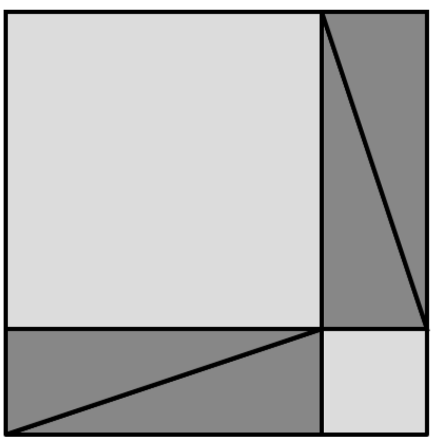
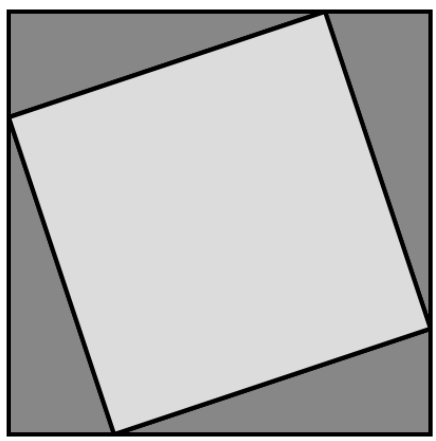
Storyboards of Major Themes

- Pythagorean Theorem
- Perfect Squares
- Pi
- Fibonacci Sequence
- Prime Numbers

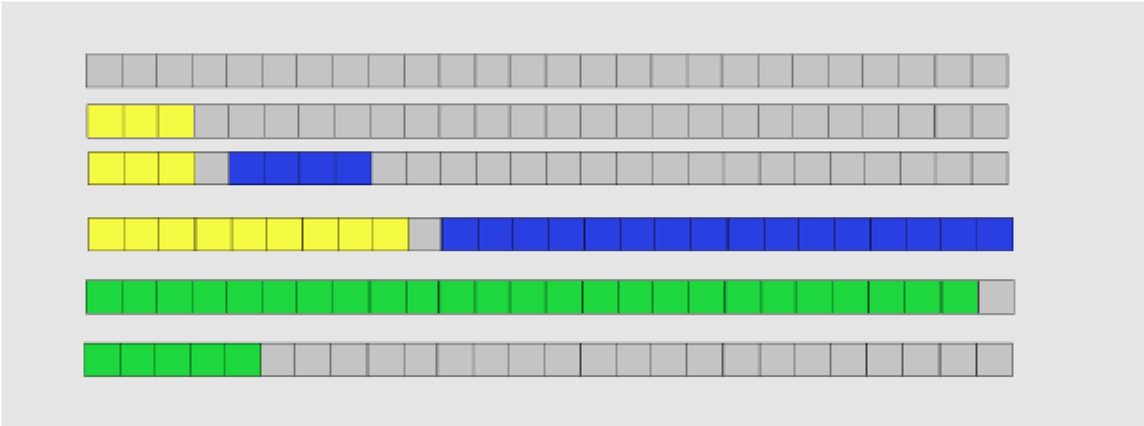
Pythagorean Theorem (Visual Research)





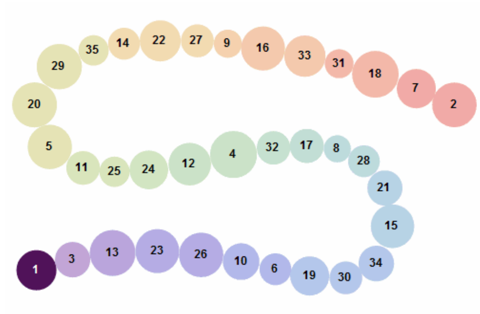
Pythagorean Theorem (Storyboard)

We can show examples of the equation at work. We can use two primary colors and the quantity of light panels in order to demonstrate.

