

BINARY REPRESENTATION

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IST 110

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Binary Representation & Importance in Digital Computing:

Binary turns out to be a crucial concept that underlies the method in which information is represented and then processed into the digital computing systems. Binary represents information utilizing two specific options, which is 0 and 1 (Innocenti et al., 2021). On the contrary, the decimal system that is commonly known among us utilizes 10 digits falling within 0-9.

The existing binary digits contain the ability to represent various numeric values, images, text, instructions, and sound within the computers utilizing specific combinations of both 0s & 1s. Any kind of digital information system has the requirement of encoding the information in the binary format aimed to be stored into the hardware memory and then manipulate the same through logically implemented operations across the hardware-based circuit (Anguraj & Krishnan, 2021). For instance, the typed-out text characters in the form of bytes, which is represented with the help of 8-digit binary numbers. On the other hand, the images consist of pixels that are mapped to specific arrays made from binary. Every individual program instruction that are fed into the CPU core present at the fundamental level turn out to be sequences made up of binary, which is then encoded into the machine-based code.

I have an amateur working knowledge when it comes to converting the decimal numbers into its binary form. The associated procedure necessarily involves a successive form of division specifically by 2 and then keeping a record of the same remainders starting from right to the left intended to establish the corresponding digit, in binary form. For instance, when converting 13 to its binary form, we need to divide 13 by 2 and then keep a note of a remainder, 1 that comes from it (Adzhemov & Kudryashova, 2021). Following this, dividing 6 by 2 and keeping a note of 0, then dividing 3 by 2 that gives us 1. Hence, starting from the right side to the left, the remainder digits

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give us with the binary format of the number that is, 1101. With more practice, this conversion process becomes much easier.

Contained with a conceptual clarity upon why the binary formats are the specific foundation for any aspect that is in digital form has made it very crucial for me to potentially learn the binary conversion procedure. The contained ability of translating back as well as forth between all the binary as well as the formats, where the human users gain the understanding in an increasingly intuitive manner such as the decimal or might be the text format that turns out to be primary for making appropriate sense to the contained information (YouTube, 2014). This is because, the same flows across both the layers of hardware as well as software present within the digital system.

As a summary, the process of binary data digitization enabling storage, transmission as well as processing is important for a proper functioning of the uncountable digitally equipped devices along with the infrastructure, which is relied by the end users, daily. A significant grasp upon the method used by the numeric as well as text-based data and its representations simply convert to simpler combinations consisting of both 0s as well as 1s. This puts forward a profound foundational insight upon all the individual workings of the existent digital realm. My main objective is to have a continuous strengthening towards the knowledge of various encoding schemes, which bridges the gap between the humans and the associated computer interpretations aligned to information that is efficiently exchanged between the two existent realms.

References:

- Adzhemov, A. S., & Kudryashova, A. Y. (2021, March). Features of Converting Signals to Binary and Minimizing Distortion. In *2021 Systems of Signals Generating and Processing in the Field of on-Board Communications* (pp. 1-5). IEEE. [10.1109/IEEECONF51389.2021.9416118](https://doi.org/10.1109/IEEECONF51389.2021.9416118)
- Anguraj, P., & Krishnan, T. (2021). Design and implementation of modified BCD digit multiplier for digit-by-digit decimal multiplier. *Analog Integrated Circuits and Signal Processing*, 107, 683-694. <https://doi.org/10.1007/s10470-020-01781-z>
- Innocenti, S. U., Becattini, F., Pernici, F., & Del Bimbo, A. (2021, January). Temporal binary representation for event-based action recognition. In *2020 25th International Conference on Pattern Recognition (ICPR)* (pp. 10426-10432). IEEE. [10.1109/ICPR48806.2021.9412991](https://doi.org/10.1109/ICPR48806.2021.9412991)
- YouTube.(2014,October3).Intro to binary numbers. YouTube. <https://www.youtube.com/watch?v=b7pOcU1xMks>