

Editing Spatial Layouts with Tactile Templates

[slides: jingyi.me/chi19.pdf]

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SKERI
THE SMITH-KETTLEWELL
EYE RESEARCH INSTITUTE

BASIC



Title



Text



Image



Gallery



Slideshow



Map



Contact Form



Newsletter Form



Button



Embed Code

STRUCTURE

NEW



Section



Divider



Spacer

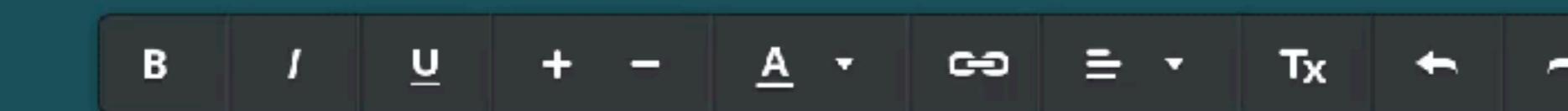
MEDIA



HD Video



Audio



HOME

BLOG

PORTFOLIO

CONTACT

Hi, I'm Ben.

Enter information about yourself [here](#).

[CONTACT ME](#)

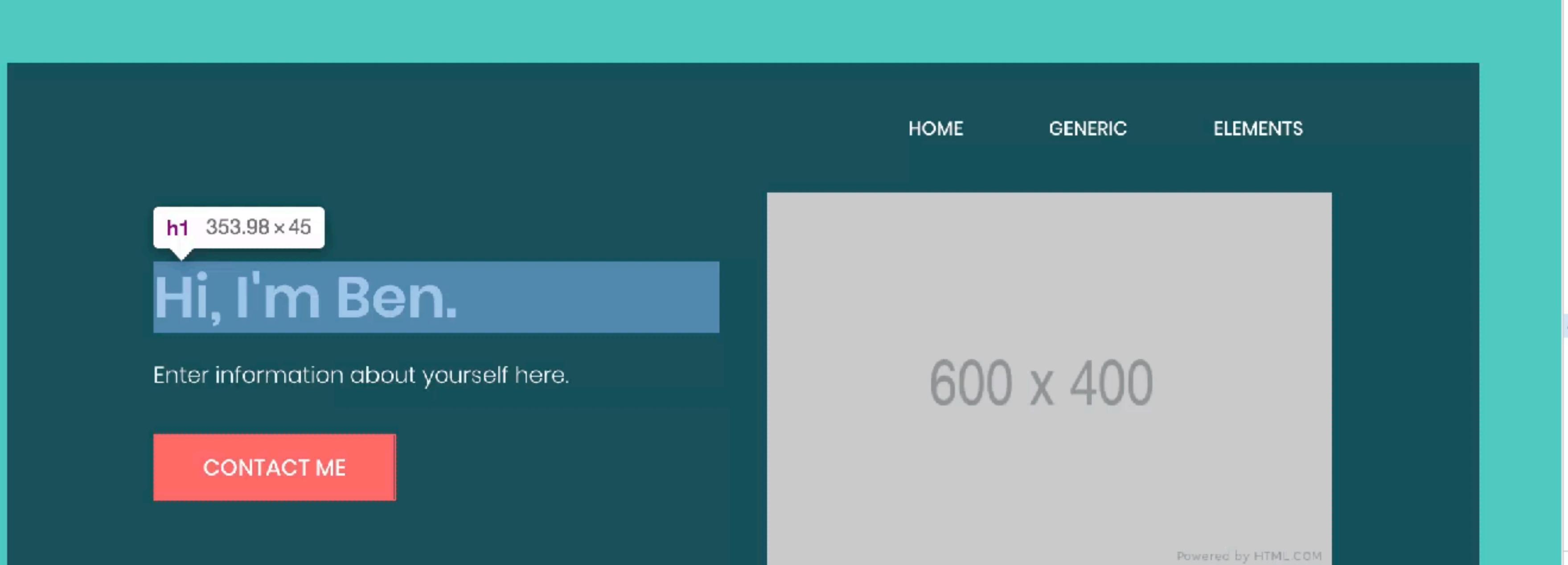
600 x 400

Powered by HTML.COM



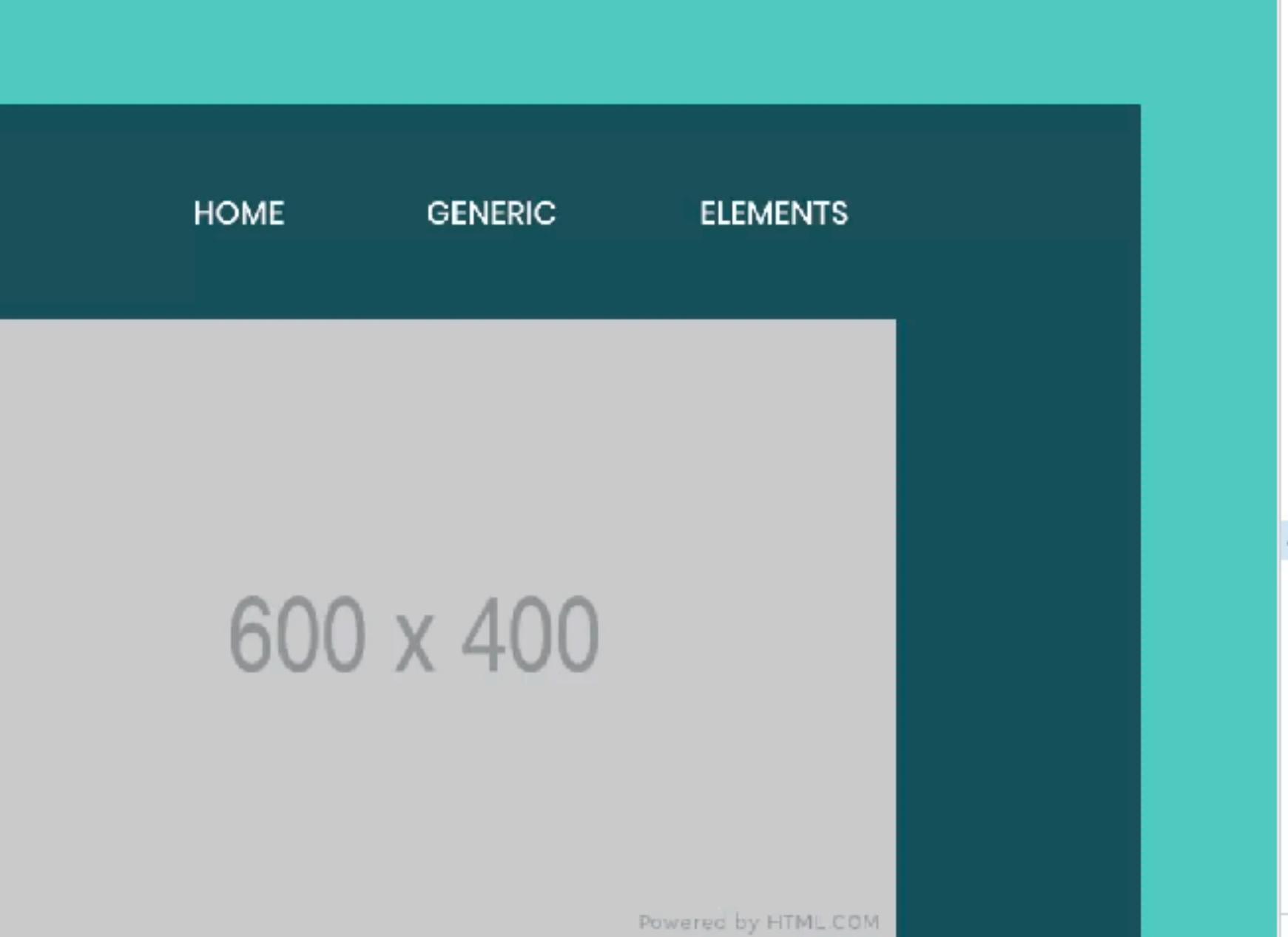
Remove Weebly branding and customize the footer on your website by subscribing to a plan.

⚡ CUSTOMIZE YOUR FOOTER



Project 1

Project description goes here



Project 2

Project description goes here

```
v3.css?buildtime=1556907709" rel="stylesheet">
</head>
<body class="wsite-theme-light wsite-page-index" style="padding-bottom: 2.8em;">
    <!-- Header Area -->
    <div class="header-top main-wrapper-first">...</div>
    <!-- End Header Area -->
    <!-- Banner Area -->
    <div class="main-wrapper">
        <div class="banner-area">
            <div class="container">
                <div class="row height justify-content-center align-items-center">
                    <div class="col-lg-5 col-sm-6 col-xs-6">
                        <div class="banner-content">
                            ...<br/>
                            <h1>Hi, I'm Ben.</h1> == $0
                            <p>
                                Enter information about yourself here.
                            </p>
                            <button class="primary-btn white-bg d-inline-flex align-items-center mt-10 ml-auto">Contact Me</button>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </div>
    html body div div div div div div.banner-content h1

```

Styles Computed Event Listeners DOM Breakpoints »

Filter :hover .cls +

element.style {
}

.banner-content h1 { main_style.css?1556951411:380
color: #fff;
font-weight: 600;

h1, h2, h3, h4, h5, h6 { main_style.css?1556951411:166
line-height: 1.5em;

h1 { main_style.css?1556951411:160
font-size: 36px;

⋮ Console What's New ×

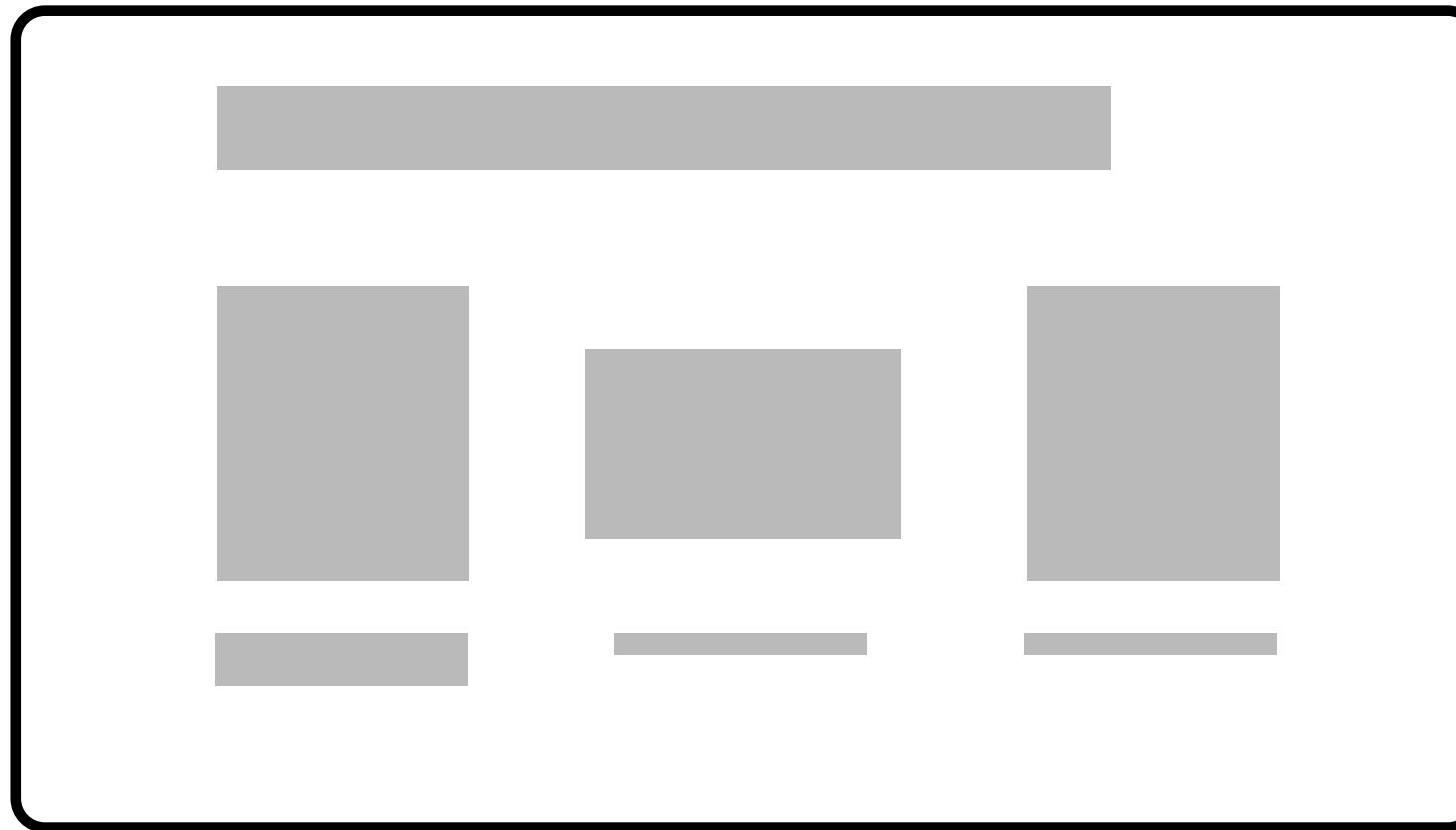
Highlights from the Chrome 74 update

Highlight all nodes affected by CSS property
Hover over a CSS property like padding or margin in the Styles pane to highlight all nodes affected by that

Blind and visually impaired (BVI) people are designers.