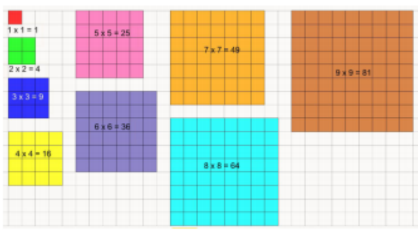


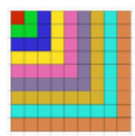
The first panel would be white light, next we would light up three panels in a primary color, afterwards we would light up the next panels in another primary color. We would then square the two numbers for the amount of panels and add the colors together. We would then square root the number of panels. The storyboard above represents 3^2 + 4^2 = 5^2

Perfect Squares (Visual Research)



[Consecutive numbers are perfect squares]





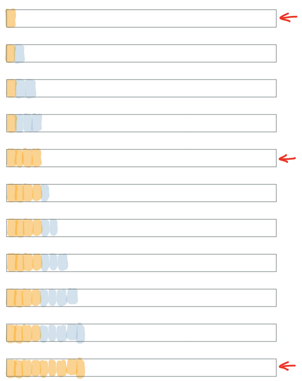
Diagonal formed by combining actual squares, also relating the numeric squares to geometric squares

×	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
12	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260
14	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280
15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

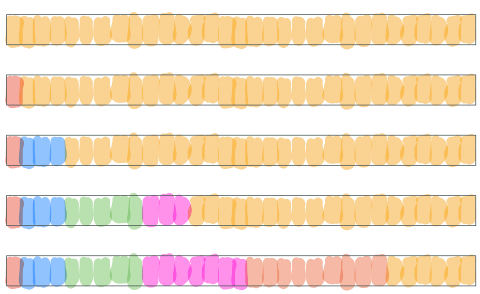
Same diagonal, but on a multiplication table

Perfect Squares (Storyboard)

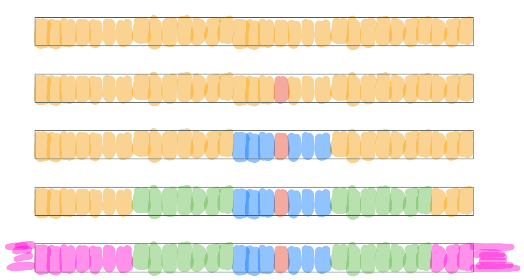
1. We start by lighting up the panels one by one from the left. Regular numbered panels are highlighted with a neutral blue color. Once we hit a square number of panels (red arrows in image), then all panels turn orange.



2. Once all the panels are highlighted, we start from the left again, and emphasize each of the perfect squares with bright colors.

