Research, Process, and Analysis for *Your Favorite Color*

The ultimate goal of *Your Favorite Color* is to encourage the viewer to reflect upon the creation of their own identity and the cultural myth of identity itself. In the piece, the viewer is prompted to enter a name, which is transformed into a 224 bit hash by a cryptographic hash algorithm from the Keccak[1] family. The first 24 bits[2] of this hash are used to populate the box in the center of the screen with a color (Figure 1).

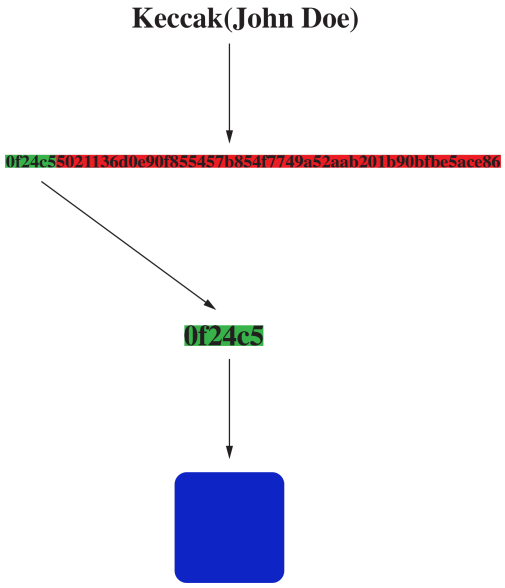

Figure 1: visual representation of the color selection process

The "collective identity" box in the top right corner is set to the hex code #000000 on initial button click. After the viewer enters another name (friend, celebrity, teacher?), the "collective identity" box becomes their "favorite color" from before. Each subsequent name entered into the name input is stored with the first two states of the "favorite color" box. Each

[1] Bertoni, *Keccak Implementation Overview*
[2] 24 bits in binary = 6 digits in hexadecimal (hex codes are 6 digits of hexadecimal)

time the button is pressed, the most common bit at each index (0-24) for each previous 24 bit hash is selected to make the "collective identity" hash (Figure 2).[3] If the page is refreshed (or a different viewer visits the site), the state of the boxes is reset. This makes each viewer's experience with the piece unique.

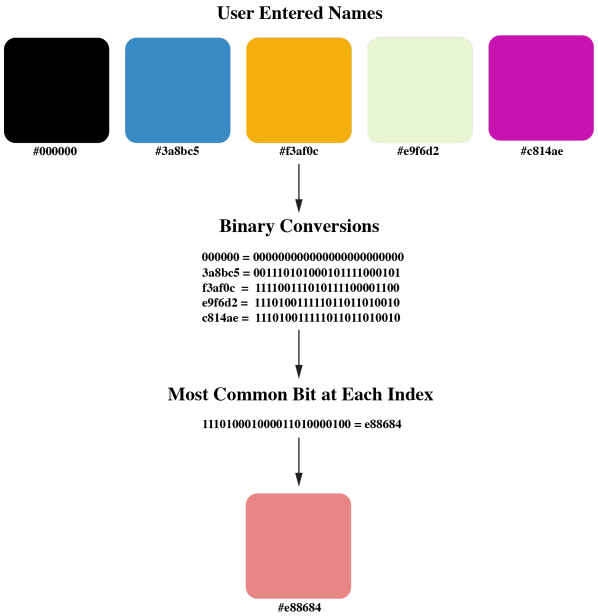

Figure 2: visual representation of collective hash generation

The visual component of the project was created using React.js, a javascript library. This allowed for the use of state[4] to store each value of the hashes generated when the button was clicked by the viewer. A database was considered to create the “collective identity” of all viewers of the site, but ultimately it was decided that the use of just the users inputs was more powerful.[5]

[3] For more info on converting from hexadecimal to binary and vice versa, see https://owlcation.com/stem/How-to-Convert-Hex-to-Binary-and-Binary-to-Hexadecimal

[4] *State: A Component's Memory*

[5] If a database was used, the “collective identity” hex code would reach a point that it takes such a large amount of user input to change it that most users would not see it change. There is a more thorough explanation of how the most common bit algorithm influences the box later.

This creates an intimate, personal experience for each viewer, which encourages a moment of reflection upon what identity really is.

