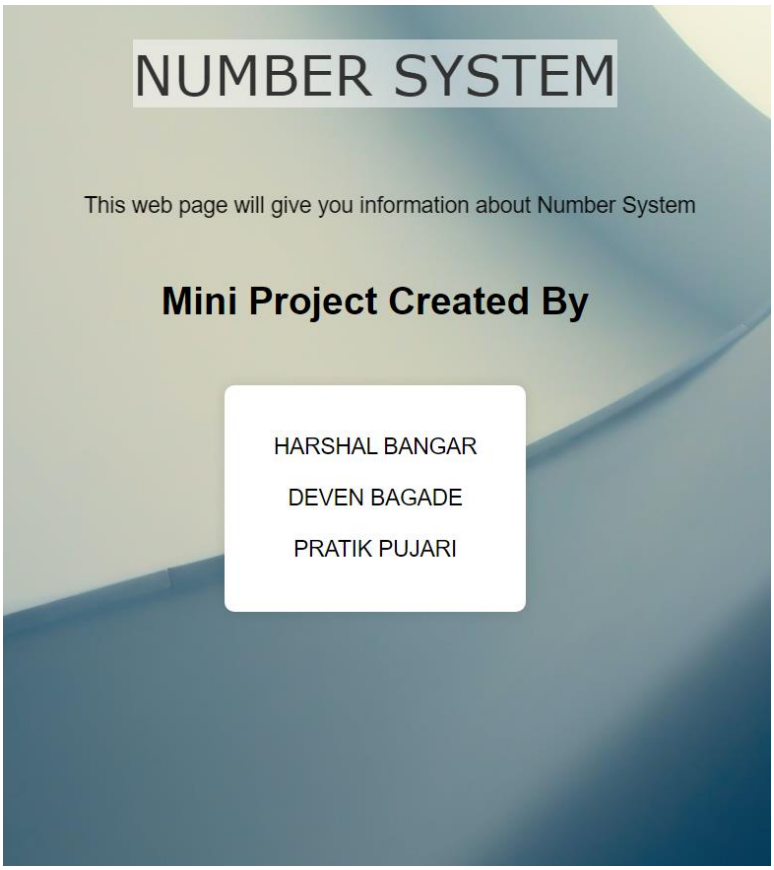


Number Systems Converter

A HTML AND JAVASCRIPT BASED PROJECT

Published by Deven Bagade, Pratik Pujari and Harshal Bangar

The Start

Starting up with the project; it is a web page created solely with the purpose of conversion of number systems.

- It was created using HTML and JavaScript languages.
- The website has multiple web pages linked with menu system.
- It is available on GitHub!
- Link for the same is provided in the end.

PURPOSE

The purpose of is to provide a nice example for application of both; HTML, JS languages and the Number System Conversion. It automates Number System conversion and along with that, gets rid of the limit applied onto calculators by their hardware.

We tried to created a visually appealing website, but functional one as this mini project.

NEED OF NUMBER CONVERSION

1.Computer Hardware and Software: The internal representation of data in computers is based on binary digits (0s and 1s), making binary conversion crucial for understanding and manipulating this data. Programmers frequently need to convert between binary and decimal to debug code, inspect memory contents, and interface with hardware components.

2.Digital Electronics and Circuit Analysis: In digital electronics, octal notation is sometimes used to represent binary numbers for better readability and manipulation. Converting between octal and binary is essential when working with hardware components and circuit diagrams.

3. Scientific Computation and Mathematics: In scientific computing and advanced mathematics, multiple number bases are used to represent complex numbers, matrices, and other mathematical entities. Converting between these bases simplifies calculations and facilitates data analysis.

4.Cryptography and Security: Cryptography, the science of secure communication, heavily relies on number conversions, particularly between binary and hexadecimal. Converting between these bases is crucial for encrypting and decrypting sensitive data, generating cryptographic keys, and implementing secure protocols.

Key Features:

- Styles (CSS): CSS is an amazing tool of HTML5 which enables
- programmers to make visually appealing changes to their
- code. We have used CSS to stylize the web page and make it more visually appealing. Using the keyframes rule of CSS, we have added fade in animation to the text.
- JavaScript: JavaScript is a powerful front-end computer language which powers websites to do calculations as well as perform certain tasks which are not possible for the HTML language to do.
- Multi-Page Website: What's better than a webpage? A Website! Which features more linked pages and maximizes the content coverage with high public appeal.
- Online Availability:

  Using the power of the internet, this website is available online too!

JOURNEY PLAN

Our team of first-year computer engineering students embarked on a software-based project, seeking to create a web-based number calculator. Initially, we attempted to develop the converter program using the C programming language. However, due to C's relatively low user-friendliness, we encountered challenges in efficiently constructing the code around the number conversion logic. Consequently, we transitioned to Python, an object-oriented, high-level programming language, which proved to be a more suitable choice.