Formatting text documents

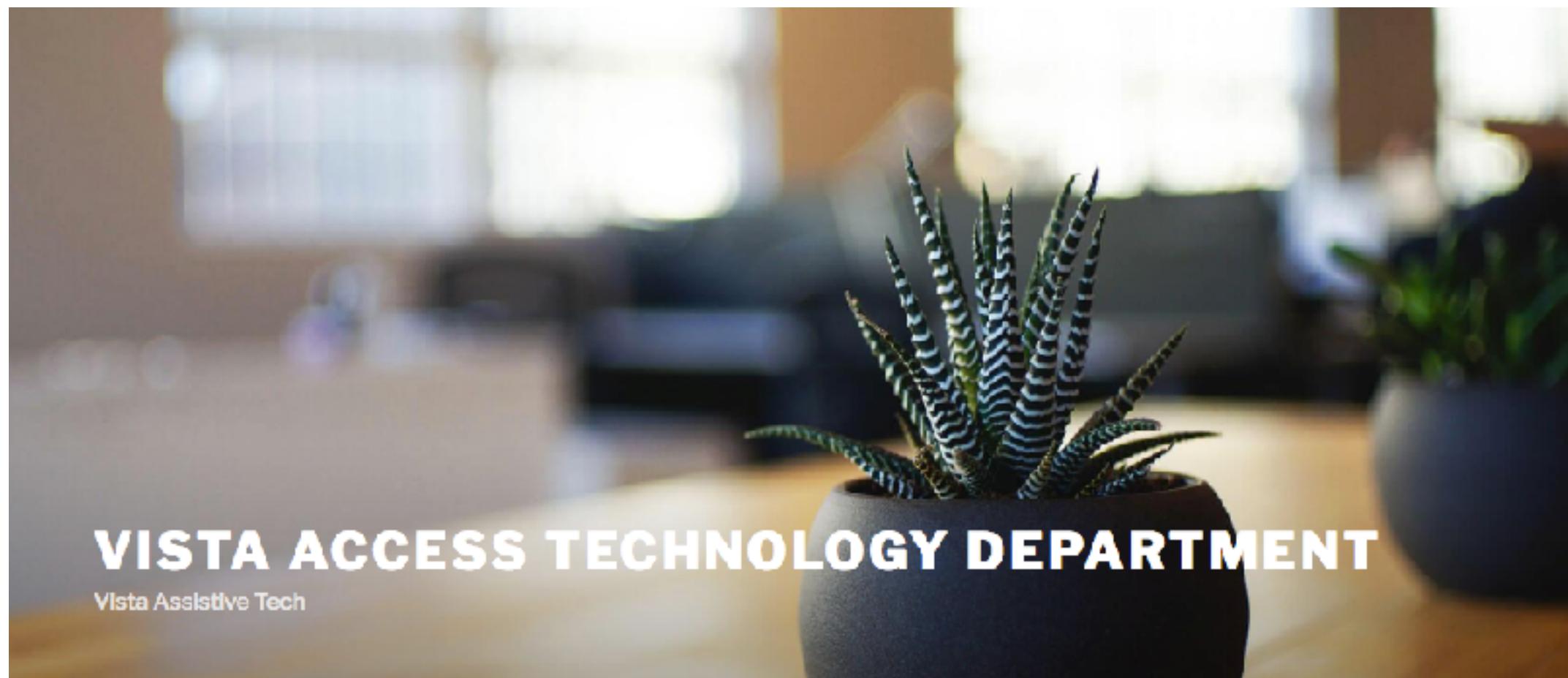


Making presentations



Making a website

Blind and visually impaired (BVI) people are designers.



ACCESS TECHNOLOGY DEPARTMENT

Welcome to the access technology department, where independence is made possible through accessible technology.

Recent Posts ▾



August 17, 2018

Using PicsArt To Simulate Vision Impairment

As the only student identified with low vision in my school district, I was asked time and time again what I could see, and what I couldn't see. This wasn't always very easy to explain, but I remember one day my teacher of the visually [...]

Accommodations, Android, Disability Life, Education, iPad, Low Vision, Technology



August 16, 2018

Android Pie Accessibility For Vision Impairment

Whenever my Android phone gets a new software update, I like to immediately check out what's new in accessibility settings for users with vision impairment. Since I have a Google Pixel 2, I received the opportunity to update my phone's operating system from Android Oreo [...]

Android, Technology



I'm a four-eyed college student from Virginia who loves writing about technology, education, and disability.

Read more about me [here](#).

Websites made by blind & low vision designers

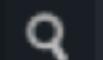
BVI designers can't choose templates based on their visual designs.

[Register](#) [Log In](#)



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Get WordPress

Theme Directory

Commercial Themes Upload Your Theme

17

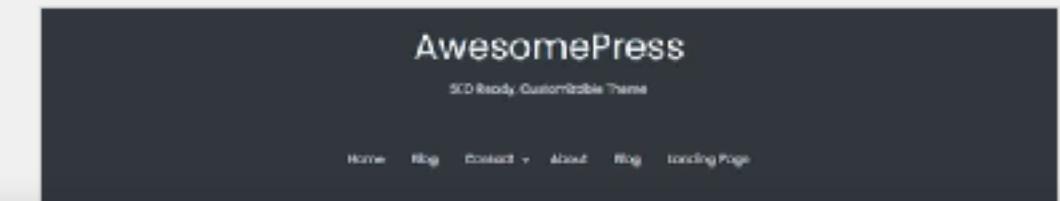
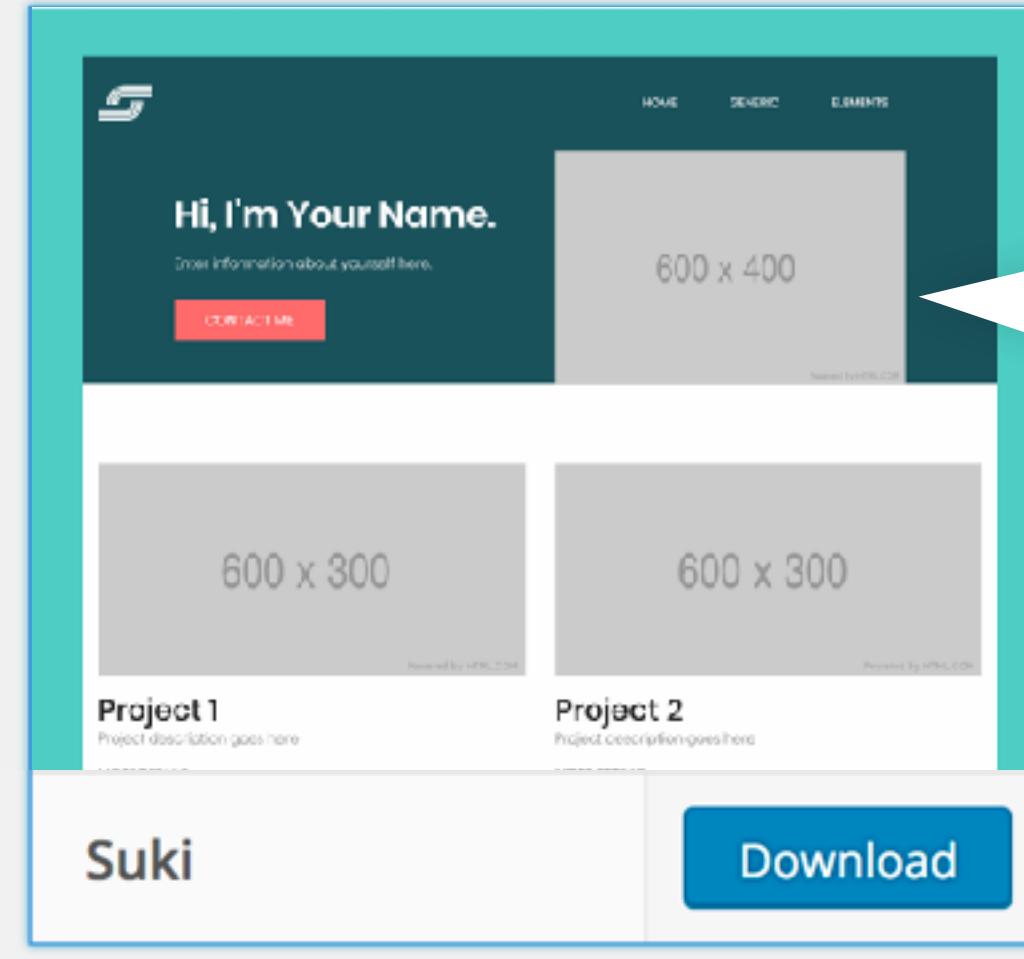
Featured

Popular

Latest

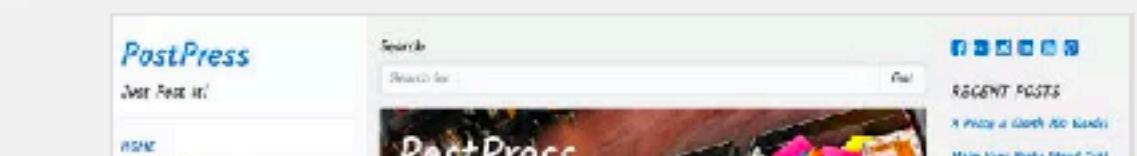
Feature Filter

accessibility



Tags:

Blog, Custom Colors, Custom Menu, E-Commerce, Editor Style, Featured Images, Footer Widgets, Full Width Template, Grid Layout, Left Sidebar, Microformats, Portfolio, Right Sidebar, RTL Language Support, Theme Options, Threaded Comments, Translation Ready, Two Columns



[audio playing]



HOME GENERIC ELEMENTS

Hi, I'm Your Name.

Enter information about yourself here.

[CONTACT ME](#)

600 x 400

Powered by HTML.COM

600 x 300

Powered by HTML.COM

Project 1

Project description goes here

[MORE DETAILS](#)

Project 2

Project description goes here

[MORE DETAILS](#)



Home Generic Elements

Hi, I'm Your Name.

Enter information about yourself here.

Contact Me

600 x 400

Powered by HTML.COM

600 x 300

Powered by HTML.COM

Project 1

Project description goes here

[More Details](#)

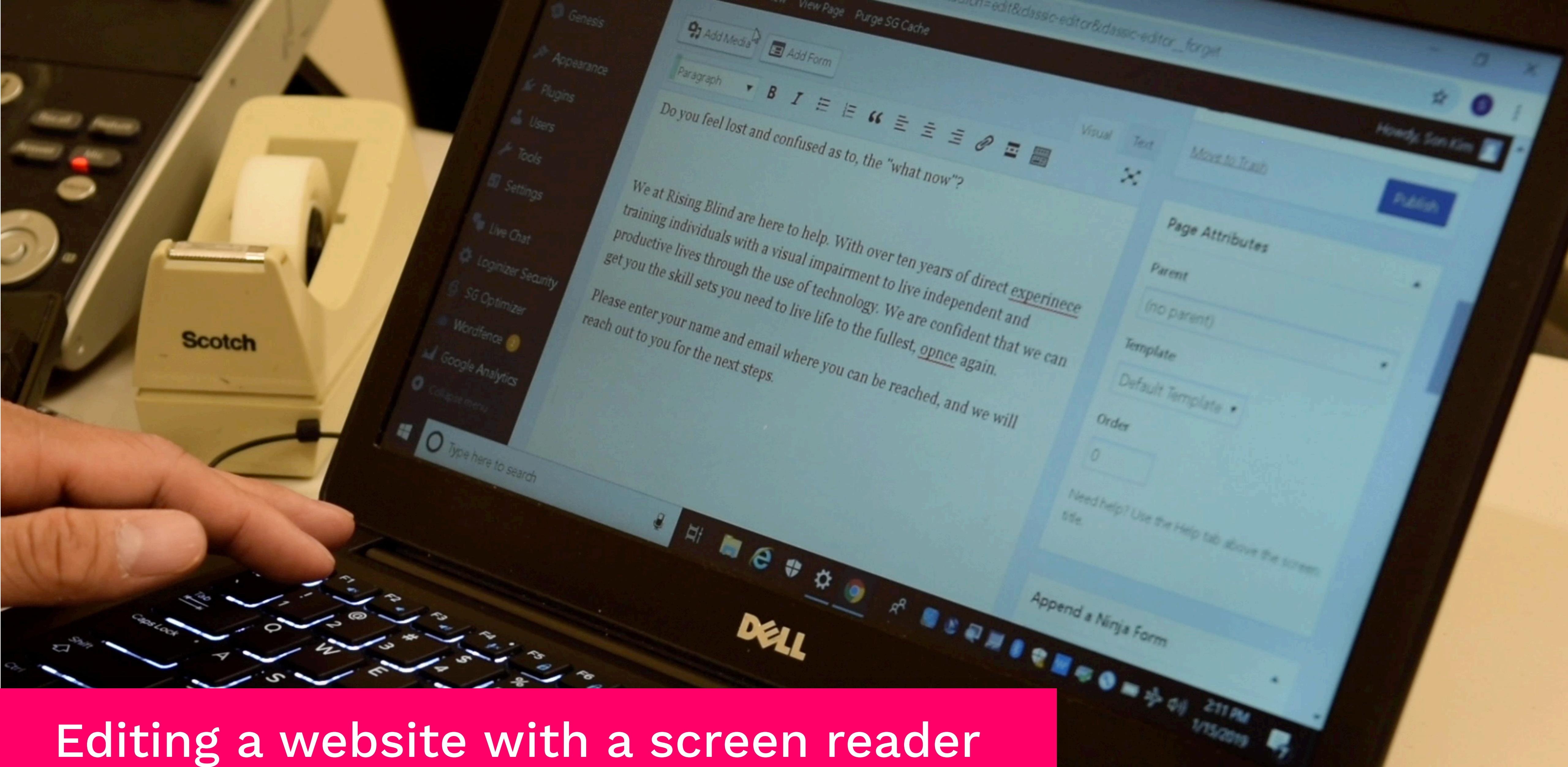
600 x 300

Powered by HTML.COM

Project 2

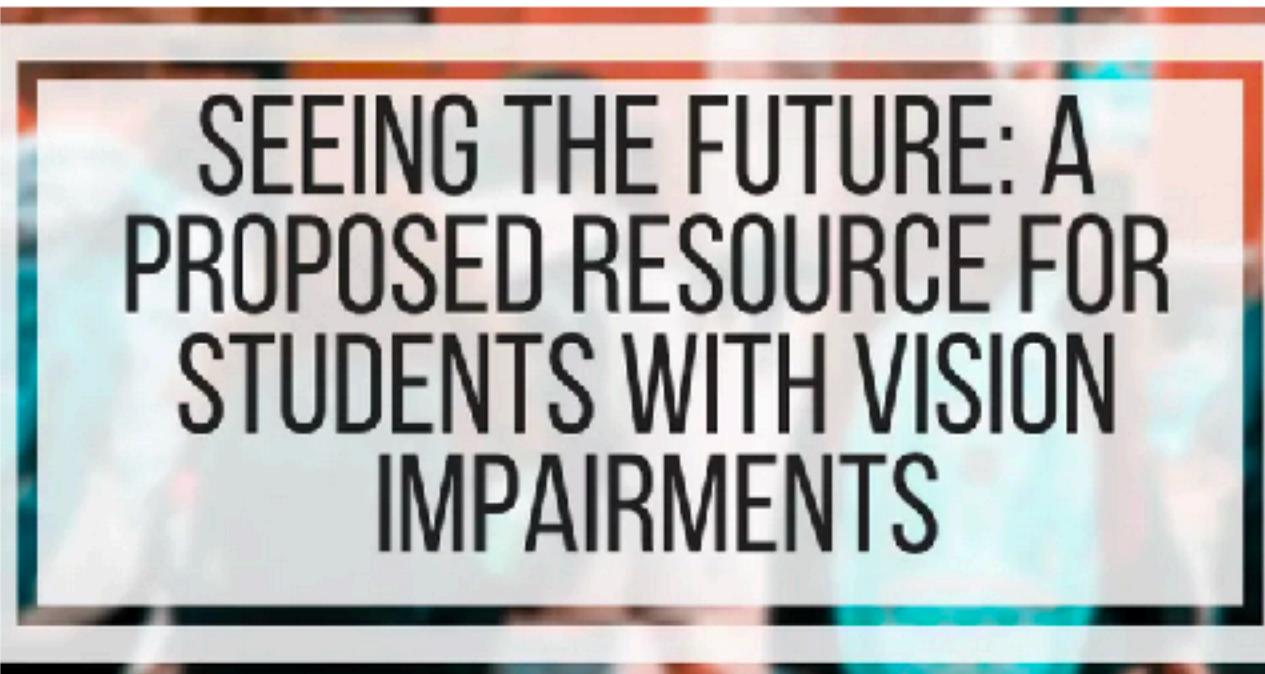
Project description goes here

[More Details](#)



