

# DOCUMENTATION

## The Electric Lightbulb

GitHub repository: [https://github.com/Patrick-Martins/LightBulb\\_Animation](https://github.com/Patrick-Martins/LightBulb_Animation)

Final product: [http://pimelite.dk/KEA\\_3Semester/Squad\\_AnimationProject/](http://pimelite.dk/KEA_3Semester/Squad_AnimationProject/)

### SQUAD

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## **Introduction (description of the project)**

The Danish Museum of Science & Technology is planning an exhibition of inventions that changed the world. Our project was to create an infoscreen as part of that exhibition.

When it comes to the topic , we have chosen Thomas Edison's electric light bulb and visualised it as you would be in a room only seeing an old desk with Edison's lamp on the table, a couple of books and an open book with some diagrams, all representing the idea that you are in 1879 , the time that Edison invented his light bulb.

The open book on the table is pulsating and invites you to push in order to go to the next scene "inside the book". A modal opens and you visualize history from the when people used candles and gas lamps, a timeline of inventions that helped pave the way for Edison to achieve his lightbulb, followed by his process and a little game where you need to help him find the best filament, after we find information about technological advancements following the lightbulb.

At the end of the modal when you click the last next button and you close the "book"(modal), you won't have the same setup as before in 1879, instead you have a laptop and a smartphone and the whole room zooms out from the table revealing all the appliances of the modern era. The open book that you clicked in the beginning was a time machine that transported you in the modern world with all the appliances.

## **Research**

### **1. History of the lightbulb<sup>1 2 3 4</sup>**

The story of the light bulb begins long before Edison patented the first commercially successful bulb in 1879.

### **2. Process of the invention**

In the years 1878-1880, Edison and his associates worked seriously to develop the light bulb. They worked on at least 3000 different theories for developing an efficient incandescent lamp.

Incandescent lamps make light by using electricity to heat a thin strip of material, called filament, until it gets hot enough to glow.

By 1879 Edison managed to create his first electric light, which burned for a few short hours.

In order to improve the bulb, Edison tested over 6000 material for the filament!

Edison discovered that when using bamboo as the filament, the bulb could burn for 1200 hours!

The bamboo became the standard filament for the next 10 years.<sup>5</sup>

### **3. Impact of the invention**

The 24 hours working time was possible since the light bulb became more popular and we became less dependent on the time of the day.

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<sup>1</sup> <https://www.bulbs.com/learning/history.aspx>

<sup>2</sup>

<https://power2switch.com/blog/how-electricity-grew-up-a-brief-history-of-the-electrical-grid/index.html>

<sup>3</sup> <https://www.bulbs.com/learning/history.aspx>

<sup>4</sup> <https://www.delmarfans.com/educate/basics/who-invented-light-bulbs/>

<sup>5</sup> <https://www.fi.edu/history-resources/edisons-lightbulb>

The increase of the working hours had a huge impact in the economy since more working time meant more productivity for companies and more money flowing in the economy.

Increased luminescence in the workplace helped make it easier for laborers to see potential workplace hazards, thus preventing accidents and making workplaces safer.

Candles and oil-based lamps were dangerous fire hazards, leading to many yearly deaths. The light bulb made for a safer nighttime home environment.

Many people found that increased nighttime luminosity made it possible to enjoy leisure activities late into the night.<sup>6</sup>

#### **4. Technological impact**

The invention of the lightbulb led to new energy breakthroughs - from power plants and electric transmission lines to home appliances. In 1882 the world's first coal-fired public power station, the Edison Electric Light Station, was built in London.<sup>7 8</sup>

The invention of the light bulb made it possible to enjoy leisure activities in our homes today, such as watching tv, playing video games or chilling with our laptops.<sup>9</sup>

#### **Design Process (sketches, wireframes, style tile)**

Before the design process we collected pictures to get some inspiration and after that conducted the "crazy eights" sketching exercise from Google's Design Sprint method but we did not do the whole sprint. After that we explained and

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<https://prezi.com/mvi4kaqrz27j/the-invention-of-the-light-bulb-and-why-it-changed-the-world/>

<sup>7</sup> [https://en.wikipedia.org/wiki/Power\\_station](https://en.wikipedia.org/wiki/Power_station)

