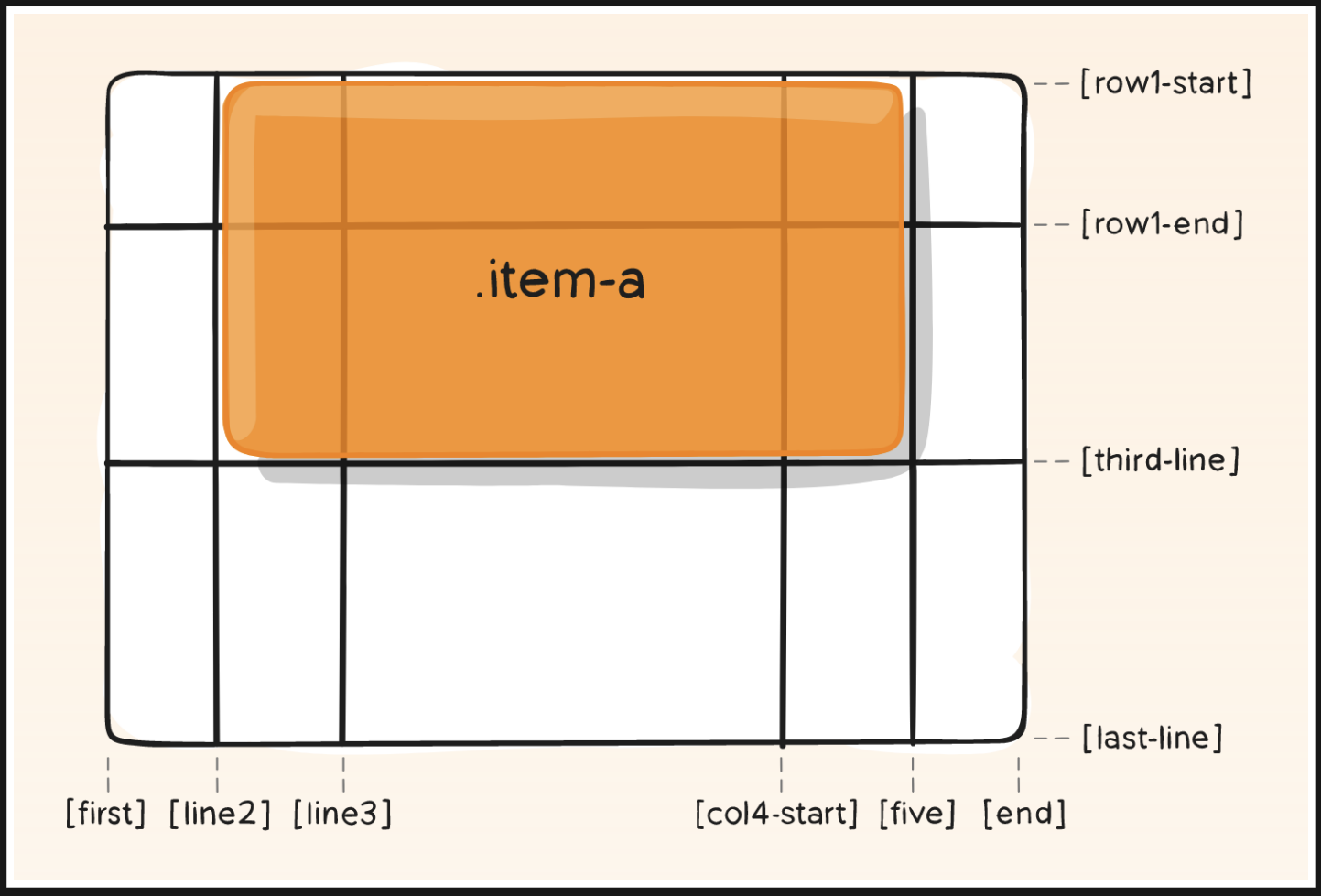
- grid-column-start
- grid-column-end
- grid-row-start
- grid-row-end

Determines a grid item's location within the grid by referring to specific grid lines. **grid-column-start/grid-row-start** is the line where the item begins, and **grid-column-end/grid-row-end** is the line where the item ends.