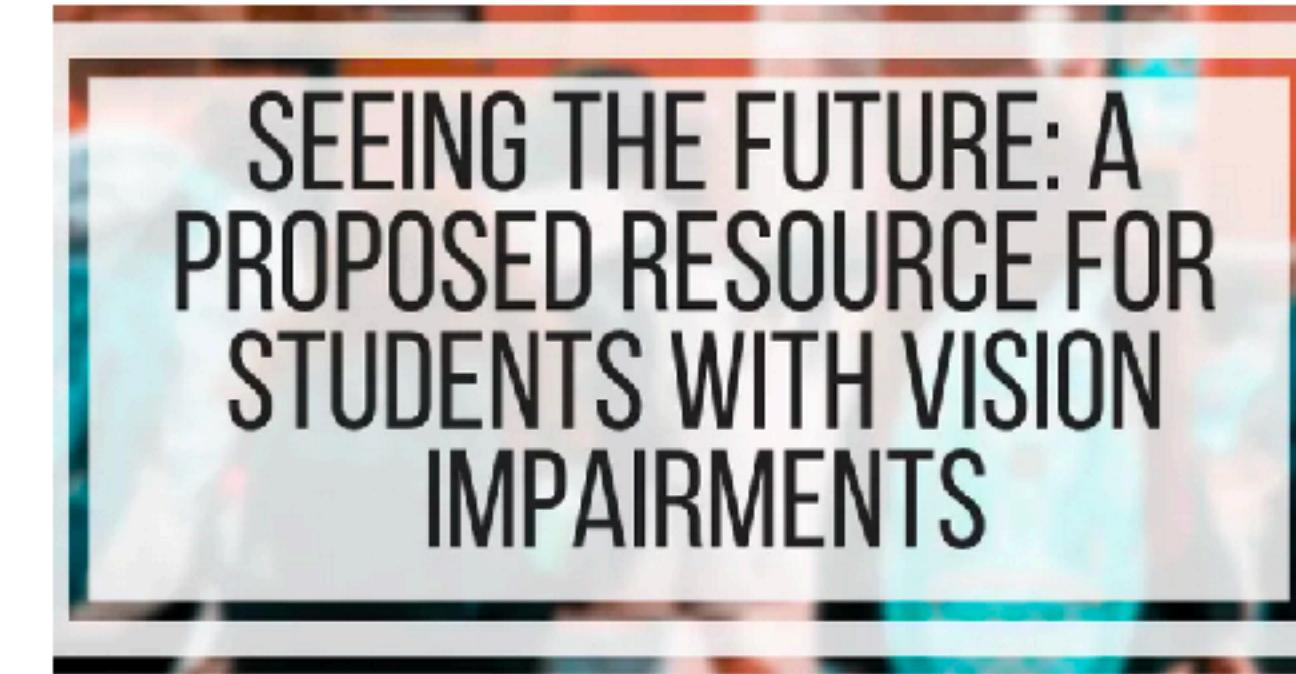
Editing a website with a screen reader

BVI designers go beyond the default template designs.



SEEING THE FUTURE: A PROPOSED RESOURCE FOR STUDENTS WITH VISION IMPAIRMENTS

Last year, I wrote a policy idea that won the “10 Ideas” yearly policywriting contest that is hosted by the Roosevelt Institute, a student-run think tank. My policy idea, entitled “Seeing The Future,” talked about a proposed state resource that would contain information for students [...]



SEEING THE FUTURE: A PROPOSED RESOURCE FOR STUDENTS WITH VISION IMPAIRMENTS

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BVI designers lack

- Access to layout feedback
- Direct control over layout elements
- Iterative design process

The screenshot displays a website template with a dark teal header and footer. In the top right corner of the header, there is a navigation menu with links: HOME, GENERIC, and ELEMENTS. To the left of the menu is a stylized white 'S' logo.

The main content area features a dark teal section at the top containing the text "Hi, I'm Your Name.", a placeholder "Enter information about yourself here.", and a red "CONTACT ME" button. Below this is a light gray "600 x 400" placeholder image with a "Powered by HTML.COM" watermark.

Below the teal section are two light gray boxes, each labeled "600 x 300". The left box is titled "Project 1" with the subtext "Project description goes here" and a "MORE DETAILS" button. The right box is titled "Project 2" with the same subtext and button. Both boxes also have "Powered by HTML.COM" watermarks.

At the bottom of the page, a dark teal footer bar contains the copyright notice "Copyright © 2018 All rights reserved | This template is made with love by [Colorlib](#)".

[select](#)[back](#)[next](#)[edit mode: off](#)[print \(pixel\)](#)[cancel](#)

HOME GENERIC ELEMENTS

Hi, I'm Your Name.

Enter information about yourself here.

CONTACT ME

Powered by HTML.COM

600 x 400

600 x 300

Powered by HTML.COM

600 x 300

Powered by HTML.COM

Project 1

Project description goes here

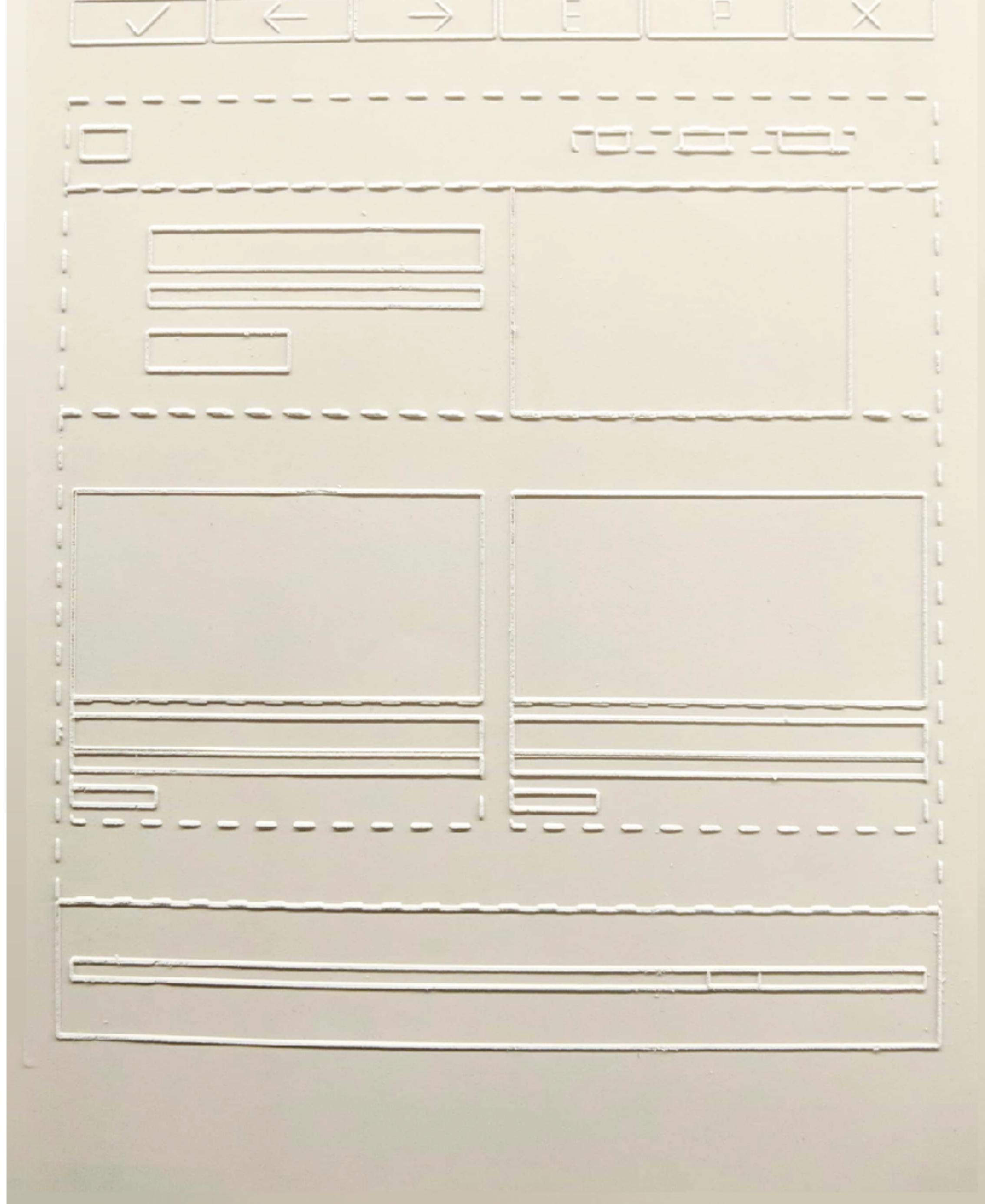
MORE DETAILS

Project 2

Project description goes here

MORE DETAILS

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RELATED WORK



Talking Tactile Tablet (2007)



Avila et al. (2018)



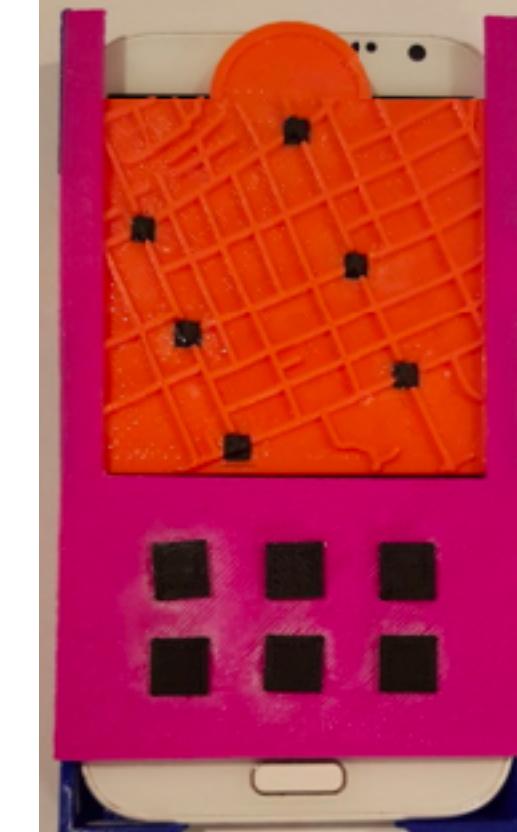
Guo et al. (2017)



Hyper Braille (2011)



McDonald et al. (2014)



Taylor et al. (2016)

Further Challenges in Layout Design

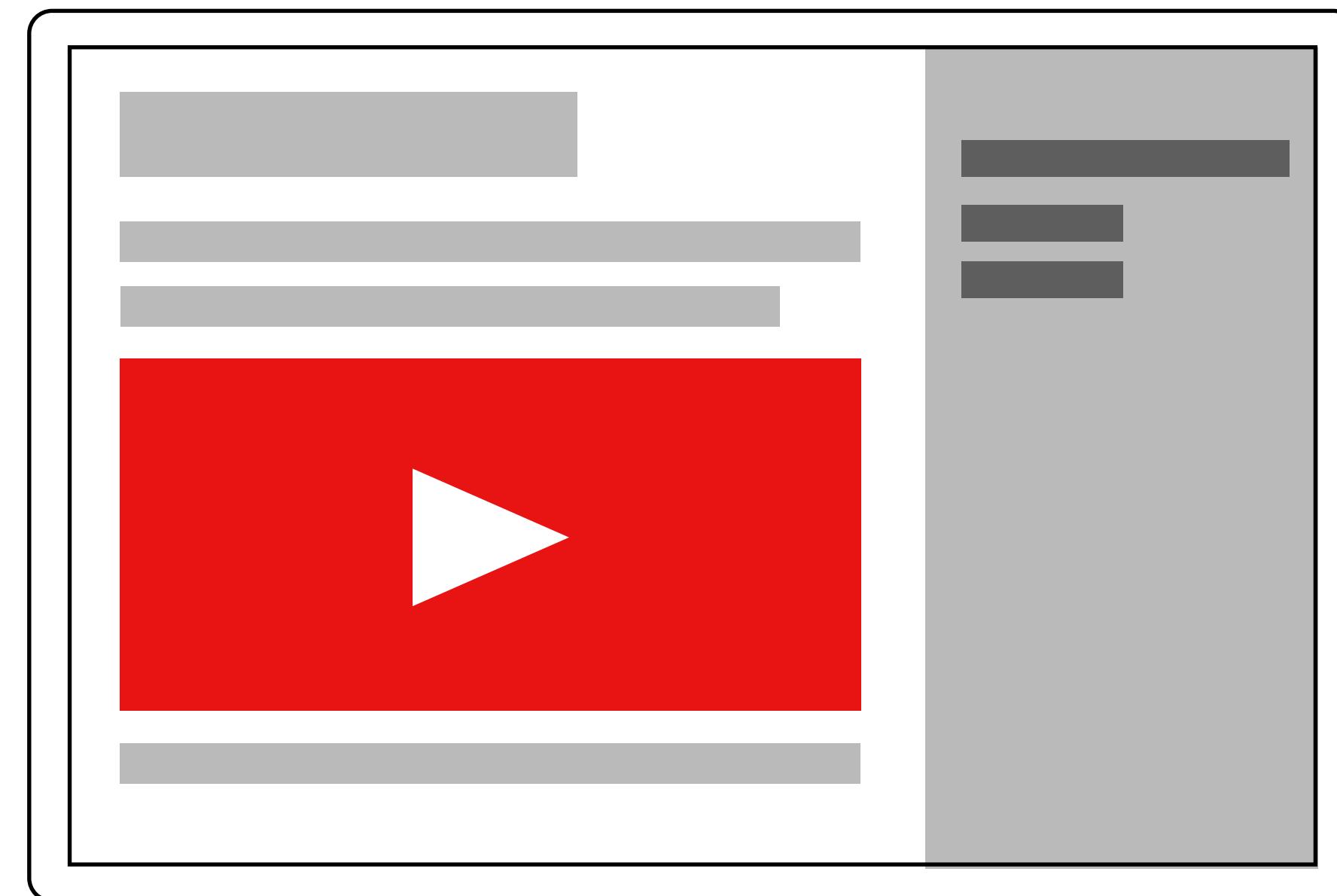
challenge

LACK OF LAYOUT FEEDBACK

“Even if I have the ability to make a change, I don’t know how it actually affected the layout. I just trust the computer did it, or ask someone.” - P3