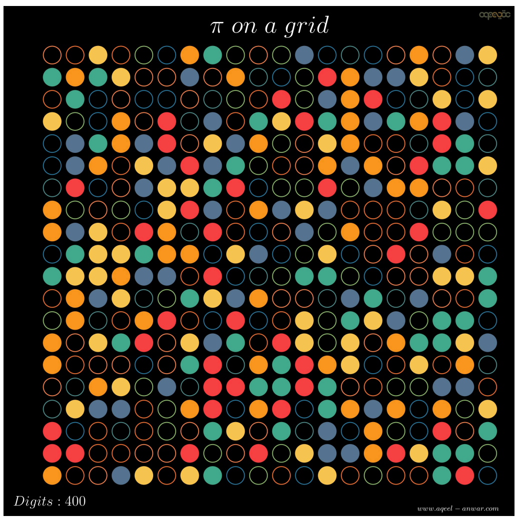


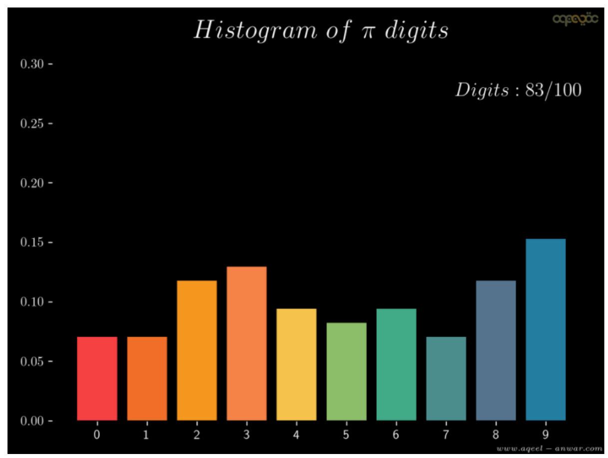
3. Lastly, to place a more visual emphasis on the perfect squares, much like how in the multiplication table you can easily identify the perfect squares by looking at the diagonal, we start expansion from the middle. At this point, we might not expand the exact number of panels for a prime, but just however many to place a visual emphasis.



π (Visual Research)

- Some general non-pi stuff:
- Mandelbrot set visualizations are usually very beautiful, and they map the speed of divergence to colors.
- We can either map numbers straight to RGB channels in straightforward ways, or if our numbers are one-dimensional, we can choose a color scheme (like we do in matplotlib) and then map the number's magnitude to a color in that scheme. We can also change the scheme around.

- Digits of Pi can be used as basically a random number generator to produce beautiful but random patterns
  https://towardsdatascience.com/visualizing-the-beauty-of-pi-cfeb1dfdd749
- 



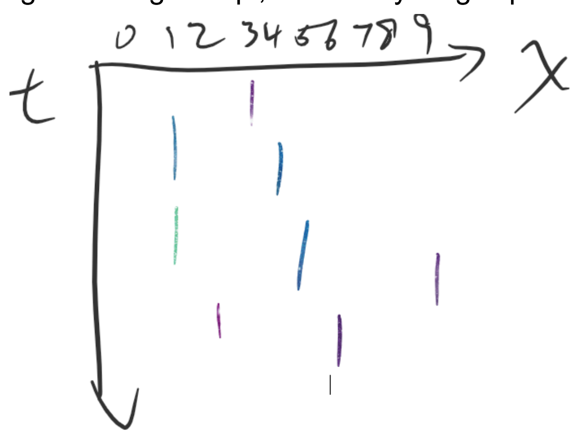
π (Storyboard)

- I want to explore the duality of structure and chaos that's present in pi. It's a very structured number, but it also has extremely random characteristics as seen above. I could go from chaos to structure and then back to chaos, simulating how anything in nature has structure in chaos but then ultimately devolves into chaos as entropy increases by the second law of thermodynamics

1. First preface the show by appealing to the definition of pi: it's the circumference of a circle with diameter 1. A ball-like lighting rolls from the Purnell side to the gates side, lighting up panels strongly (and slowly fading) every 3.14 panels/time-units. It can leave behind a trail of colorful weak background noise.

a.

2. Light up from one end to another gradually using colors determined by the digits
3. Display a sine wave where y-axis corresponds to brightness. Then oscillate/move it around
4. From the brick walls part, start by slow lighting of the 3rd, 1st, 4th, panel (with fade), and so on until the 8th digit, and then move on to light up the other panels in similar ways according to the digits of pi, until everything is purely random



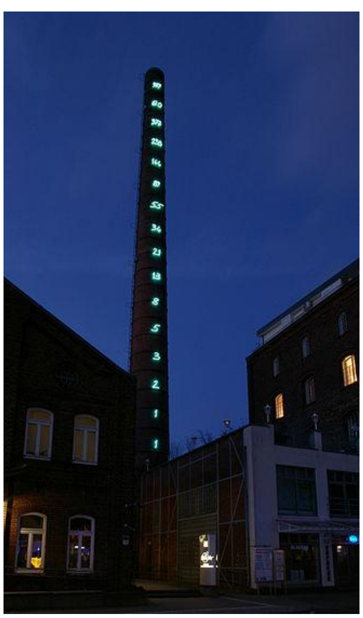
a.