- <line> - can be a number to refer to a numbered grid line, or a name to refer to a named grid line
- span <number> - the item will span across the provided number of grid tracks
- span <name> - the item will span across until it hits the next line with the provided name
- auto - indicates auto-placement, an automatic span, or a default span of one

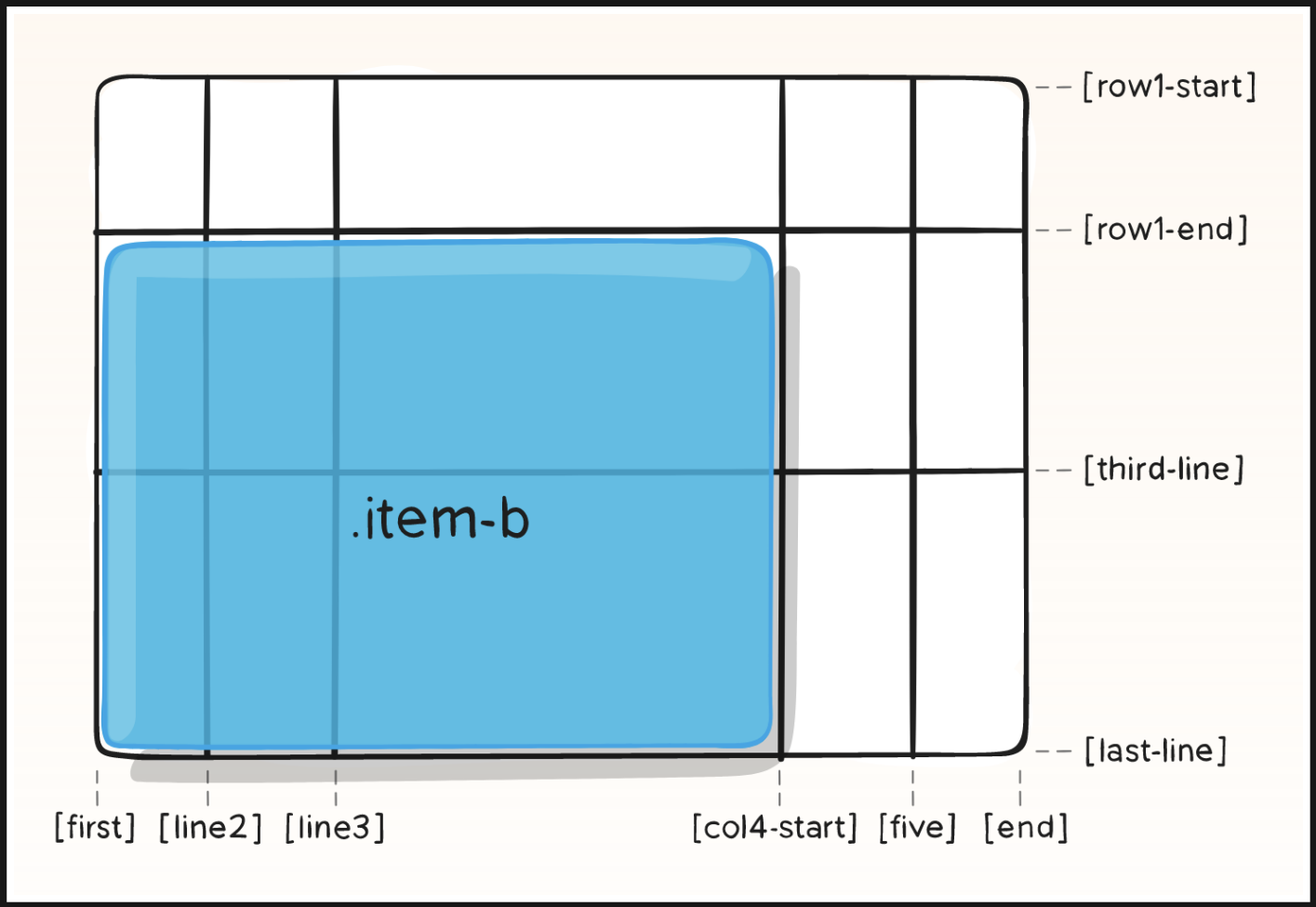
So if we have a child element with a class of item-a:

```
.item-a {
        grid-column-start: 2;
        grid-column-end: five;
        grid-row-start: row1-start;
        grid-row-end: 3;
}
```