Mental Model



Actual layout

challenge

HIGH LOAD ON SHORT-TERM MEMORY

Who we are

Stanford University's Power2ACT is an open forum for students with and without disabilities (including invisible disabilities) to share and learn about challenges faced by each other. The purpose of the group is to create a community of disability advocates on campus, raise awareness about disabilities, host events related to disability, and create a safe space for open dialogue and exchange of ideas within the Stanford community. The group also seeks to bridge the gap between students with and without disabilities, thereby bringing about greater sensitivity in the broader Stanford community. We organize several events, talks and workshops throughout the year, besides serving as a resource for anything disability-related.

Mission

As articulated by our Constitution, our mission includes:

- To create and foster a community of advocates for the disability community on Stanford's campus.*
- To create a safe space for open dialogue and exchange of ideas both within the community and in association with other student organizations.*
- To advocate for students' with disabilities needs to the University in regards to access to all aspects of university life.*
- The group will work extensively with the Office of Accessible Education and the Diversity & Access Office.*
- To provide Stanford with information about the disability community's current and historical issues through hosted events.*
- To connect with other student community organizations and to expand the reach of Power to ACT throughout the Stanford*

...

```
<div class="organization-info">
```

```
    <h3>Who we are</h3>
```

```
    <div class="justified">
```

```
        <div class="col-md-6">
```

```
            <p id="left"> Stanford
```

```
                University's Power2ACT
```

```
                is... </p>
```

```
        </div>
```

```
    <div class="divider">
```

```
        &ampnbsp</div>
```

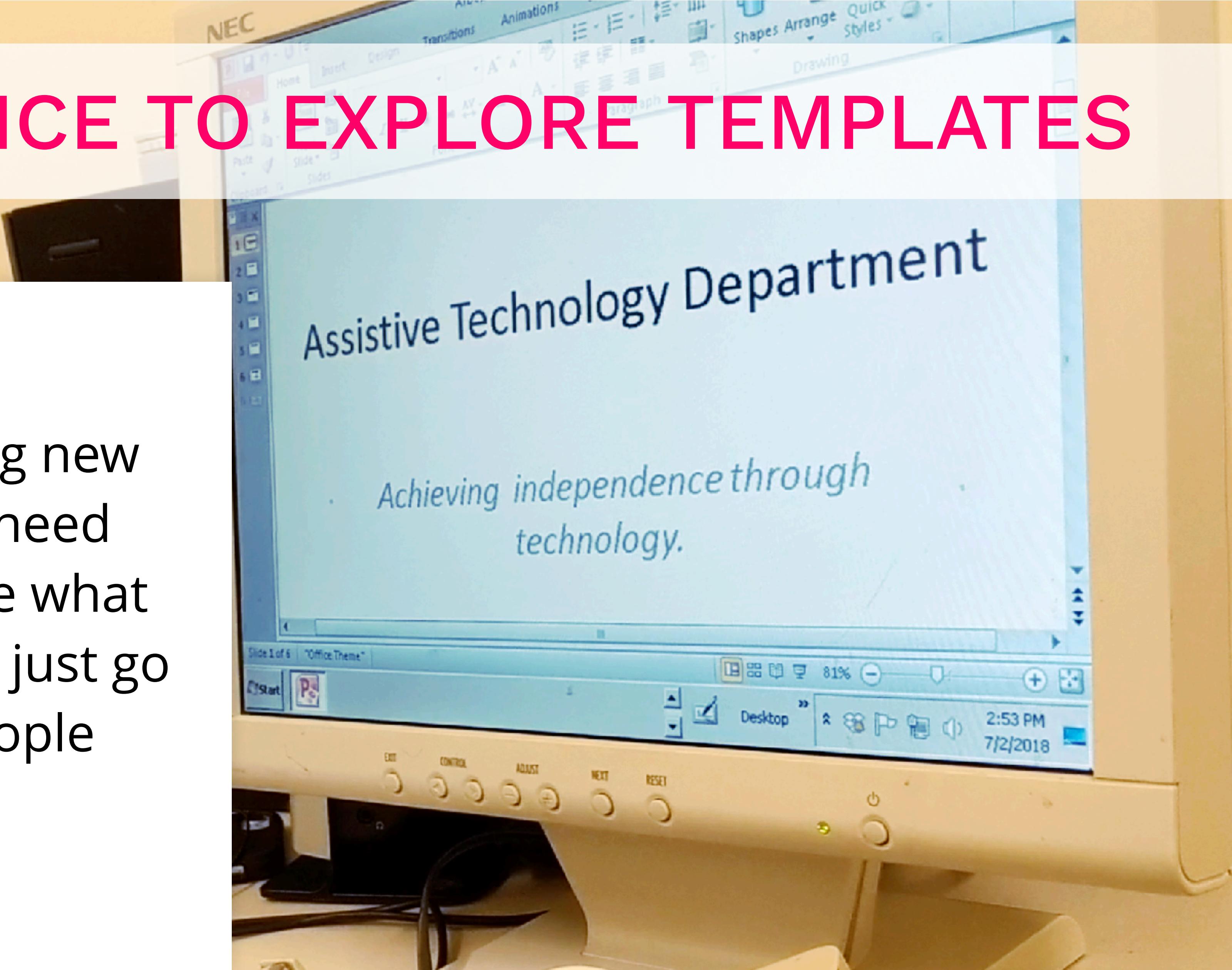
```
    <h3>Mission</h3>
```

...

challenge

RELUCTANCE TO EXPLORE TEMPLATES

"I don't feel confident in experimenting in choosing new layouts, because I would need someone to explain to me what it looked like every time. I just go with the default—that people have already described—because I know it." - P2



DESIGN GOALS

- 1 Leverage existing workflows of starting from **templates**
- 2 Provide **feedback** on spatial layouts in **multiple modalities** to avoid high cognitive loads

