

# Data Representation

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Data Representation refers to the form in which data is stored, processed, and transmitted

## Examples

- Binary
- Unicode
- Encryption
- Images

# Data Representation

## Binary

The atomic unit of data in computer systems is the bit, which is actually an acronym that stands for Binary digit. It can hold only 2 values or states: 0 or 1, true or false therefore it can carry the smallest amount of meaningful information possible<sup>1</sup>.

### DATA REPRESENTATION

Digital computers store information in binary

Binary allows two states

\* On yes true 1

\* Off no false 0

Each digit in a binary number is called a bit

0 1 1 0

bit

Off On On Off

Binary number system == how numbers can be processed in binary



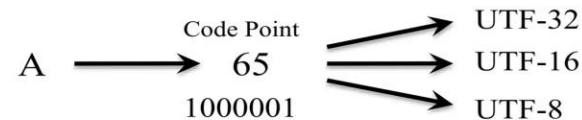
# Data Representation

## Unicode

Unicode uses two encoding forms: 8-bit and 16-bit, based on the data type of the data that is being encoded. The default encoding form is 16-bit, where each character is 16 bits (2 bytes) wide. Sixteen-bit encoding form is usually shown as U+hhhh, where hhhh is the hexadecimal code point of the character<sup>2</sup>.

## Unicode

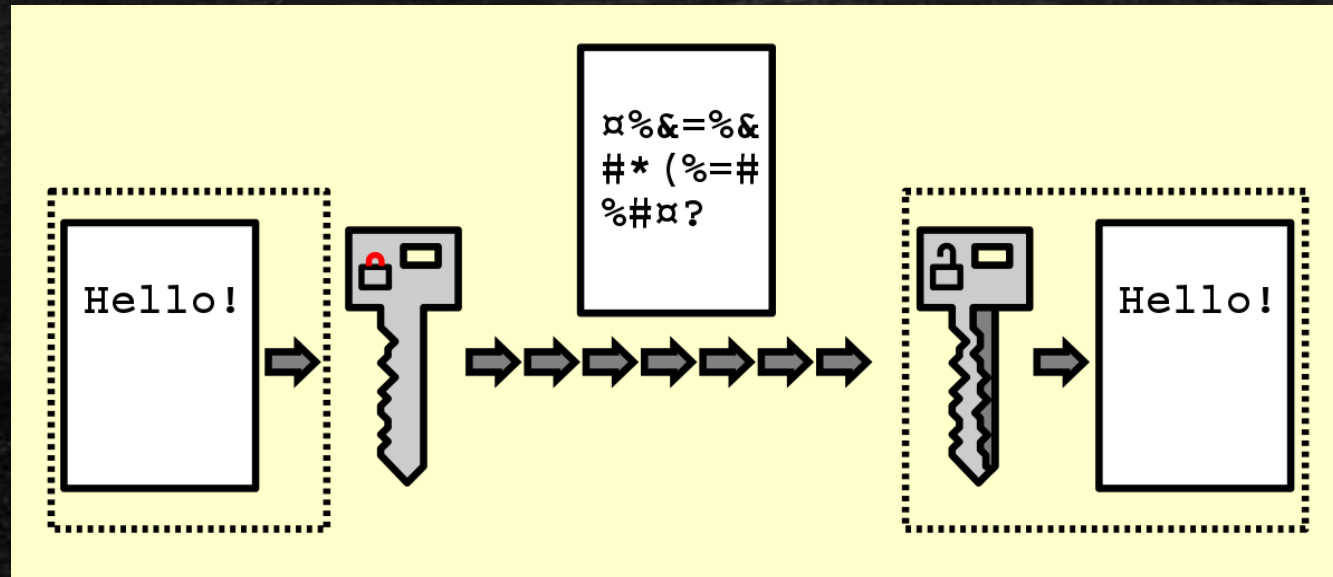
- A standard character encoding designed to support all of the world's languages
- Unicode represents characters differently than ASCII
- Characters are mapped to a **code point**



# Data Representation

## Encryption

Data encryption converts data from a readable, plaintext format into an unreadable, encoded format: ciphertext. Users and processes can only read and process encrypted data after it is decrypted. The decryption key is secret, so it must be protected against unauthorized access<sup>3</sup>.

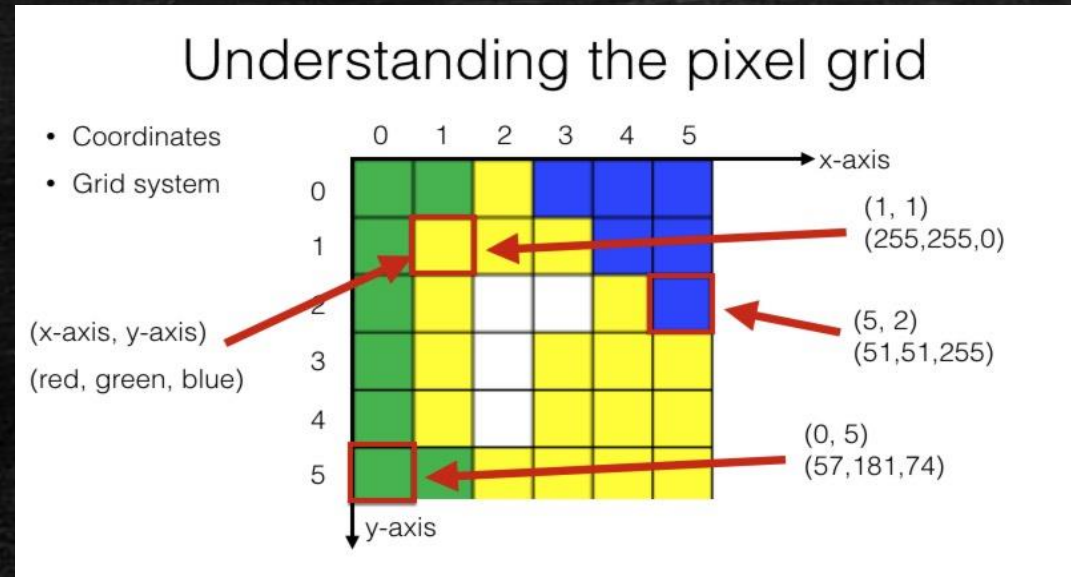




# Data Representation

## Images

The images types we will consider are: 1) binary, 2) gray-scale, 3) color, and 4) multispectral. Binary images are the simplest type of images and can take on two values, typically black and white, or 0 and 1. A binary image is referred to as a 1-bit image because it takes only 1 binary digit to represent each pixel<sup>4</sup>.



# SOURCES CITED

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2. IBM Technology corporation, <https://www.ibm.com/docs/en/db2/11.5?topic=support-unicode-character-encoding>
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