To disguise the origins of the "collective identity," a cryptographic hash function was implemented through the use of the npm package sha3.[6] This creates an air of mystery behind the creation of this portion of the viewers experience, which is similar to many peoples relationship with their own identity and it's creation. Ideally, this encourages that moment of reflection, perhaps having to do with the meaning of the word identity itself, or simply the viewer's own identity. Roland Barthes speaks extensively about the marriage of cultural myths, or "second order signs" (the concept), and form.[7] It is this work's goal to examine the cultural myth of identity in contemporary society and raise questions regarding the influence of technology, people and the unknown through the visualization of a cryptographic hash function.

As a demonstration of the piece, a list of names that consisted of family, friends, and artists was compiled and entered into the piece in sequential order. Each of the generated hex codes for the names were recorded, as were the generated hex codes for the "collective identity" color box (Figure 3). These generated colors were then blended together and put side by side in order of generation (Figure 4).

As more names are entered by the user, the "collective identity" color box stays similar for longer amounts of time. About halfway through the data collection, multiple instances of cyan, blue/purple, and pink appear sequentially (Figure 4). This is because when the most common bit at each index is taken, some indexes accrue an overwhelming majority of one bit.[8]

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[6] *SHA3*
[7] Barthes, *Mythologies*
[8] This is the reason that using a database for every single user input would not be ideal.

For example, the 0th bit in the most common bit hex code is 0 for all but five entries.[9] All this means is that for bits to flip, there has to be more and more entries with the opposite bit inputted from the viewer. This can be easily related to the viewer's identity, because as you progress through life and form an identity, it takes greater (or just more) outside forces to influence it in the same way that it may have been influenced before.

Name	First 24 Hash Bits	Most Common Bit Hash
Max Cheever	#F7DFF7	#000000
Talia Casale	#3EA8FB	#F7DFF7
Siobhan Kelley	#C58E92	#3688F3
William Ferros	#57CFF4	#F78EF3
Wilbur Cheever	#347C29	#578EF2
Mary-Margaret Christie	#FBB2FC	#77CEF3
Dante Tocci	#6034AB	#778EF0
Wilbur Cheever Jr.	#806E18	#77BEFB
Richard Christie	#9E1AC6	#74AEB8
Dolores Christie	#0BD2CE	#F6BEFA
Luke Pedersen	#3F5840	#169EFA
Jake Kwasnieskwi	#F2EDE5	#37DEFA
Kathy Cheever	#4DA7EC	#36DEE0
Douglas R. Hofstadter	#F540D6	#77FEEC
Randall Munroe	#050F24	#77CEE4
Daniel Temkin	#6B9C51	#77CEE4
Refik Anadol	#C57498	#778EE4
Sougwen Chung	#C0A6FD	#77DEF4
Sherry Zhang	#7E2A02	#458EF4
Joel Swanson	#67DDE9	#77AEF4
Charlee Lachance	#457AAD	#678EE0
Emily Pozzy	#59149C	#67FEE0
Ben Thompson	#EB3072	#451EE0
Mikias Silva	#E533AA	#673EF0
Eric Mukwa	#9C3085	#653EE0
Gabriel Panzo	#D96AE9	#653EE0
Sublime Kitenga	#EB4571	#453EE0
Don Dilamini	#A54118	#E53EE0
Whit Steele	#527576	#E53CE0
Shanta Das	#287E25	#E57CF0

Figure 3: Names entered in sequential order along with hex codes and generated "collective identities"

[9] 4, C, and A's corresponding binary translations all end in 0, I am referring to the 0th bit of the 24 bit binary representation of the hex code.