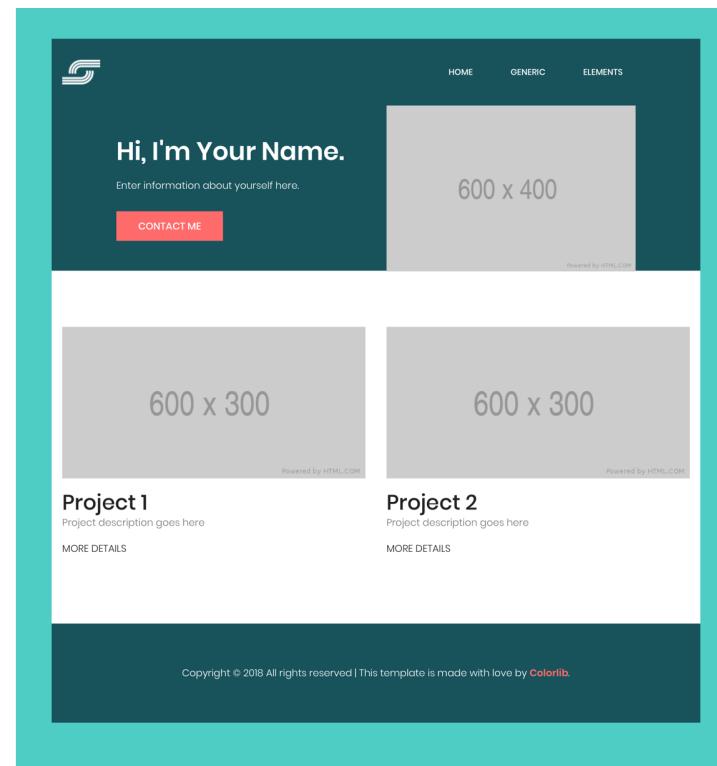
An Accessible Layout Design Tool



ROUTE

FABRICATION PIPELINE IMPLEMENTATION

input



Template



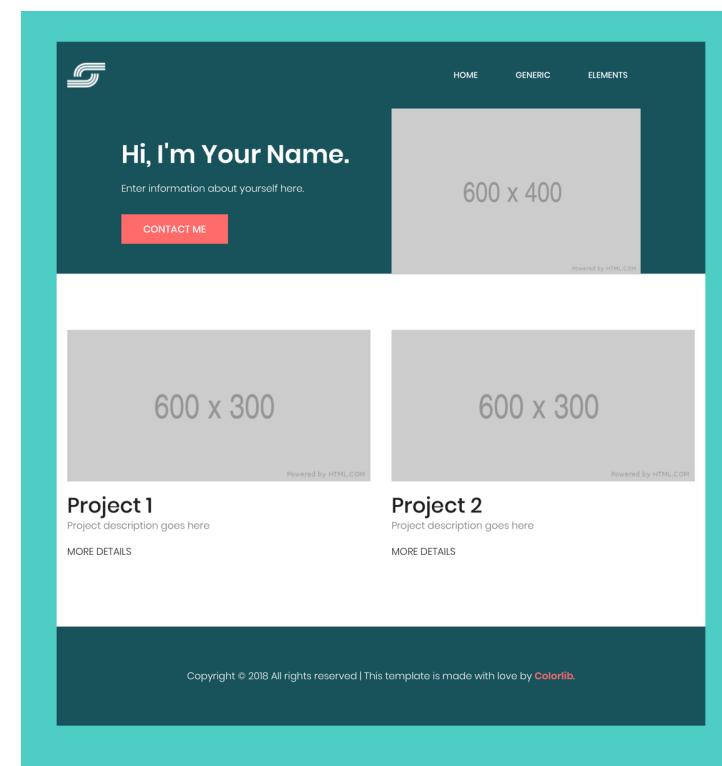
Tactile sheets & small multiples



Interactive
design tool

FABRICATION PIPELINE IMPLEMENTATION

input



Template

Parse
DOM

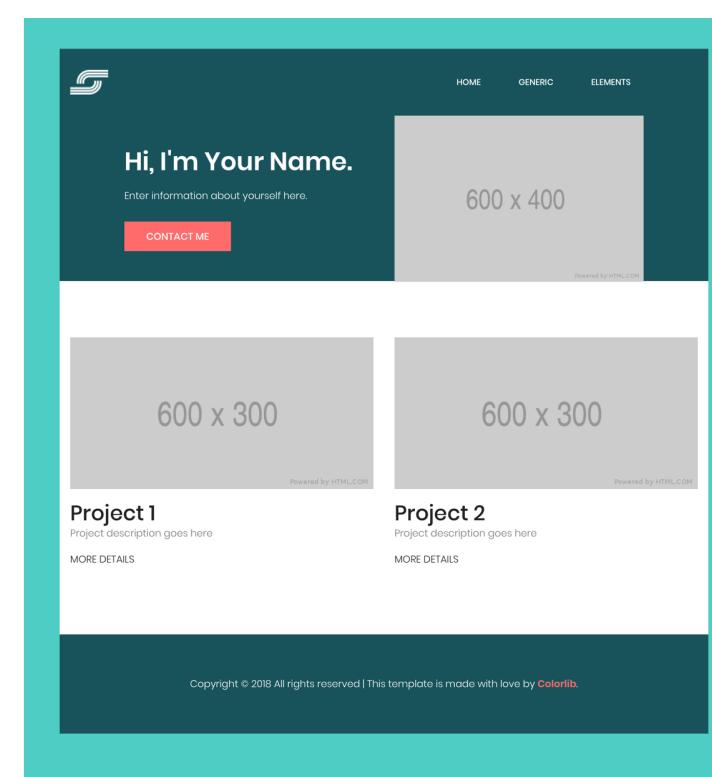


Tactile sheets & small multiples



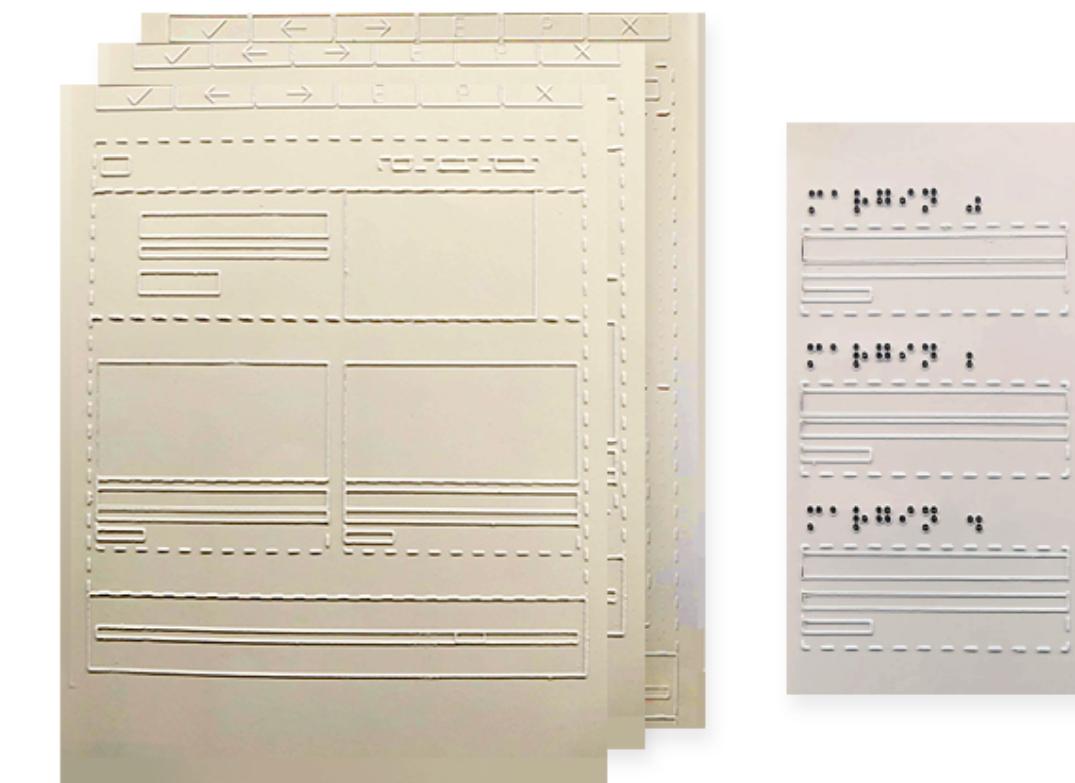
Interactive
design tool

FABRICATION PIPELINE IMPLEMENTATION



Template

Parse
DOM



Tactile sheets & small multiples

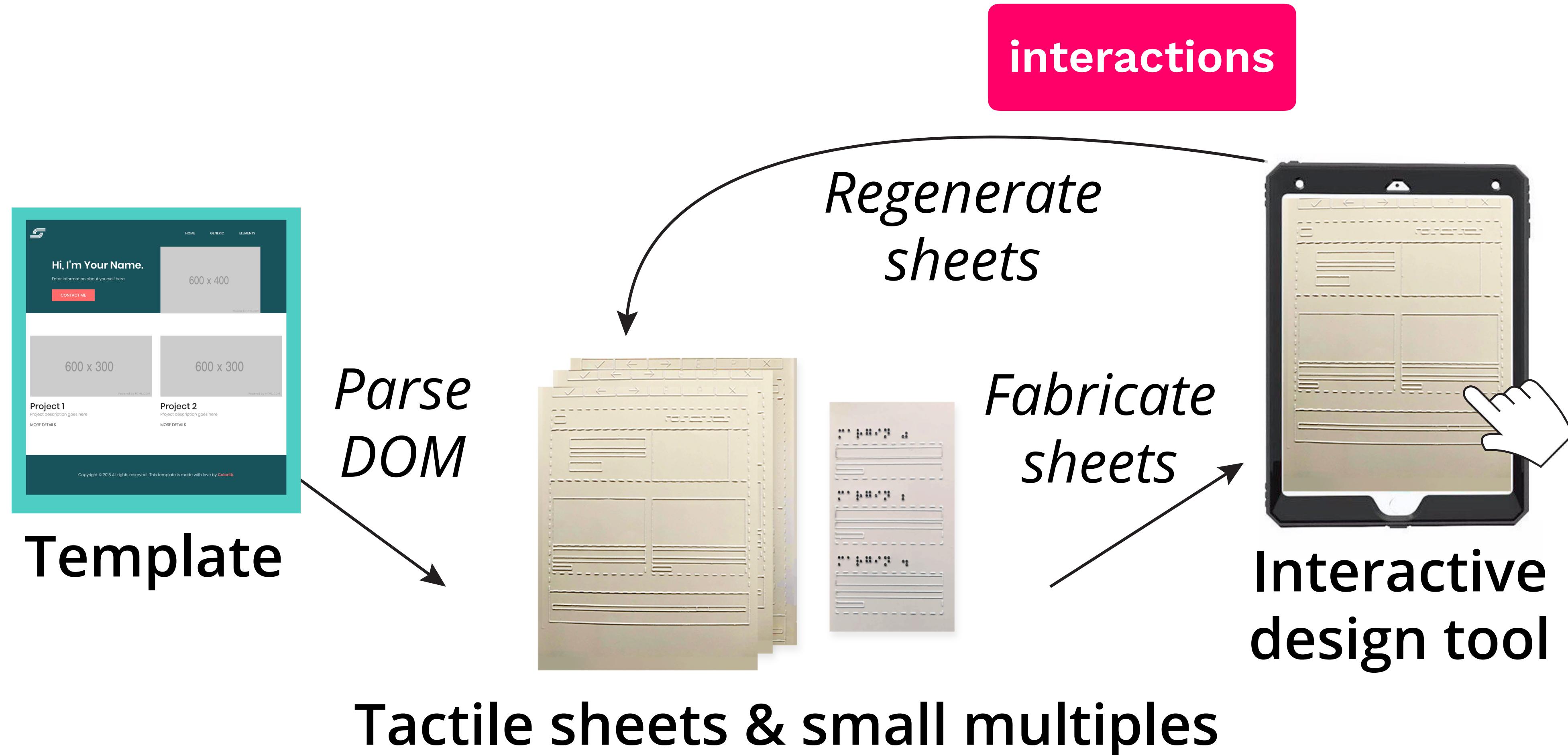
interactions

Fabricate
sheets

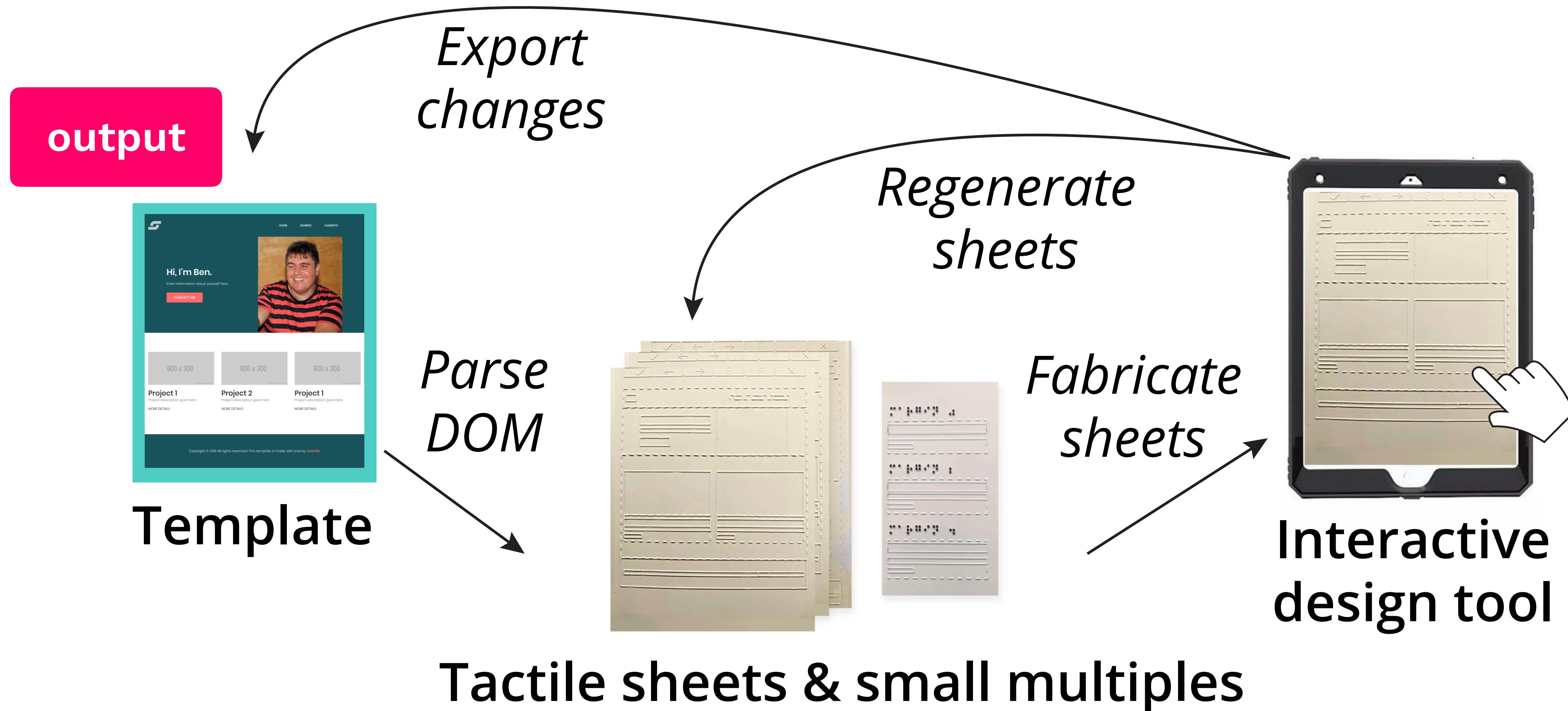


Interactive
design tool

FABRICATION PIPELINE IMPLEMENTATION

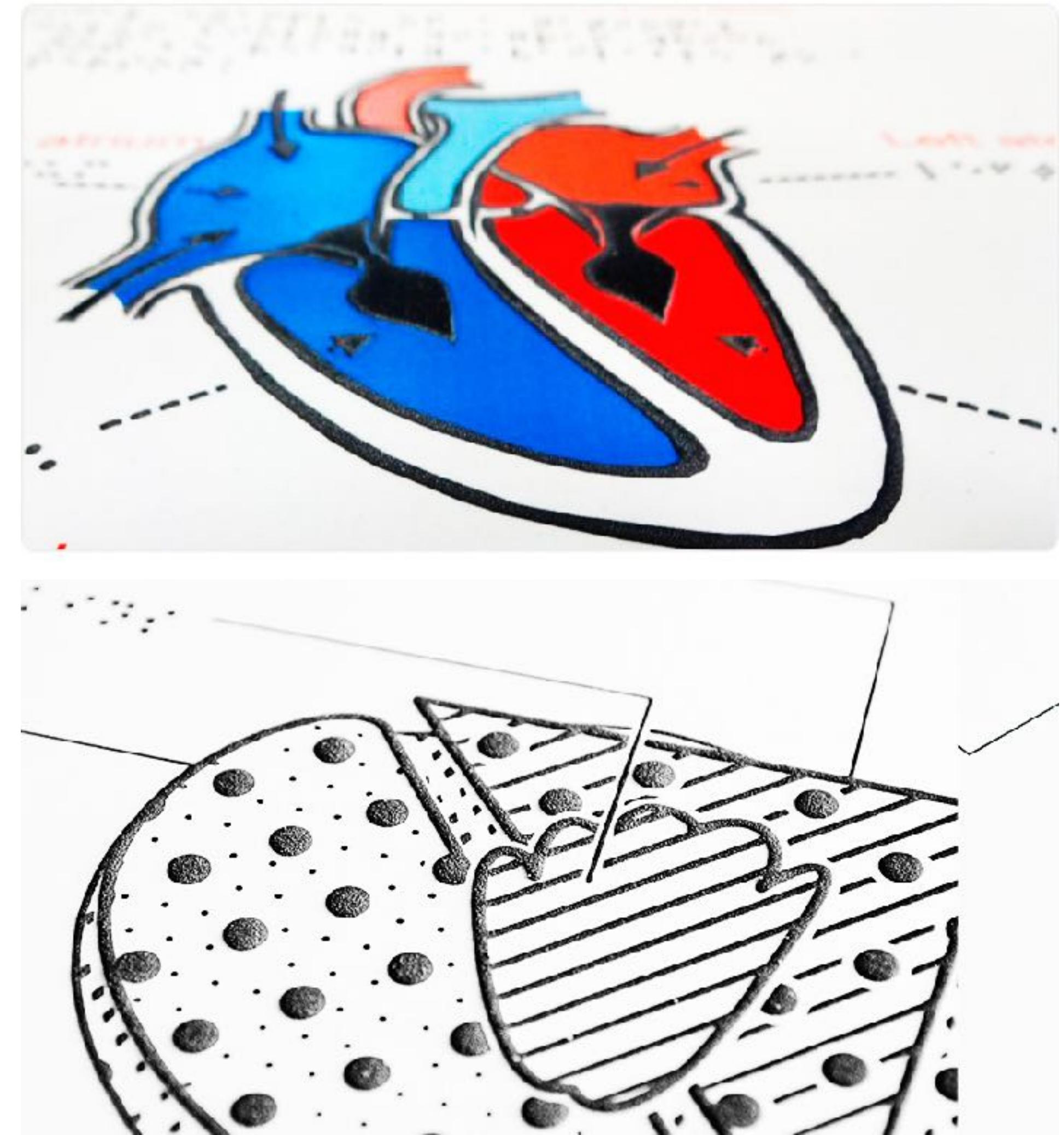


FABRICATION PIPELINE IMPLEMENTATION

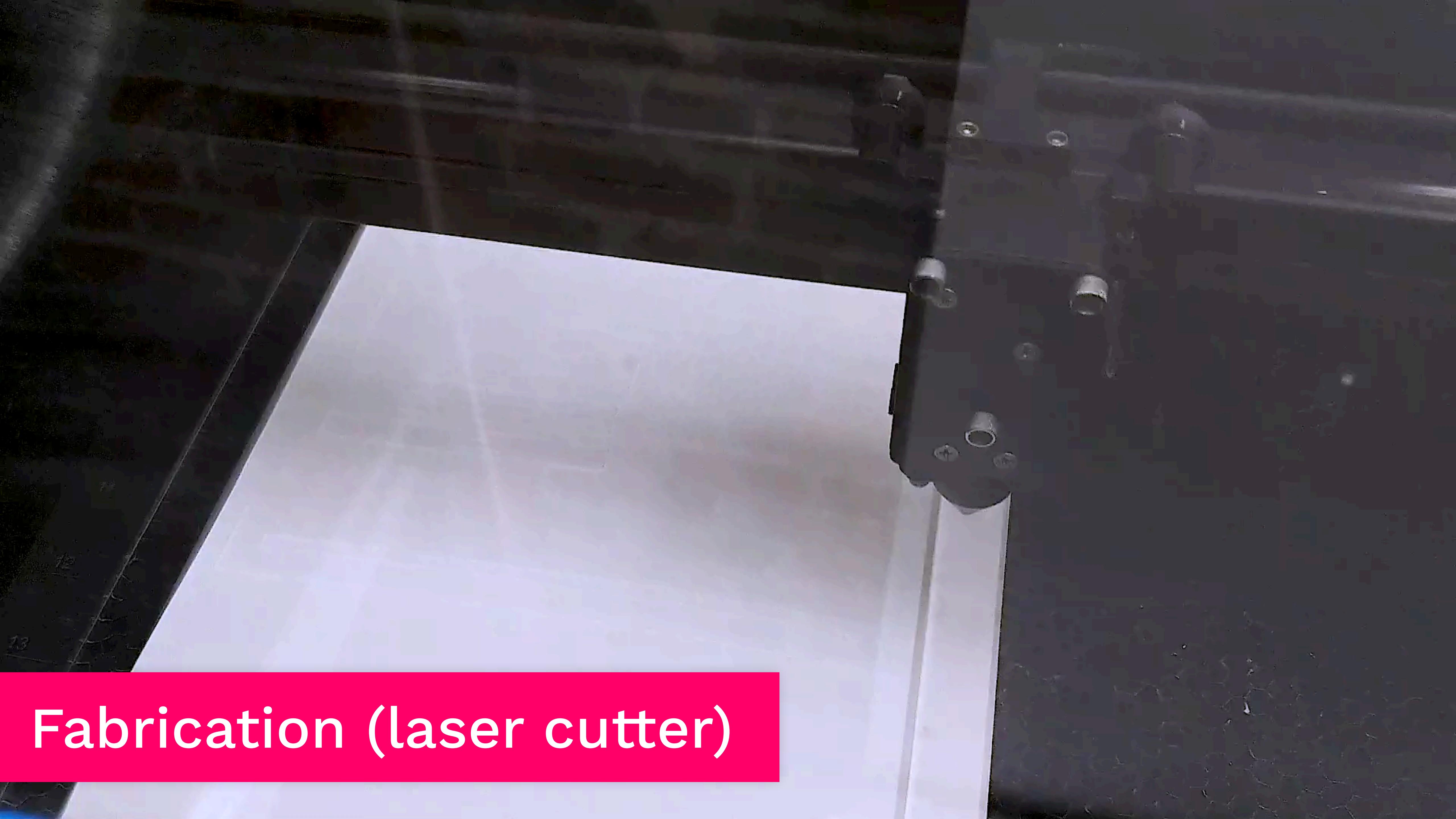




Fabrication (swell paper)



source: American Thermoform

A close-up photograph of a laser cutter's cutting head. The head is black and mounted on a vertical white support arm. It is positioned over a dark, textured surface, likely a workpiece being cut. The background is dark and out of focus.

Fabrication (laser cutter)

A close-up photograph showing a person's hands interacting with a tablet computer. The tablet has a black frame and is held at an angle. The person's left hand is gripping the left side of the tablet, while their right index finger is pointing towards the center of the screen. In the background, a portion of a white keyboard is visible on a light-colored surface.

Exploring a layout

[select](#)[back](#)[next](#)[edit mode: off](#)[print \(pixel\)](#)[cancel](#)

HOME

GENERIC

ELEMENTS

Hi, I'm Ben.

Enter information about yourself here.

[CONTACT ME](#)

600 x 300

600 x 300

600 x 300

