Web Tech Report

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1 Introduction

Ciphers, or cryptograms, are methods used to encode messages to securely communicate, even if messages fall into the wrong hands. Ciphers have been used for thousands of years for various purposes, the oldest use of a cipher is believed to be some 4000 years ago in Egypt[1]. most commonly used to communicate during times of war to keep battle plans and strategies hidden from the enemy. This web tech coursework takes a look at 4 ciphers: The Ceaser Cipher[2] The ROT2 Cipher[3] The Vigenere[4] The ATBASH[5] These 4 where coded in Javascript and implemented in web pages designed with HTML and a CSS stylesheet. The web pages allow for user input to encode and decode messages as the user pleases.

2 Software Design

The design for this coursework was rather simple. There are 5 pages in total, a home page with an introduction, 4 images to represent each cipher with a bit of information beneath each image, there is a navigation bar at the top of each page with links to each cipher page. Each page follows the same template; two images/gifs on either side of a centered H1 header, information about each cipher centered beneath the header, at the bottom of the text there is a text box to allow a message to be typed in and 2 buttons to encrypt and decrypt as well as another text box to input a key where needed (Vigenere and Ceaser ciphers need a user input key). The CSS stylesheet simply set a black background with green text (an attempt to create a matrix theme). The header of the homepage, along with the GIFs used are an homage to Gravity Falls, a series I enjoyed watching, in which cryptography was an ongoing theme throughout the series.

3 Implementation

Each cipher was implemented using Javascript. Below are screenshots highlighting the coding process to encode messages, each cipher follows a similar template in terms of encoding messages, once the encryption was done, decrypting was simply a matter of working backwards.

```
/*Loop through the alphabet and the user input
compare each character of the user input with the alphabet
if a match is found, the index has 13 added on to it
and an output string is built by running the new index through
the alphabet to replace each character
*/
  for (i = 0; i <= uInput.length; i++) {

    for (j = 0; j <= alphabet.length; j++) {
//This initial if statement allows the function to handle spaces
      if (uInput[i] == " ") {


        output += uInput[i];
      } else if (uInput[i] == alphabet[j]) {

        var index2 = j + 13;
//allows the function to loop back to 'a' if the index goes beyond 'z'
        if (index2 > 25) {

          index2 -= 26;
        }

      var  x = alphabet[index2];

        output += x;

      }

    }

  }
  // this line removes the last char from the string
  // i had an error where the letter c was added at the end of every
  // output
  var sillyString = output.slice(0, -1);

  document.getElementById("test").innerHTML = sillyString;
}
```

4 Critical Evaluation

Comparing my work against the requirements will reveal that the specification has been met and more, the minimum number of needed ciphers has been met, and index and design page have been created. However, there was an error in which the output for the ROT13 cipher added on the letter 'c', I was unable to figure out the cause of the error,

instead I have simply omitted the last character on the output. There's also room for improvement within the design, removing the backgrounds from images

5 Personal Evaluation

This coursework was one that I really enjoyed working on, within the past 5 weeks I've learned quite a bit about web designing, from HTML, CSS and Javascript, I am now confident enough to have started working on my own blog from scratch. The biggest challenge was the Vigenere cipher, which took me a week to figure out how to properly implement it using Javascript. I tackled such challanges by first making sure I properly understood how each cipher would encode text, writing down primitive psudocode(with pen and paper) for each step of the encryption, finally I would look at each line of code and make sure I know what it's doing. A lot of blood, sweat and tears where spilt over these 6 web pages and I feel I have performed above average with my ciphers.

References

A list of citations for the images and GIFs used in the web pages

http://gravityfalls.wikia.com/wiki/List_of_cryptograms

https://giphy.com/gifs/gravity-falls-dreamscaperers-i-wanted-this-to-look-better-idk-4bSoQR9w5h0TC

http://www.teeuwisse.de/catalogues/selected-drawings-ii/the-assassination-of-julius-caesar.html

https://www.goodreads.com/review/show/153810763

https://giphy.com/gifs/bill-cipher-xs1f52PBmRwI

http://resources.infosecinstitute.com/an-examination-of-the-caesar-methodology-ciphers-vectors-and-block-chaining/#gref

https://giphy.com/gifs/antmvh1-fashion-model-ujGxL0wVo2iUxkEbX1

https://giphy.com/stickers/running-run-3oswUAL1AJzd16YWvC

https://www.istockphoto.com/fi/photo/caesar-cipher-wheel-gm178431355-24556773

[1] Unkown, "A brief history of cryptography."

[2] J. Lyons, "Ceaser cipher."

[3] J. Lyons, "Rot13."

[4] J. Lyons, "Vigenere cipher."

[5] J. Lyons, "Atbash cipher."