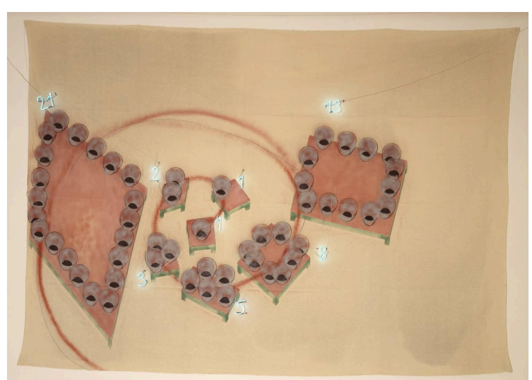
5. Alternative to 4: from the middle, display 3 lit panels, then 1, then 4, then 5, and so on according to the digits of pi.
6. At the end change into a different random color representation of pi which dims down to the transition of next segment.

Fibonacci (Visual Research)

There's a link between the Fibonacci sequence and the golden ratio, as the ratio of a Fibonacci number to its predecessor converges towards the golden ratio. The golden ratio is described as aesthetically pleasing, and there is a commonly held belief that it was used in major works of art and architecture such as works by Leonardo da Vinci. However, there is not much evidence of this. On the other hand, some modern artists have adopted the use of the golden ratio in their artwork. One example is *The Sacrament of the Last Supper* by Salvador Dali, who used the golden ratio in the dimensions of the canvas and the dodecahedron in the centre of the painting.

There's an exhibit by Mario Merz for the Centre for International Light Art, depicting the Fibonacci numbers. Mario Merz has also used the Fibonacci sequence in many other art installations, representing the principles of creation and growth. Other artists such as Grace DeGennaro have also made a conscious effort to incorporate the Fibonacci number in their art.





Storyboard (Fibonacci)

The numbers of the Fibonacci sequence can be represented visually using the lighting on the bridge, with each number being represented by the spacing between individual lights of the same color. These lights representing the Fibonacci sequence will light up at a slow, constant rate from the Gates to the Purnell side of the bridge, representing the concepts of growth and creation associated with the Fibonacci sequence.

The individual light fixtures not being used to represent the Fibonacci sequence itself will serve as a background for the sequence, and represent the many areas in which the Fibonacci sequence is used or is believed to be used.

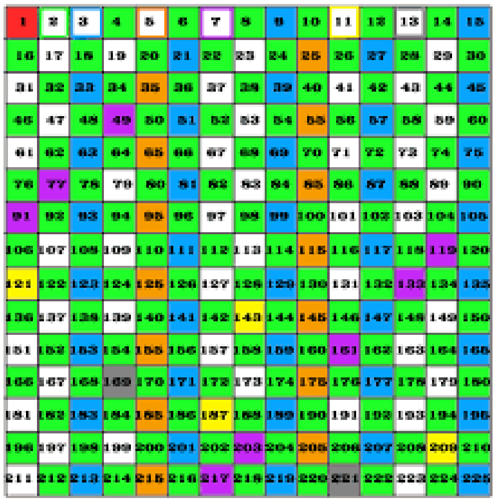
Firstly, many people believe that the Fibonacci sequence can be found within nature. Thus, colors can be used to represent different areas of nature, such as forests, flowers and animals. The primary color used would be green, representing vegetation/greenery, but colors such as red, yellow, blue and brown will also be present to represent other colors that are commonly found in nature. These colors will not be static, but change slightly in terms of intensity or color, in order to represent the movement and life present in nature. ‘