Project 1

Project description goes here

[MORE DETAILS](#)

Project 2

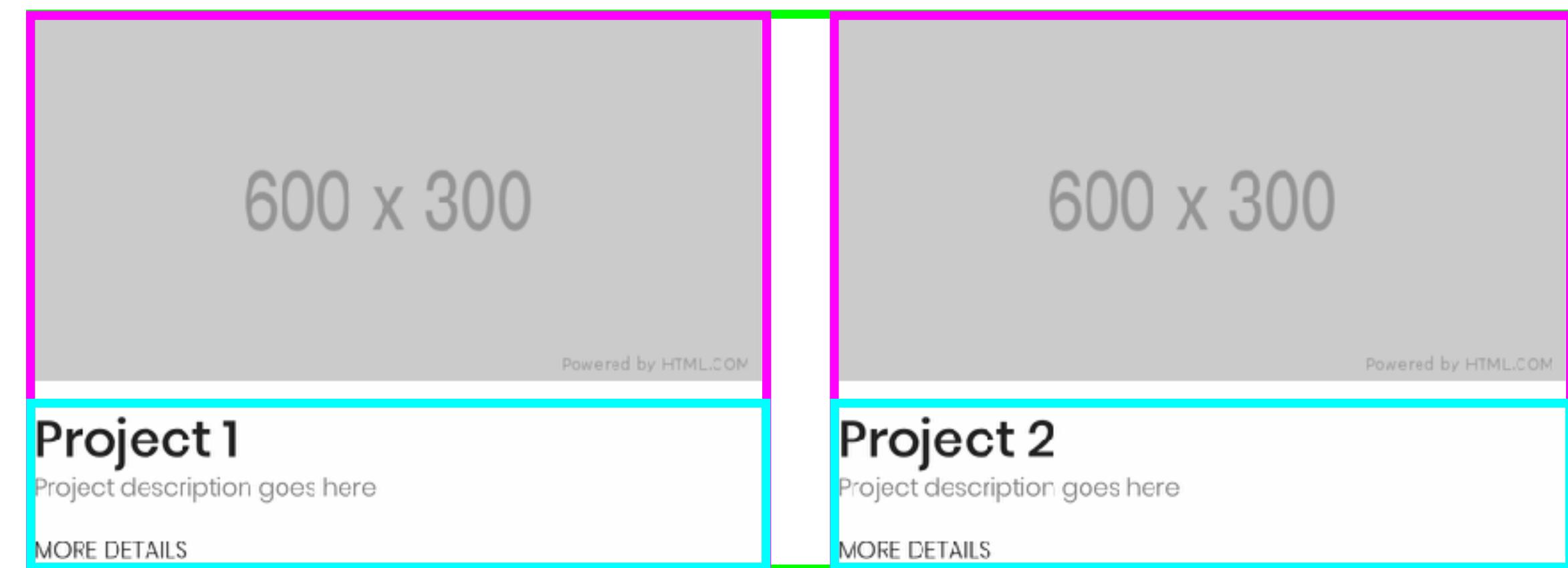
Project description goes here

[MORE DETAILS](#)

Project 1

Project description goes here

[MORE DETAILS](#)



Pixel Representation

Two project cards are shown side-by-side. Each card has a gray background with a pink border. Inside each border is a light gray rectangle labeled "600 x 300". Below each light gray rectangle is the text "Powered by HTML.COM". Underneath each light gray rectangle is a red header bar containing the project name and a "MORE DETAILS" button.

Project 1
Project description goes here
[MORE DETAILS](#)

Project 2
Project description goes here
[MORE DETAILS](#)

The container representation shows the hierarchical structure of the website. The top level is a dark teal header with a red navigation bar containing "HOME", "GENERIC", and "ELEMENTS". Below the header is a dark teal section with a green dashed border. This section contains a photo of a man in a striped shirt and a red contact form with the text "Hi, I'm Ben.", a placeholder for "Enter information about yourself here.", and a "CONTACT ME" button. Below this is a white section with two red-bordered boxes, each containing a "600 x 300" placeholder and the text "Powered by HTML.COM". At the bottom is a red footer bar with the text "Container Representation".

Hi, I'm Ben.
Enter information about yourself here.
[CONTACT ME](#)

Project 1
Project description goes here
[MORE DETAILS](#)

Project 2
Project description goes here
[MORE DETAILS](#)

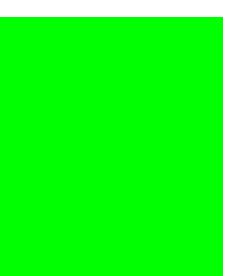
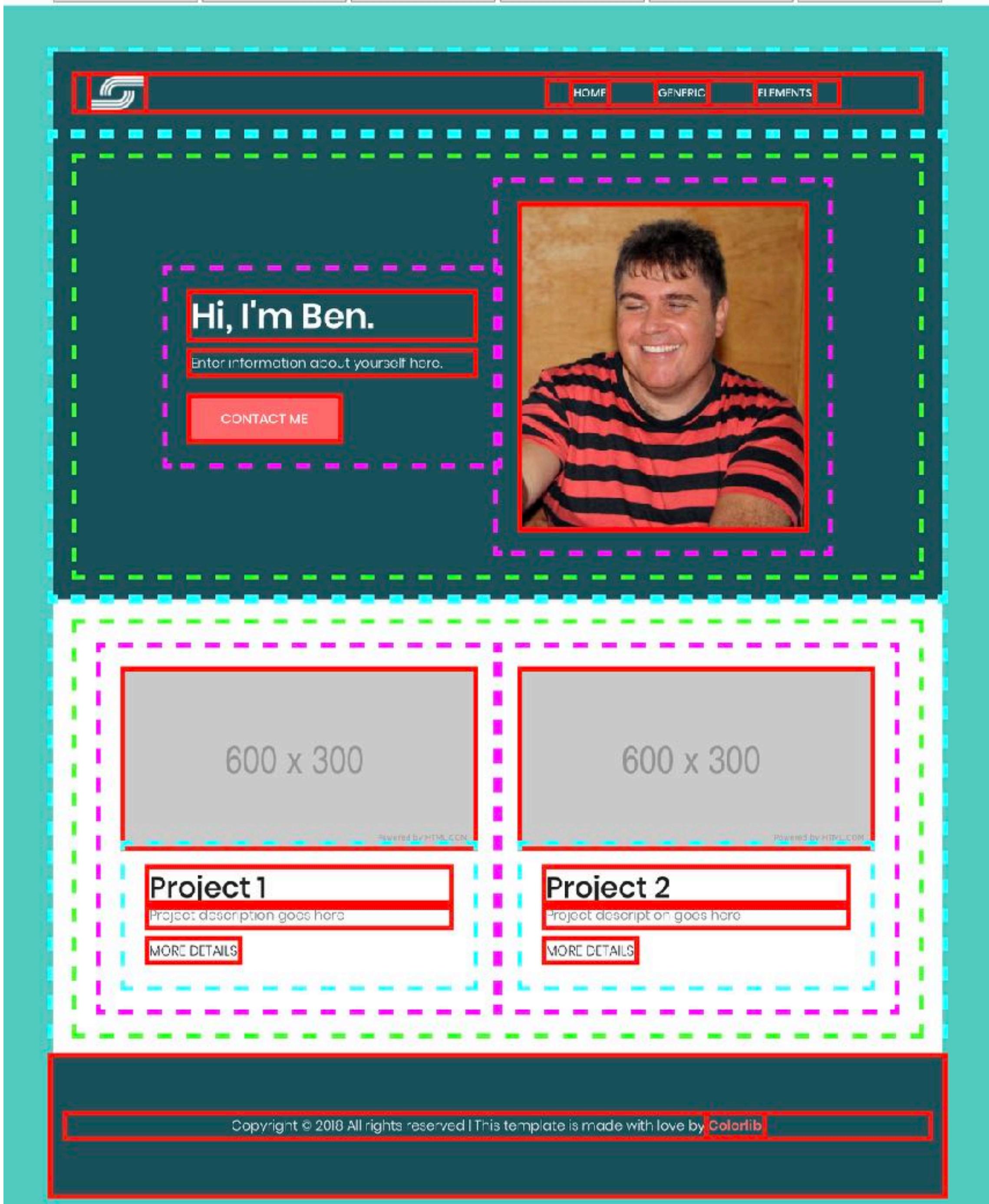
Container Representation

[select](#)[back](#)[next](#)

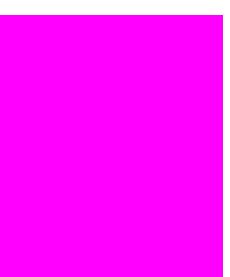
edit mode: off

print (inflated)