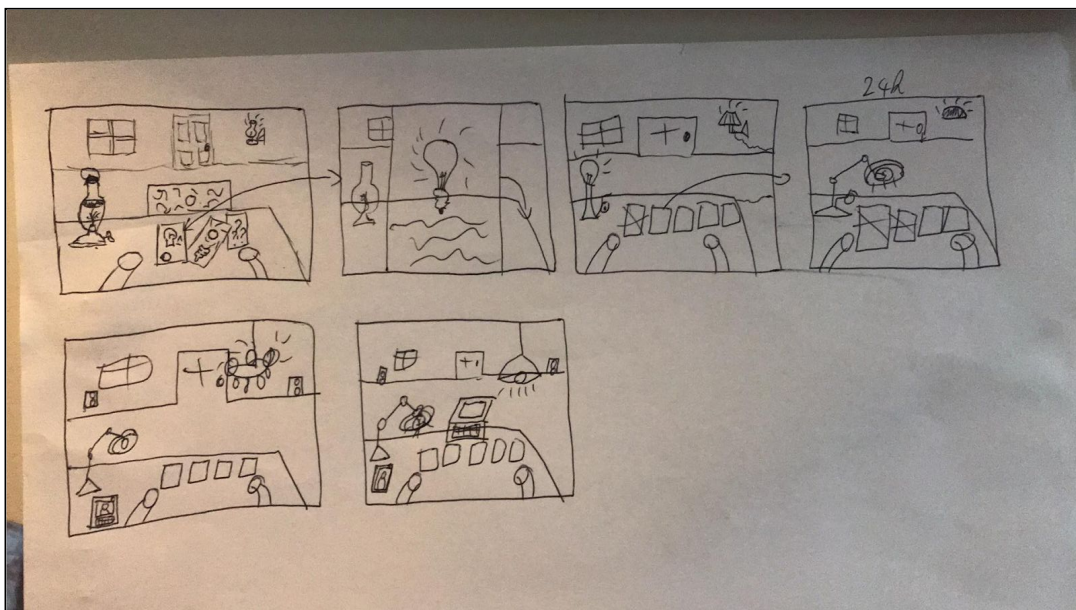
<sup>8</sup> <https://edisontechcenter.org/HistElectPowTrans.html>

<sup>9</sup> [https://prezi.com/ug7\\_pkzeggy1/the-light-bulbs-impact-on-society/](https://prezi.com/ug7_pkzeggy1/the-light-bulbs-impact-on-society/)

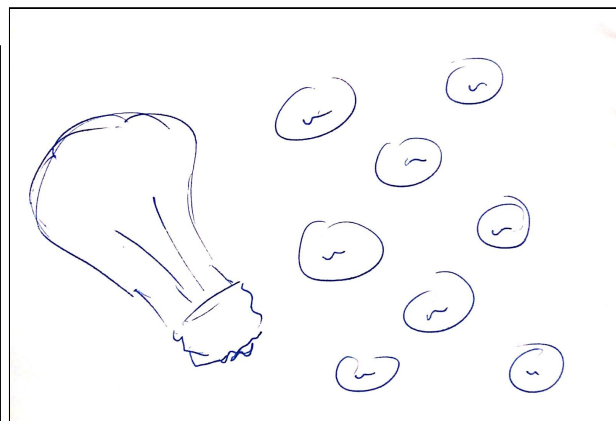
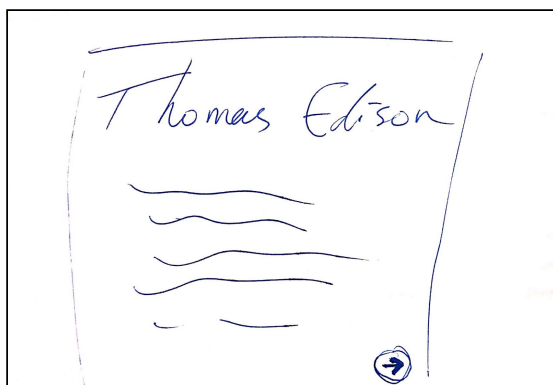
discussed each of our sketches and agreed on what we will choose to draw in the wireframes.