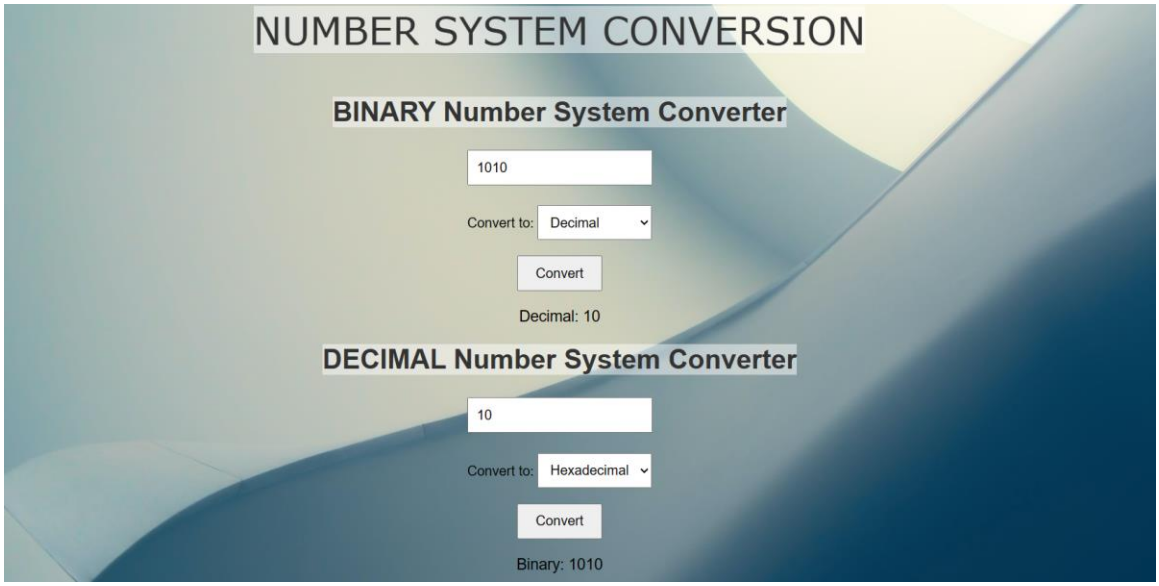
Next, we focused on building the web page using HTML and CSS. However, we encountered compatibility issues when integrating the Python code into the HTML code. Additionally, certain code functions were not functioning properly within the HTML environment. Therefore, we opted for JavaScript, a language that excels in web development due to its superior performance and data management capabilities. JavaScript's responsiveness and ability to handle large amounts of data made it an ideal choice for our web-based application.

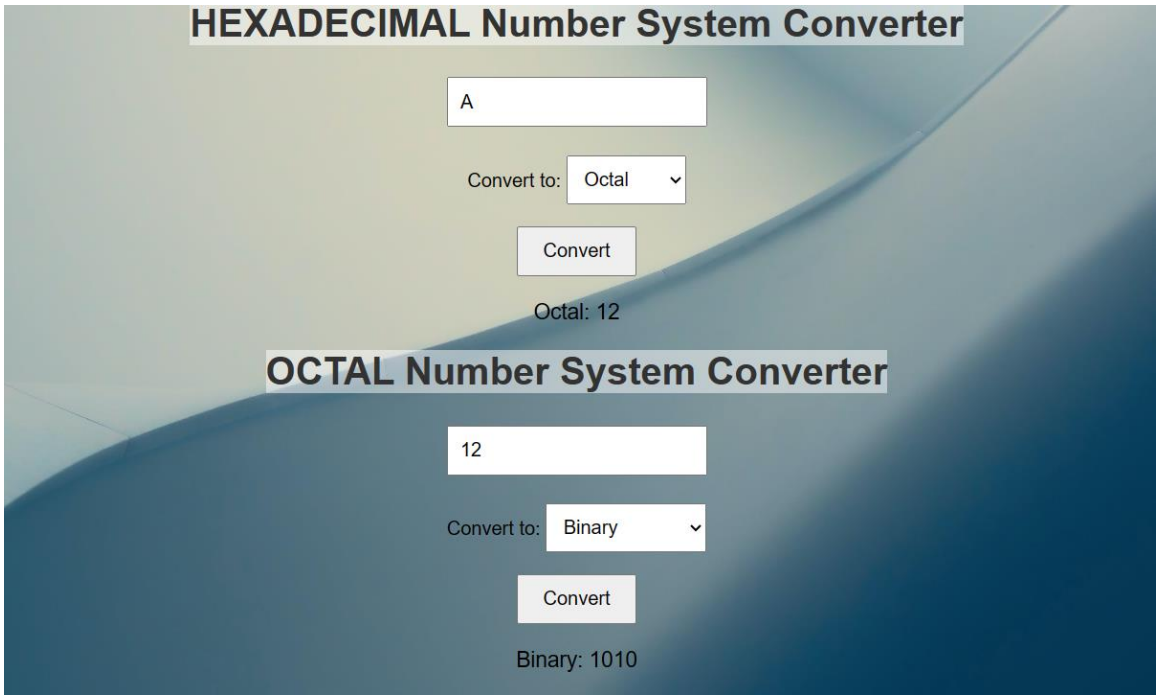
Through this iterative process, we successfully developed a web-based number converter that effectively converts between various number bases. Our journey highlights the