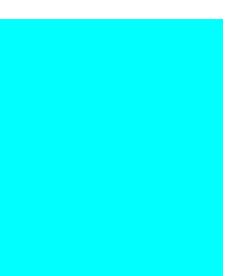
cancel



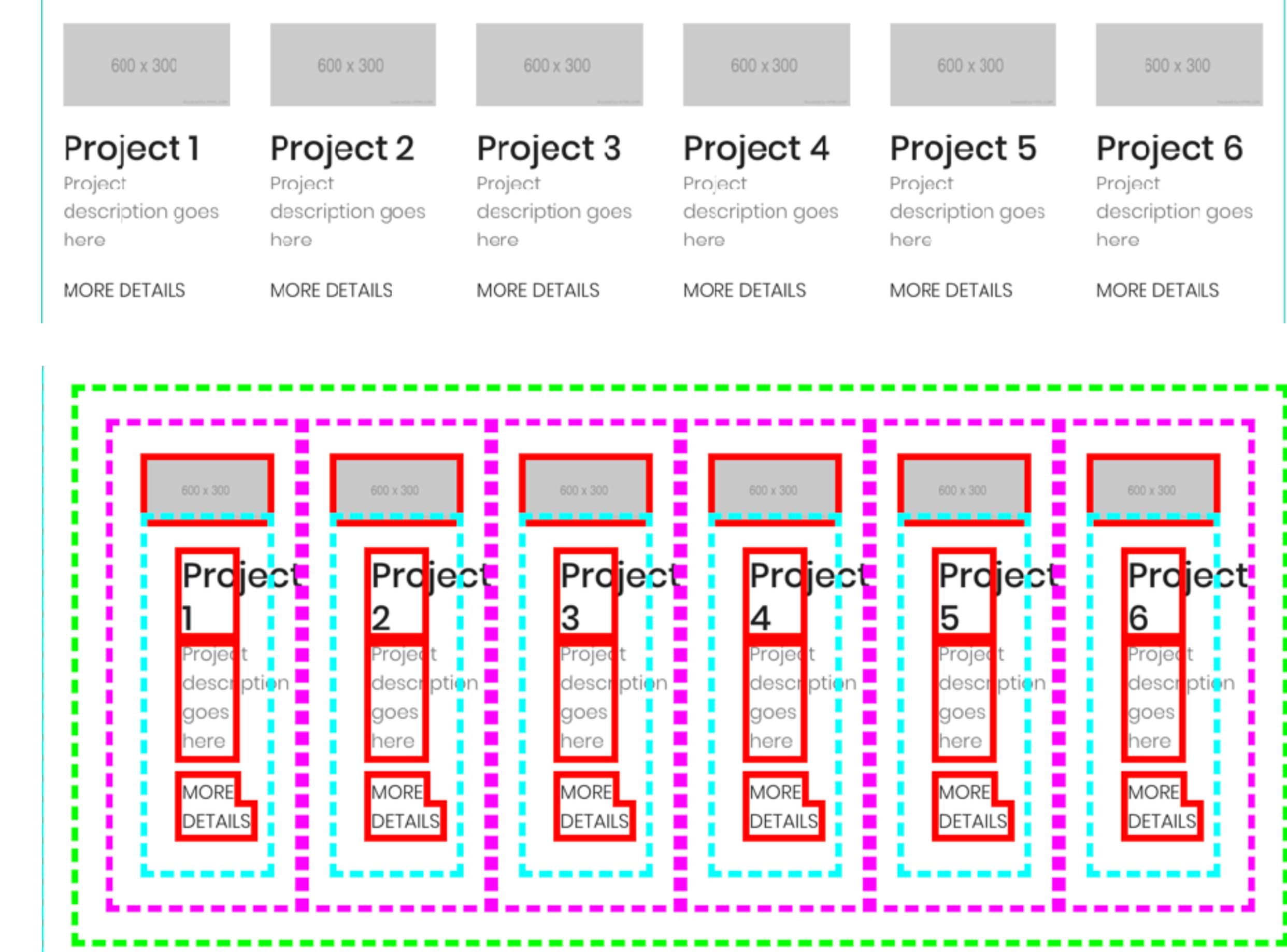
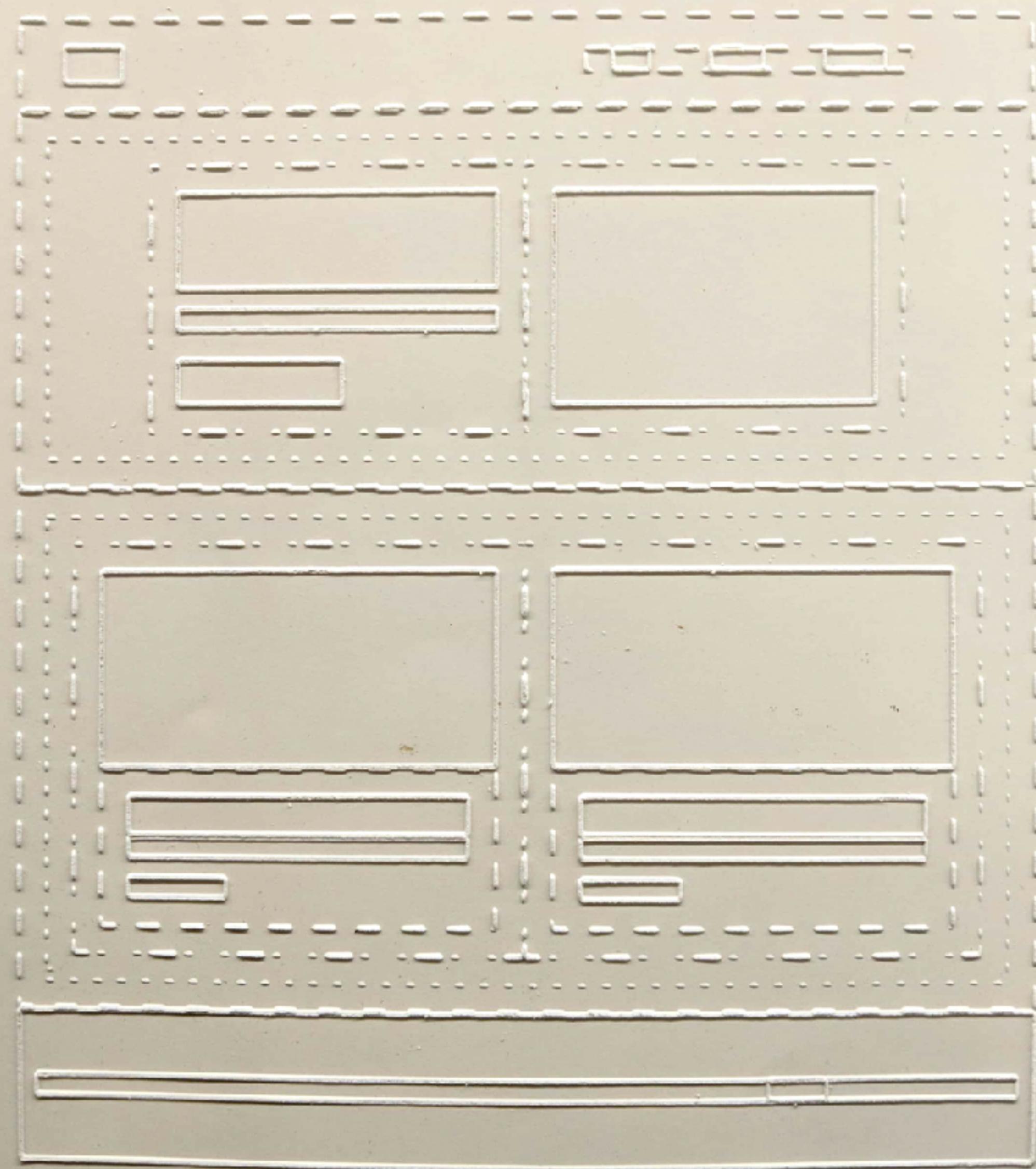
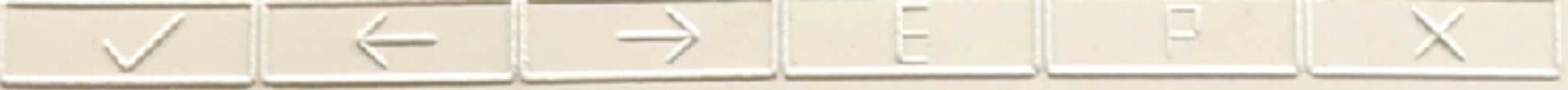
Row group



Column group



Other containers

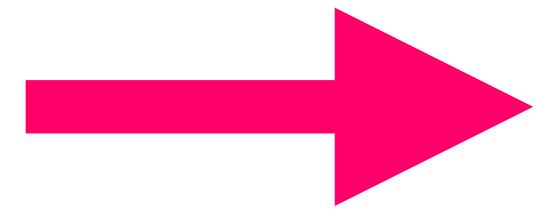


A close-up photograph of a person's hand holding a black tablet device. The screen displays a grid of small, colorful squares, likely a game or a visual representation of data. The person is wearing a white shirt and a brown jacket. A portion of a grey couch is visible at the bottom.

Selecting column to copy

A close-up photograph of a person's hand pointing their index finger towards the center of a smartphone screen. The phone is held horizontally and displays a light-colored grid or table structure. The background is a textured, light-colored surface.

Duplicating a column



select back next edit mode: on print [inflated] cancel

HOME GENERIC ELEMENTS

Hi, I'm Ben.

Enter information about yourself here.

CONTACT ME



600 x 300

Project 1

Project 1 description goes here

MORE DETAILS

600 x 300

Project 2

Project 2 description goes here

MORE DETAILS

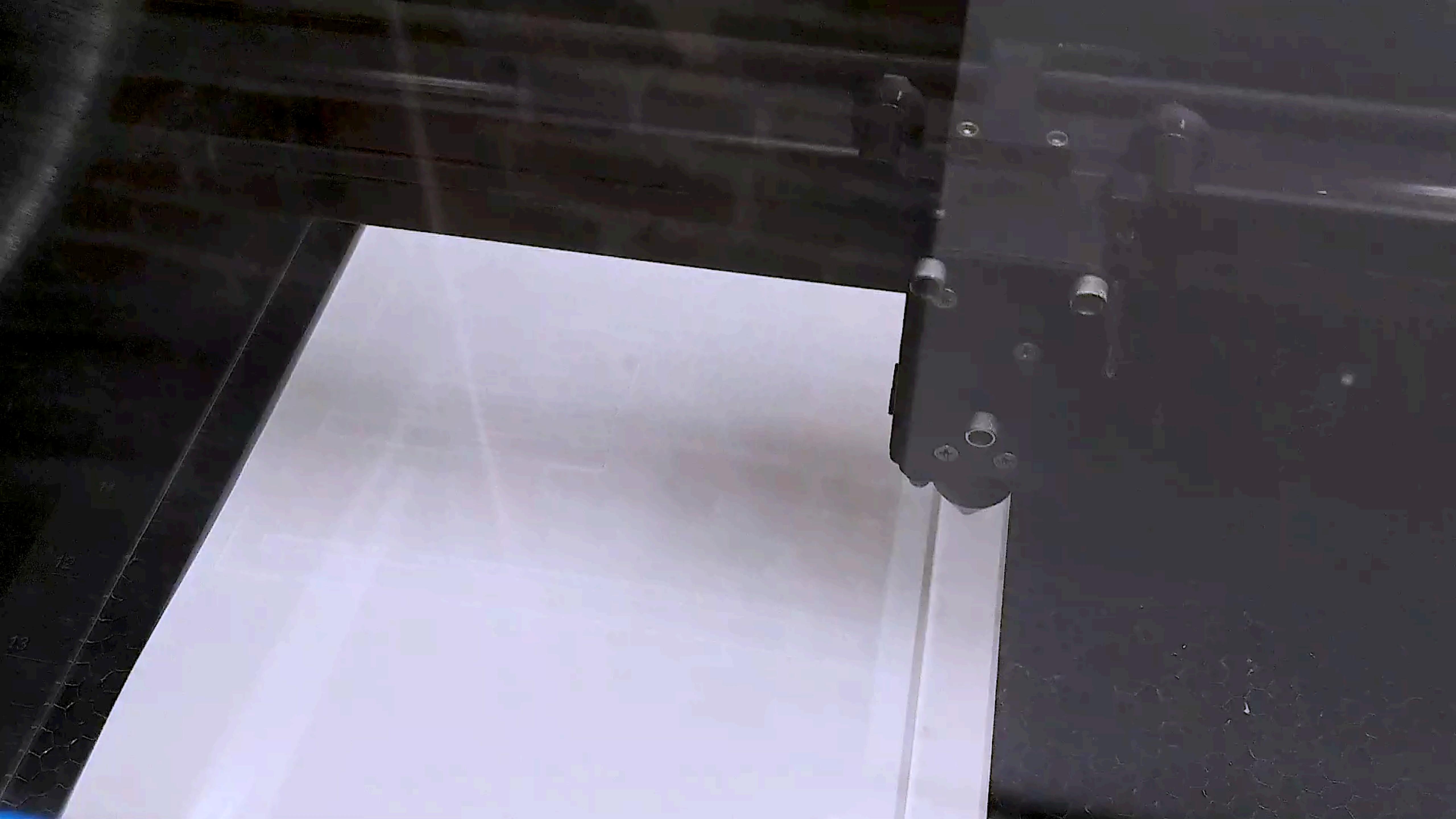
600 x 300

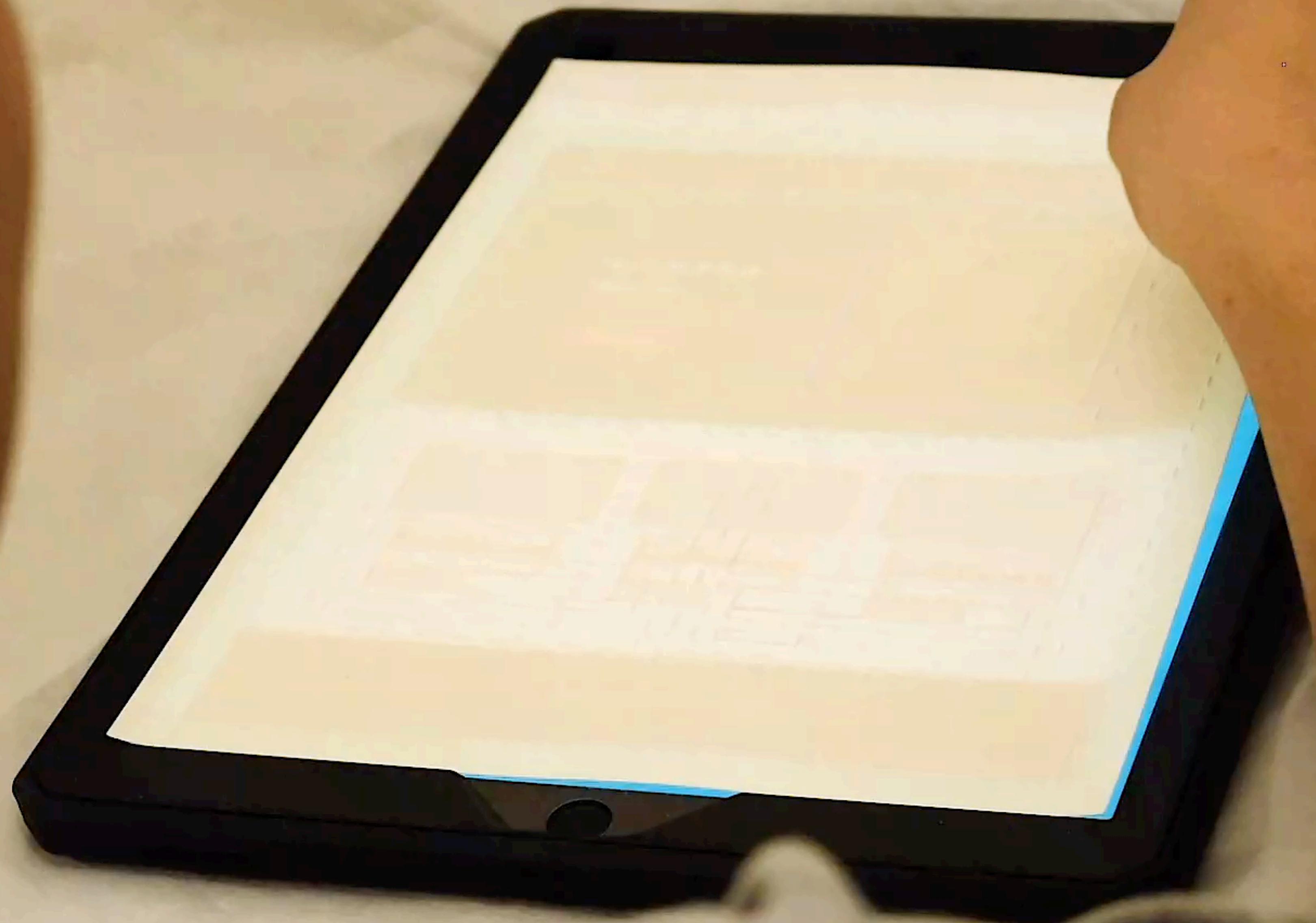
Project 1

Project 1 description goes here

MORE DETAILS

Copyright © 2018 All rights reserved | This template is made with love by Colontib