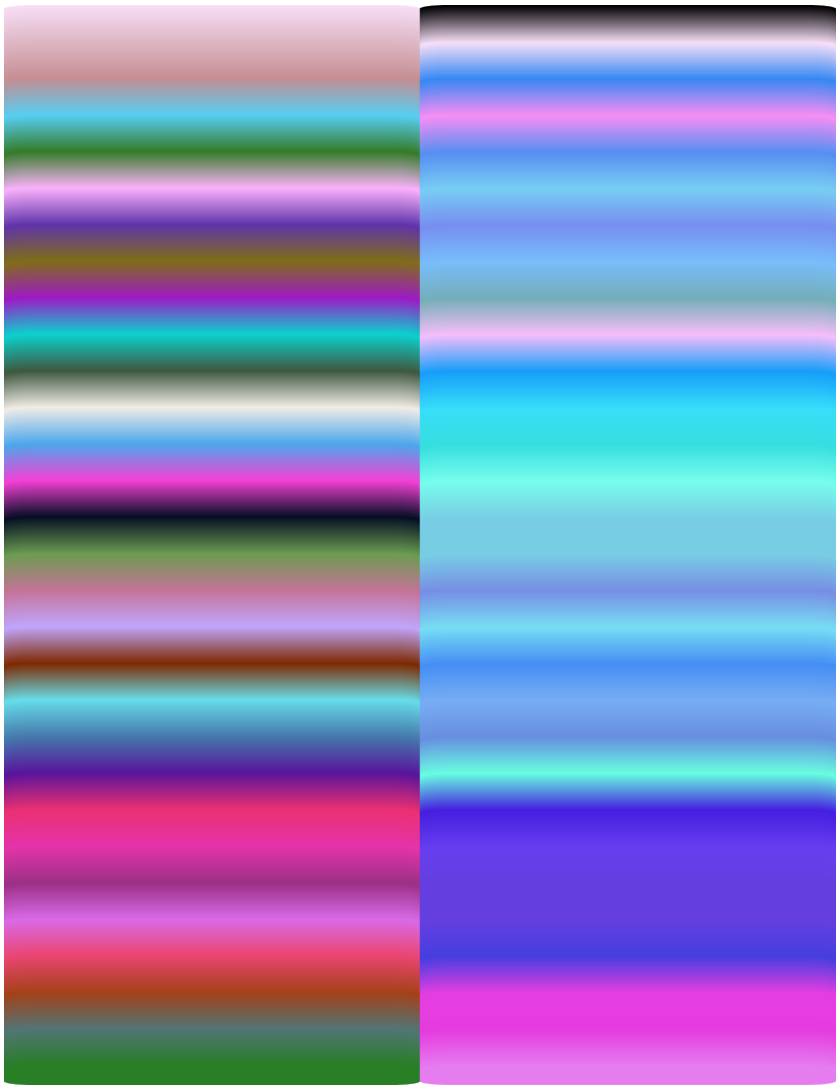

Figure 4: Visualization of hex codes by individual name (left) and "collective identity" hex codes (right)

At first glance, it may look like there was a drastic change between the large block of blue/purple and pink at the bottom right of the visualization (Figure 4). Upon further inspection of Figure 3, it can be seen that the difference between the blue and the pink is just 2 bits.[10] This is a perfect representation of how small changes can have such a drastic influence on someone's

[10] 4 = 0100, E = 1110.

identity. The reason these colors are so different is because the bits that are being changed are more significant.[11] The inverse of this can also be seen in some places, for example in the "most common bit hash" column of Figure 3 for "Kathy Cheever" (#36DEE0 = 001101101101111011100000) and "Douglas R. Hofstadter." (#77FEEC = 011101111111111011101100) The hex codes in these two instances differ by 5 bits, but these bits are less significant than the previous example.[12] This visualizes how sometimes things that may seem significant may actually be less significant in reality, with respect to the effect it has on a person's identity.

The uncertainty regarding the influences and effects that other people and forces have on your "identity" is because of the cultural myth that is identity, which has been created by contemporary society.[13] One's identity is not defined as much by their interests or experiences, but is defined more by the products and services they choose to buy and sell.[14] *Your Favorite Color* begs the question: what does identity mean to you, as an individual, and how has the idea and creation of an identity been influenced by society?

[11] Essentially, the bits that are changing are ones that are closer to the left side of the R, G, or B setup of hex codes, so in this case flipping red bits 7 and 5 (7 being the most significant red bit on the left) has a greater impact on the red portion of the color than flipping bits 0 and 1. See the source *How to Read Color Hex Codes* for a more thorough explanation of this.

[12] That is, with the grouping of 8 bits each for red, green, and blue.

[13] I refer to "contemporary society" in the same way that Barthes might refer to the "bourgeoisie"

[14] Their jobs, the clothes they wear, the house/car they own, etc..

Bibliography

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