importance of selecting the appropriate programming language and development tools to suit the specific requirements of a project. By carefully evaluating the strengths and limitations of each language, we were able to overcome technical challenges and create a user-friendly web application.

EXAMPLES

Here is examples from our live project and we have also provided the a sample number conversion from 1 to 15 to cross verify.





Here is the reference chart

Decimal	Binary	Octal	Hexadecimal
0	0000	000	0000
1	0001	001	0001
2	0010	002	0002
3	0011	003	0003
4	0100	004	0004
5	0101	005	0005
6	0110	006	0006
7	0111	007	0007
8	1000	010	0008
9	1001	011	0009
10	1010	012	A
11	1011	013	B
12	1100	014	C
13	1101	015	D
14	1110	016	E
15	1111	017	F

HOW DOES IT WORK?

The JS code receives the input from the HTML in the form of a value. We have declared options for conversions which are selectable using the dropdown list. The select option is the sent to the switch case statement which the selects the statement block to be executed. Use of parseInt() allows us to convert string to integer form along with the hexadecimal values from A to F since those cannot be included in calculation. Declaring multiple functions allowed us to keep the program clutter free and easily debug-able. It's not easy to debug a code if the systematic approach is not followed.

Entering an invalid input in the text box and proceeding for conversion results into an unique error output.

HTML:

The HTML part of the website uses a lot of different tags and attributes. It's a giant combination of such.

Using anchor tags, we linked all of the webpages together.

Using the viewport attribute of meta tag makes this website optimized for mobile devices too.

The Marquee tag features moving text!

Use of display types to make text appear and/or disappear.

JAVASCRIPT:

Adding Event Listeners allows us to check out for buttons clicks.

Using different functions makes debugging easier.

Using switch case statement for target selection.

Adding custom patterns for the objective number system syntax and coupling them with if statement to generate errors.

LINK TO OUR HTML SITE

https://stonecollector.github.io/num-sys-conv/index.html

ADVANTAGES:

The web based number converter can have many salient features and advantages over the conventional application based converters as follows:

Performance Optimization:

Web-based converters are optimized for performance, ensuring quick conversion speeds and efficient handling of large numbers. Users can expect smooth and responsive operation even when converting complex numbers.

Collaborative Use:

Web-based converters can be shared easily with colleagues, classmates, or friends, enabling real-time collaboration on number conversion tasks. This collaborative aspect is particularly useful for educational or teamwork settings.

Cross-Platform Compatibility:

Web-based converters are not restricted to specific operating systems or device types. They can be accessed from any browser, regardless of whether the user is using Windows, mac OS, Linux, or a mobile operating system.

Accessibility and Convenience:

Web-based converters are readily accessible from any device with an internet connection, eliminating the need for installation and compatibility issues. Users can easily access the converter from their computers, smartphones, tablets, or any other internet-enabled device.

AMOUNT OF TIME REQUIRED

As we were constantly jumping to different coding languages it took us more time than expected

It took nearly one and half week just to build the perfect working code and another week to build and integrate the web page as we were doing almost 2 to 3 hours of work everyday

CONCLUSION

The development of our web-based number converter project has been an enriching experience that has reinforced our understanding of programming languages, web development principles, and the importance of selecting the right tools for the job. We successfully overcame the initial challenges posed by C's complexity and compatibility issues with HTML by transitioning to Python and JavaScript, respectively. These choices

enabled us to create a user-friendly and efficient web application that effectively converts between various number bases.

The project has demonstrated the value of careful planning, adaptability, and a willingness to explore different solutions when faced with technical hurdles. We believe our experience can serve as a valuable guide for other aspiring developers embarking on similar projects.

Our web-based number converter stands as a testament to our ability to apply theoretical knowledge to practical applications. We are confident that this project will serve as a stepping stone for our future endeavors in the field of computer engineering.