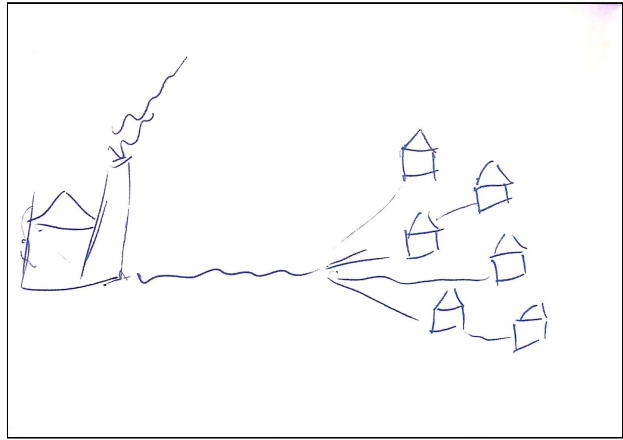
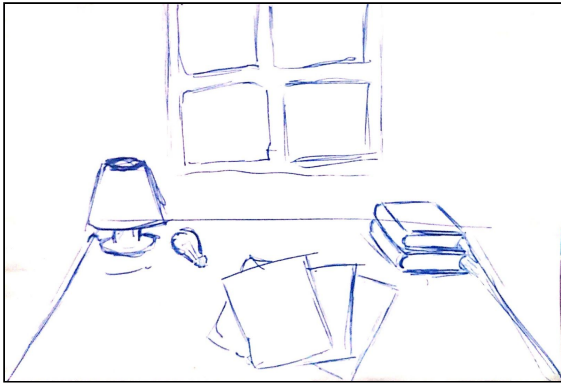
We chose this specific style in order to immerse the viewer in our world by finding him or herself surrounded by all the elements of a physical room from 1800's and convey information in a more friendly and cartoonish way to make it appealing for both children and adults as an interactive story, to be able to receive the information more actively.