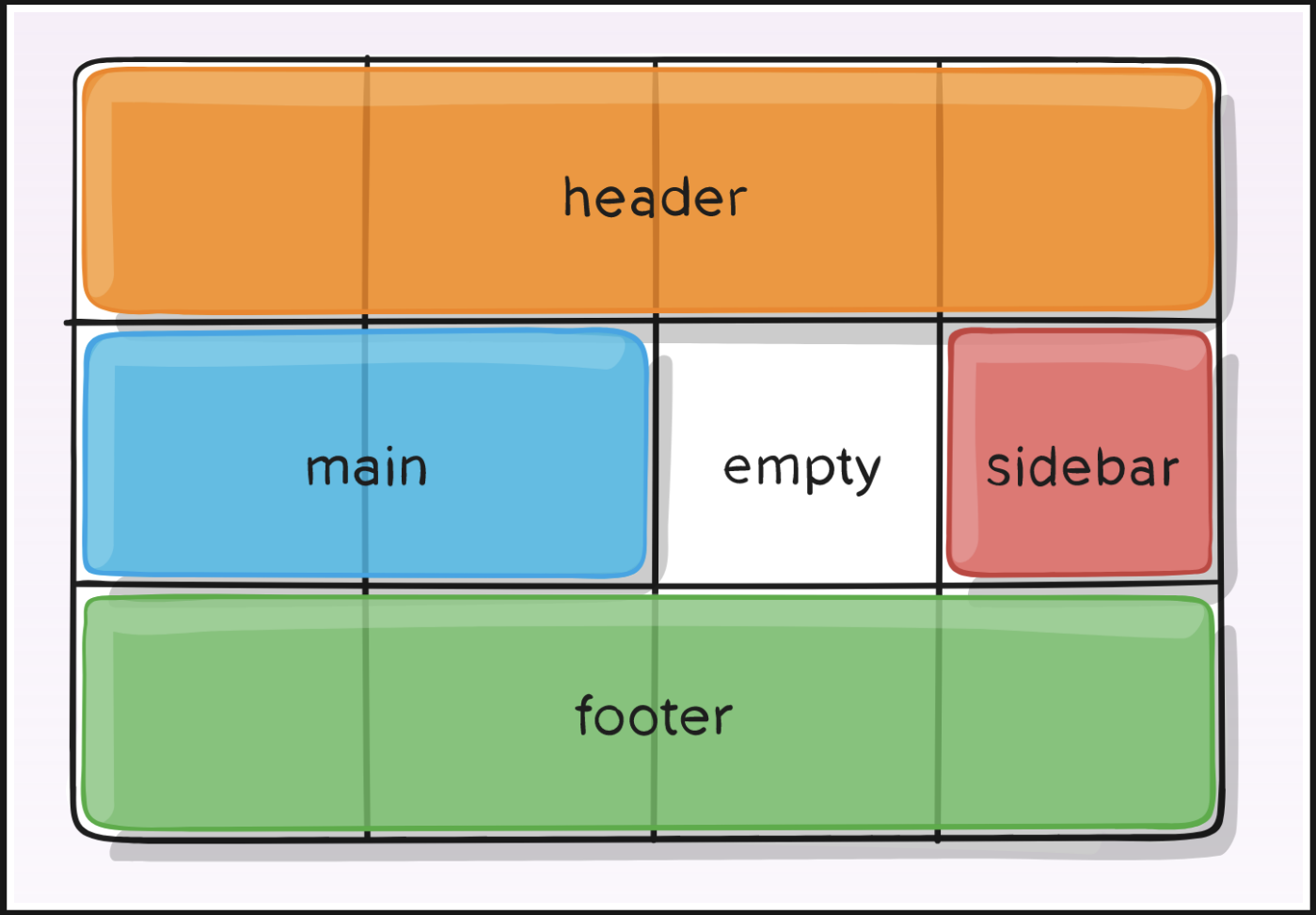

[row1-start]
[row1-end]
.item-a
[third-line]
[last-line]
[first]
[line2]
[line3]
[col4-start]
[five]
[end]

One more example:

```
.item-b {
        grid-column-start: 1;
        grid-column-end: span col4-start;
        grid-row-start: 2;
        grid-row-end: span 2;
}
```


[row1-start]
[row1-end]
.item-b
[third-line]
[last-line]
[first]
[line2]
[line3]
[col4-start]
[five]
[end]

With this system, it should be apparent that you can quickly build out sections and elements of site and have them reliably placed:


header
main
empty
sidebar
footer

So, we've only scratched the surface of all of the options, but as usual we just don't have time to go in depth with every single variation.

Some things you consider looking into:

- **grid-template-areas**
- **grid-template**
- **grid-column-gap** and **grid-row-gap**
- **grid-gap**
- **justify-items**
- **justify-self**
- **align-self**
- **place-self**

Note, the images linked in the presenation are from https://css-tricks.com/snippets/css/complete-guide-grid/.

It's a phenomenal resource, check it out over the week.

With that, let's do two demos on a single page project using **CSS grids**.

Questions?

Next week we start **JavaScript** in earnest.