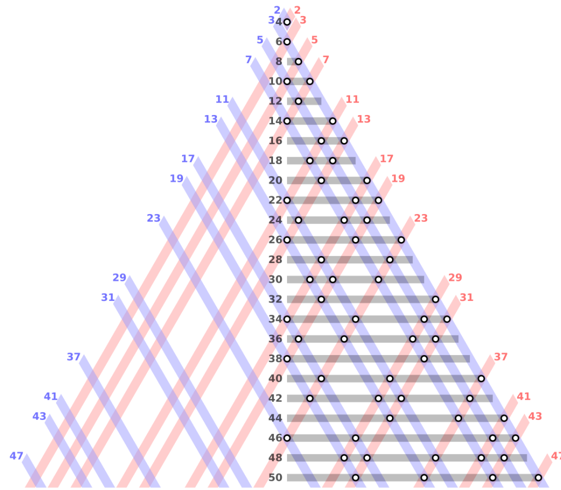
Secondly, the Fibonacci sequence is used in art itself. Thus, colors can also be used to represent the concept of art itself. There would be no primary color used here, instead there would be a wide range of colors, intensity and patterns in the background to match the vibrancy and diversity of art that can be found.

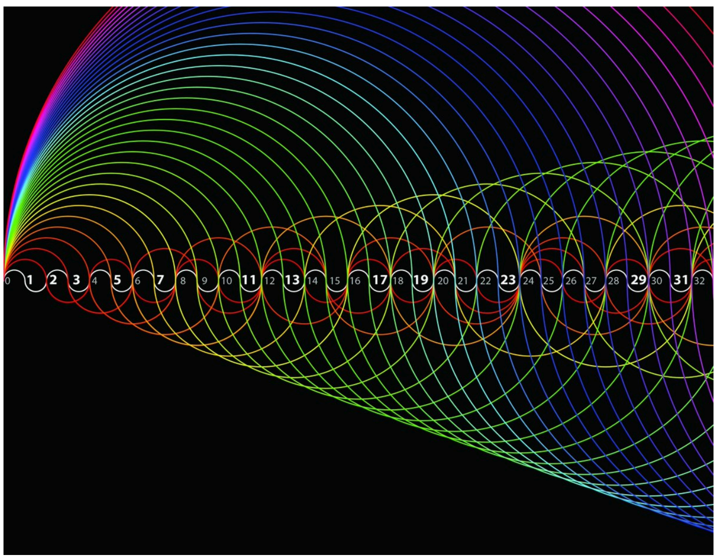
As the background changes, the lighting representing the Fibonacci sequence itself will change in color and intensity to complement the background colors, ensuring that they still stand out from the background.

Images:
https://commons.wikimedia.org/wiki/File:Algeria_Nature.jpg
https://commons.wikimedia.org/wiki/File:PikiWiki_Israel_37244_anemones.JPG
https://pixabay.com/illustrations/abstract-background-art-color-4923427/

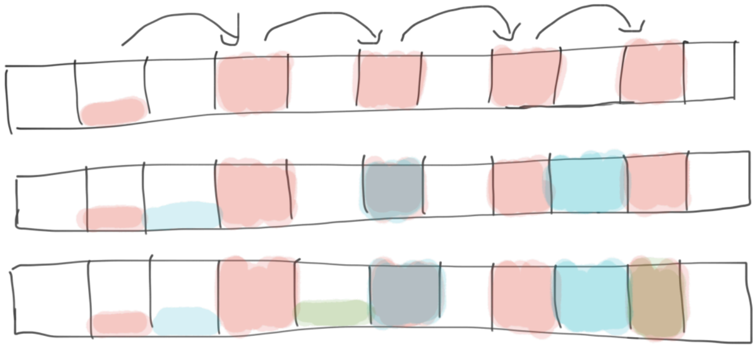
Primes (Visual research)







Primes (Storyboard)



We can visualize the prime numbers with the Sieve of Eratosthenes. We would start with all sections of the bridge being white. Then all multiples of 2 would be turned red from left to right. Then all multiples of 3 would be turned blue, all multiples of 5 would be turned green, and so on. This would lead to all composite numbers being colored with their prime factors, leaving only the prime numbers in a bright white color.