1.Sketch

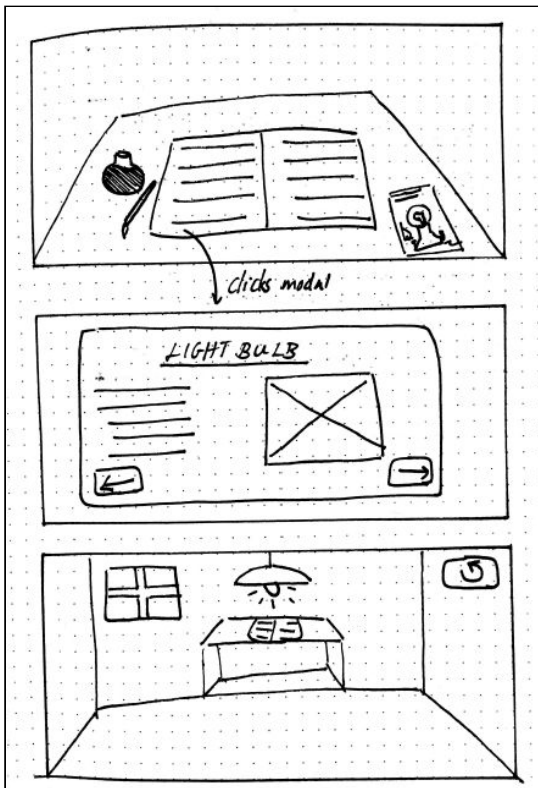


2.Sketch

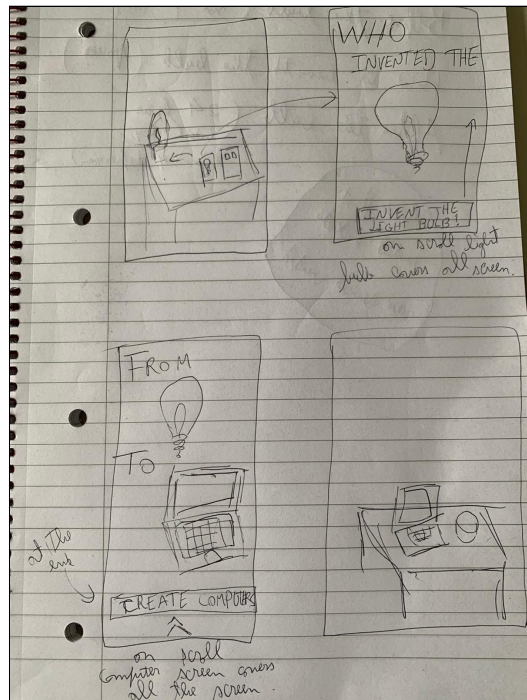




3. Sketch

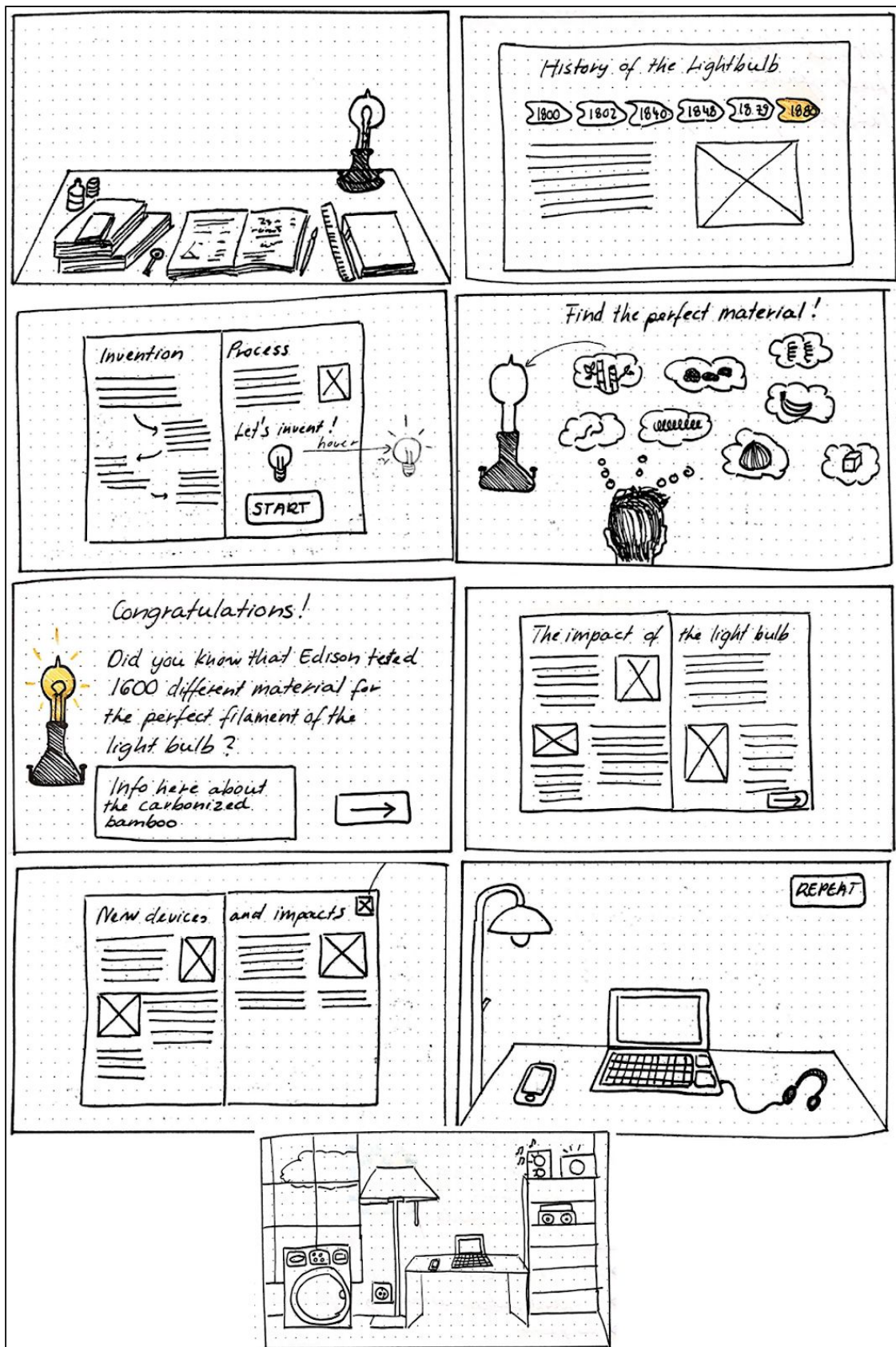


4. Sketch





## Wireframes



## Style Tile

In this project we aimed for a classic style that matches the tone and the spirit of the 19th century. In the terms of colours we got inspired by a picture of Thomas Edison's actual room. In terms of font we choose *Georgia* because it's a serif font which goes well with the century our inventor lived in.