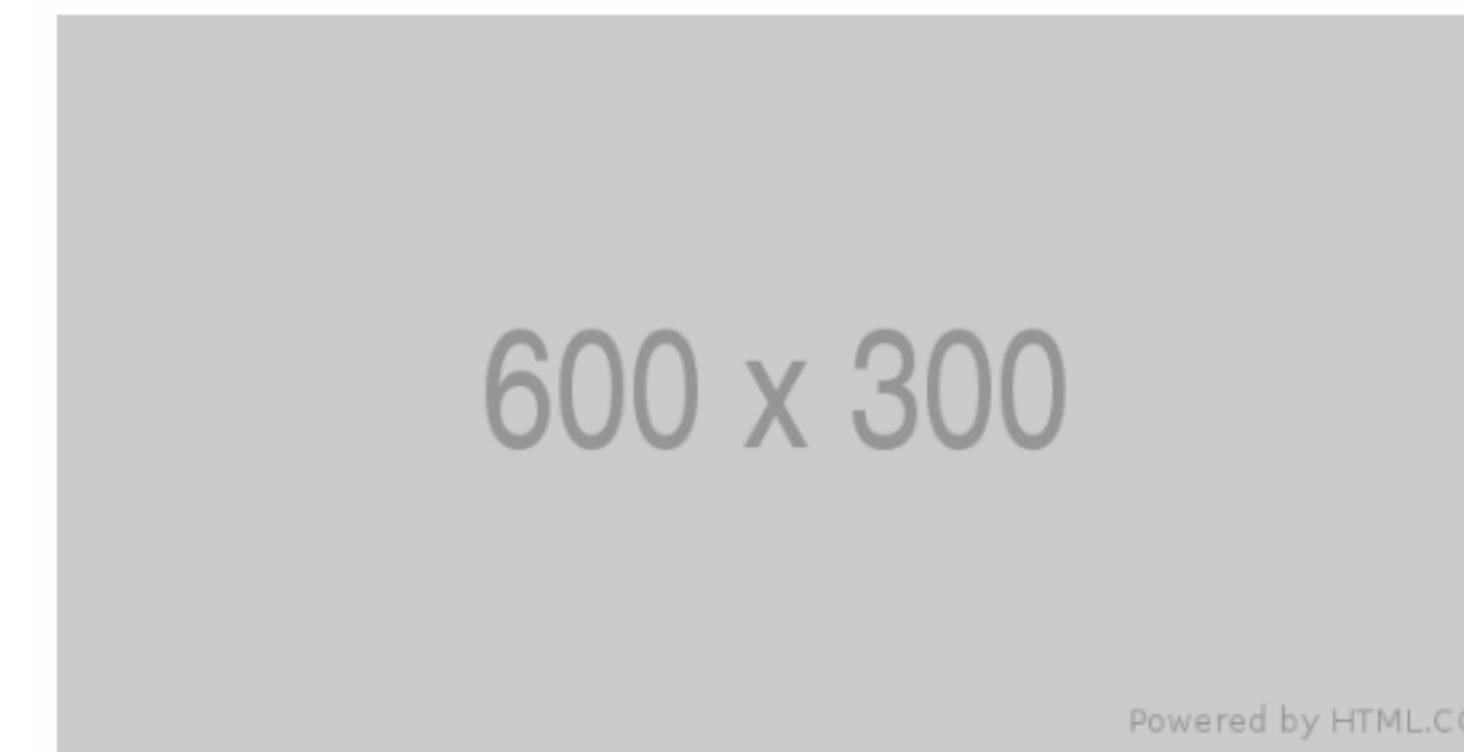




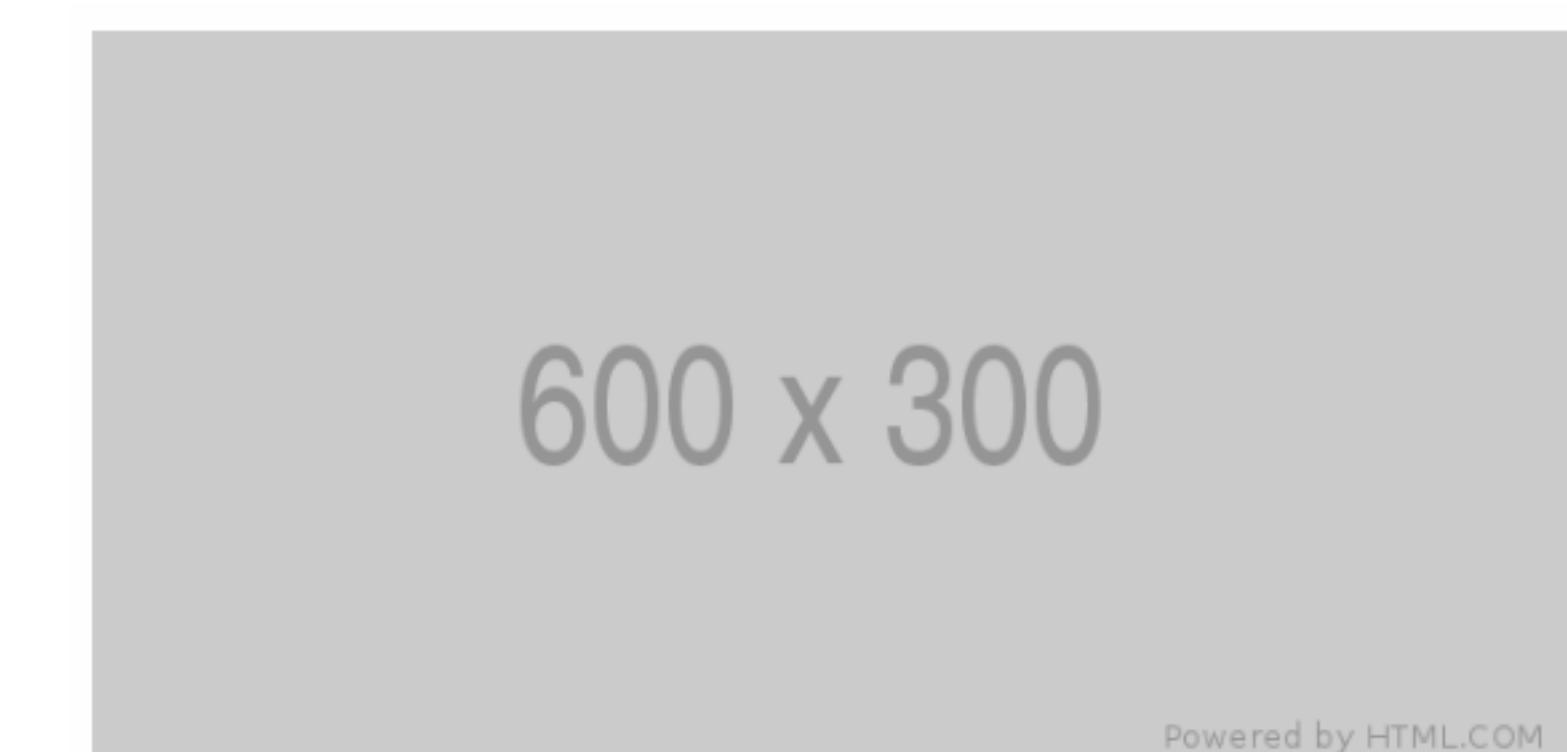
SMALL DESIGN MULTIPLES



Powered by HTML.COM



Powered by HTML.COM



Powered by HTML.COM

Project 1

Project description goes here

MORE DETAILS

Project 1

Project description goes here

MORE DETAILS

Project 1

Project description goes here

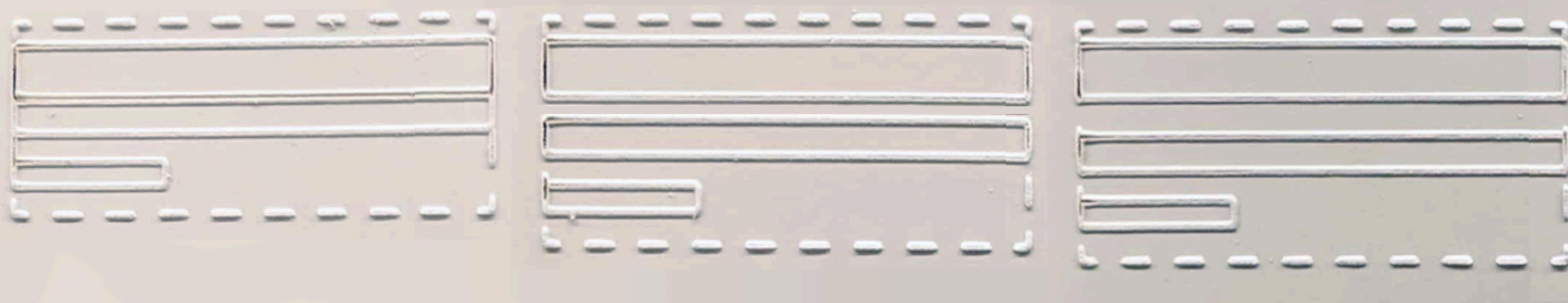
MORE DETAILS

SMALL DESIGN MULTIPLES

600 x 300

600 x 300

600 x 300



SUPPORTED EDITING OPERATIONS

- Filling in text, images, videos
- Resizing & aligning elements
- Duplicating, deleting & swapping elements
- Copying & reusing element styles
- Changing padding/margin

Discussion





Rising Blind – rising above Blindness to Independence

Welcome to rising Blind, where we believe that going blind is not the end of life.

Blindness is a condition that is feared more than many deadly diseases. According to the [National Institute of Health](#), losing eyesight is feared more than cancer, heart attacks, and severe mental illness. An article at [WebMD](#), goes on to say that Americans fear losing eyesight more than loss of hearing, speech, or even a limb. Research!America, conducted a nationwide poll found that Americans overwhelmingly associates vision loss as a vital threat to their quality of life and independence.

Here at rising Blind, living with blindness is a daily routine. Loss of vision presents little to no barriers on our daily tasks, needs, and quality of living. Through our experience and expertise, our passion is to guide and assist individuals suffering from recent loss of vision to adapt and embrace their new lifestyle.

Through our stories, resources, guides, tips and tricks, Rising Blind provides positive direction for any individual feeling lost to find their way back to comfort and confidence. We understand that living a quality life as an individual with a visual impairment may seem daunting, but through information, education, and training, a brighter future awaits.



LIMITATIONS → FUTURE WORK

- Does this tool enable design independence? → Formal evaluation
- Low refresh rate → Cost/interactivity trade-off
- Accessible layouts without tactile templates → Manipulating screen reading order of elements

imperative

BUILD TOOLS THAT AMPLIFY DISABLED EXPERTISE

Website Name

Home About Services Contact

Website Title

700 x 200

Powered by HTML.COM

700 x 200

Powered by HTML.COM

700 x 200

Powered by HTML.COM

Project One

Project text here.

[View Project](#)

Project Two

Project text here.

[View Project](#)

Project Three

Project text here.

[View Project](#)

Footer text

BUILD TOOLS THAT AMPLIFY DISABLED EXPERTISE

Website Name

Home About Services Contact

Website Title

Project One

Project text here.

[View Project](#)



700 x 200

Powered by HTML.COM

Project Two

Project text here.

[View Project](#)



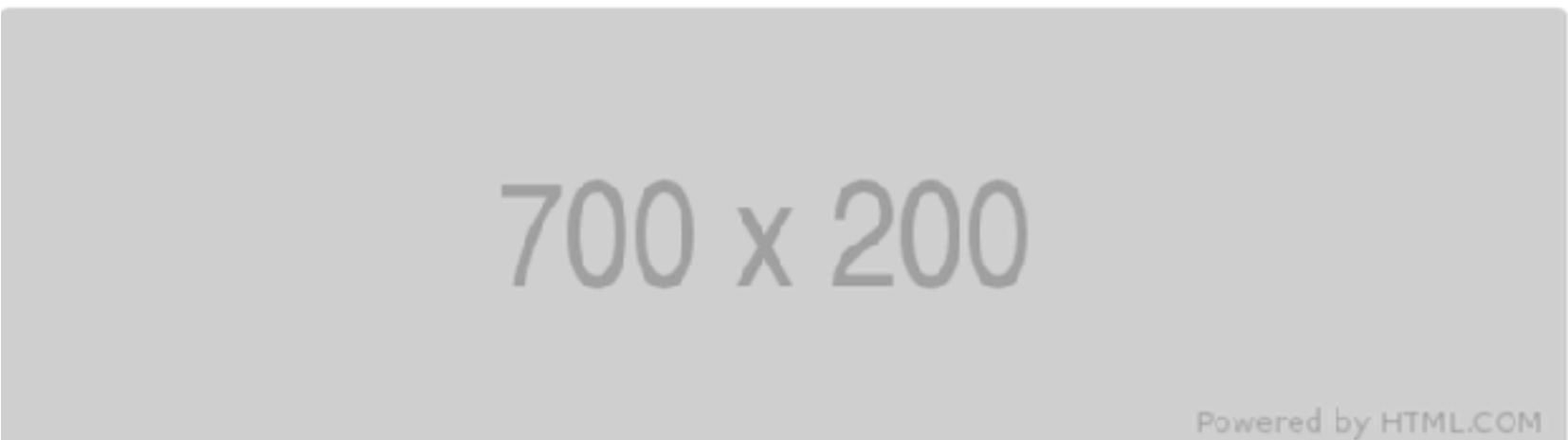
700 x 200

Powered by HTML.COM

Project Three

Project text here.

[View Project](#)



700 x 200

Powered by HTML.COM

Editing Spatial Layouts with Tactile Templates

Jingyi Li • Son Kim • Joshua A. Miele
Maneesh Agrawala • Sean Follmer

jingyili@cs.stanford.edu
[@jingyitweets](https://twitter.com/jingyitweets)