### The Electric Lightbulb

**Font: Georgia, Bold**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Quis ipsum suspendisse ultrices gravida. Risus commodo viverra maecenas accumsan

**Font: Georgia, Regular**

**Backup Font**

.. 

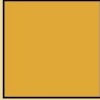


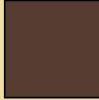

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**Font: Times New Roman, Regular**



### Style Tile

Version 1.

### Main colors



**Buttons**



**Insightful** *Solid*  
*Interactive* **Conservative**



## JSON-file object structure

```
{ } content.json > ...
1  [
2    {
3      "context": "timeline-intro"
4    },
5    {
6      "context": "timeline"
7    },
8    {
9      "context": "process-intro"
10   },
11   {
12     "context": "process-curiosity"
13   },
14   {
15     "context": "process-conclusion"
16   },
17   {
18     "context": "filament-game"
19   },
20   {
21     "context": "congratulations-message"
22   },
23   {
24     "context": "work-impact"
25   },
26   {
27     "context": "lifestyle-impact"
28   },
29   {
30     "context": "technology"
31   },
32   {
33     "context": "last-scene"
34   }
35 ]
36
```

### JSON for the scenes

This JSON file is stored in an array called "contentArray". It contains the names that correspond to the classes of each template that we want to be displayed for each different scene. So each time the user clicks the next button, for example, there is an increment of the counter which moves to the next element of the contentArray and displays the content of that specific template.

```

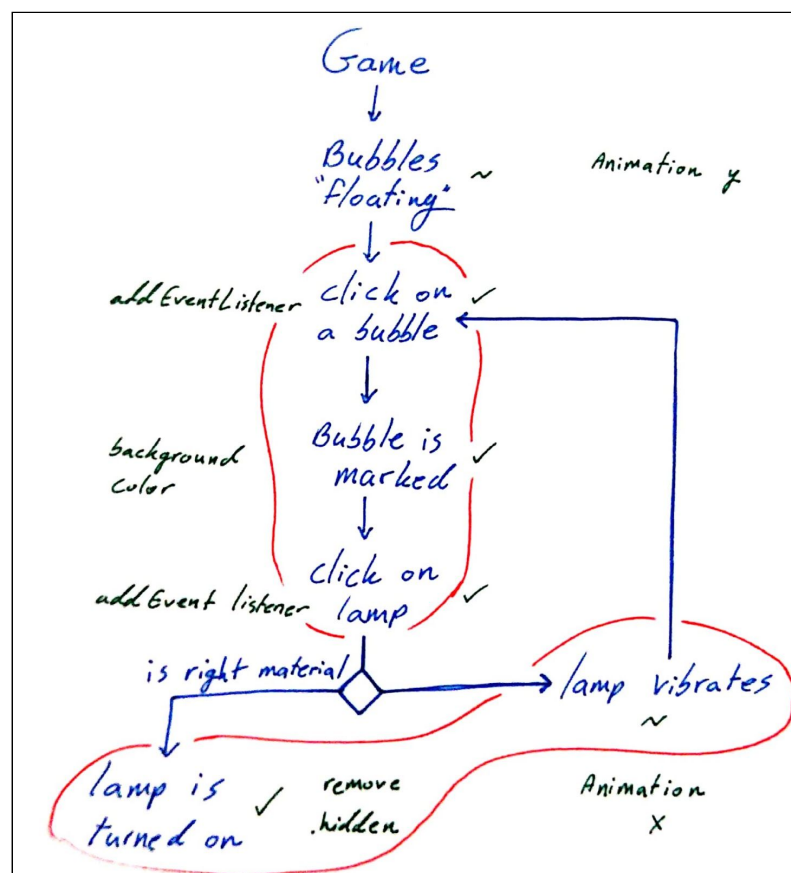
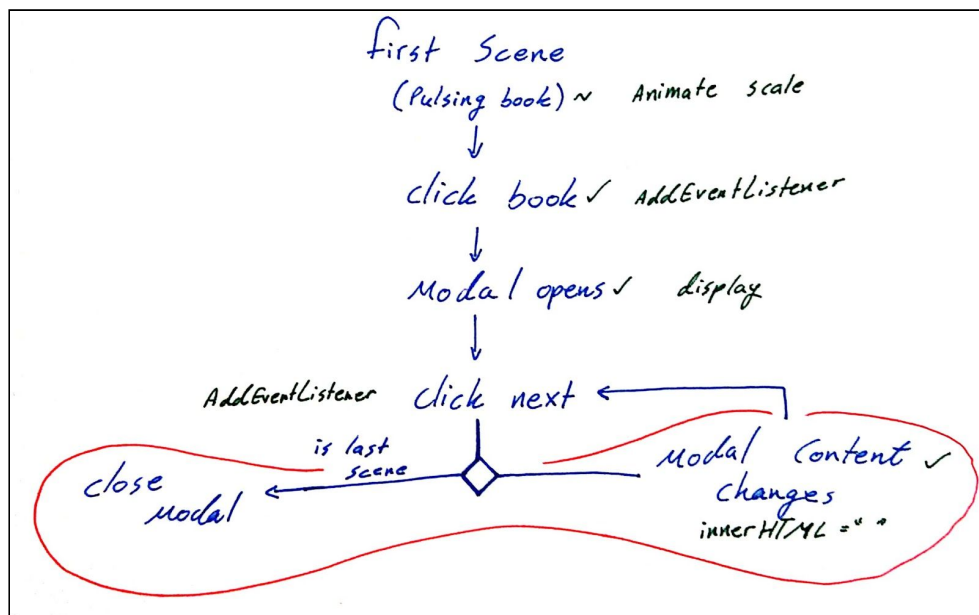
static > {} timeline.json > ...
1  [
2    {
3      "yearID": "year1800",
4      "image": " voltaic-pile.svg",
5      "text": " In 1800, Italian inventor Alessandro Volta developed the first practical method of generating e
6    },
7    {
8      "yearID": "year1802",
9      "image": " arch-lamp.svg ",
10     "text": " In 1802 Humphry Davy, an English chemist and inventor, produced the world's first electric lamp
11   },
12   {
13     "yearID": "year1840",
14     "text": " In 1840, British scientist Warren de la Rue developed an efficiently designed light bulb using
15     "image": "warren.svg"
16   },
17   {
18     "yearID": "year1848",
19     "text": " In 1848, Englishman William Staite improved the duration of conventional arc lamps by developin
20     "image": "staite.svg"
21   },

```

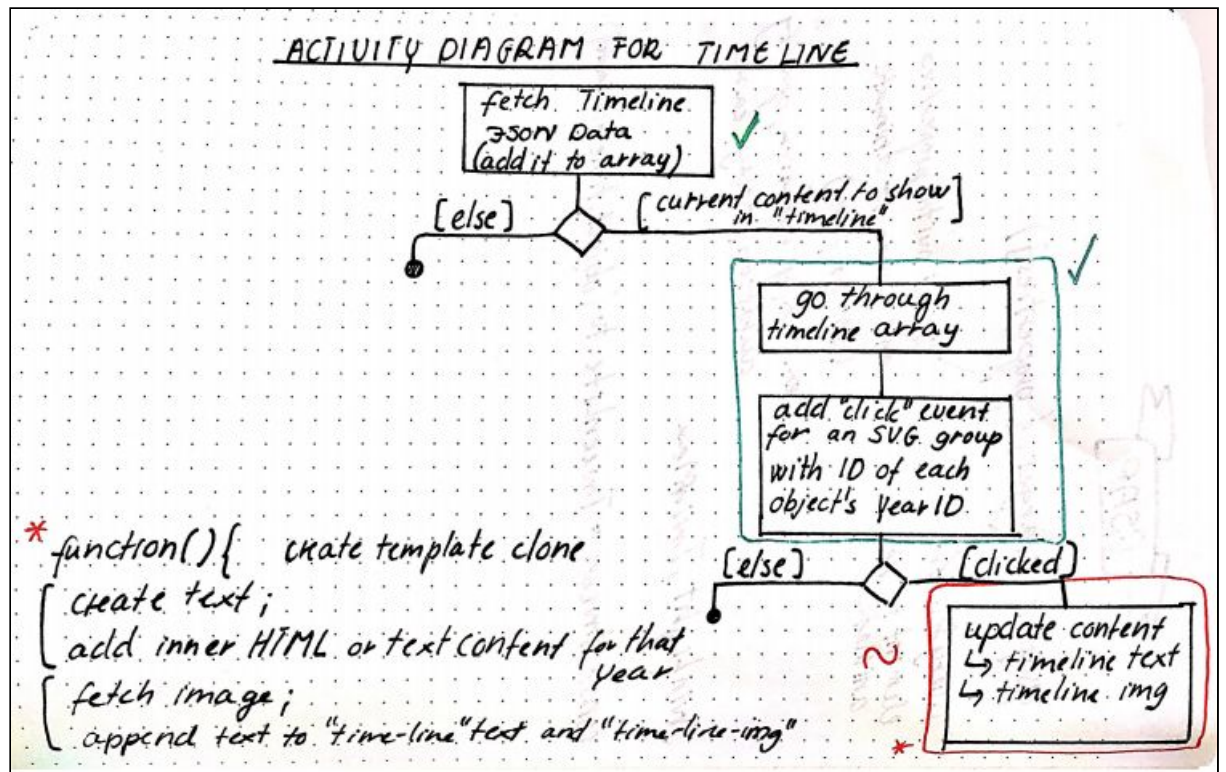
## JSON for the Timeline

When the user arrives at the timeline scene, a fetching of the Timeline.JSON data occurs. This JSON file contains information about the id of each SVG group element from the timeline SVG, which represents each year container that can be clicked. It also has information about the text that should show up about a specific year and the image that should be fetched and displayed as well.

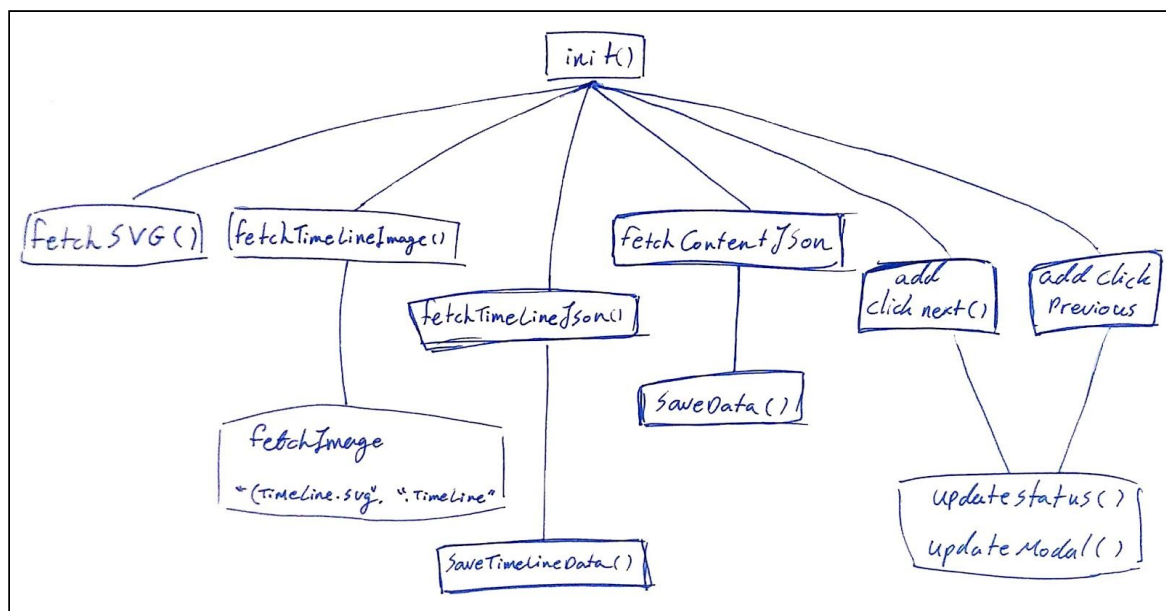
## Activity Diagram (for the interactive part)



## Activity Diagram (for the Timeline scene)



## Call-graph for the JS code



## Javascript modules

We didn't implement any Javascript modules in our project apart from GSAP, because we didn't have the necessity to do it. However, after finishing our product, we came to realize that its implementation would be convenient for simplifying our code and make it more understandable.

## Asset list

From the beginning of the project we created every part of the product in Adobe Illustrator. By drawing all the SVGs we got more control when it came to the phase of animating them.

