**Odds and ends-Deterministic encryption: 159**

**Deterministic encryption** is a form of encryption that allows for deterministic encryption and decryption operations, meaning that the same plaintext will always encrypt to the same cipher-text. It is useful in scenarios where search ability and equality comparisons on encrypted data are required. Here's an explanation of how deterministic encryption works and an example: **Working of Deterministic** **Encryption:**

**1. Key Generation:** A deterministic encryption scheme involves generating a secret encryption key that will be used for both encryption and decryption operations. The key generation process typically follows the same principles as symmetric encryption schemes.

**2. Encryption:** To encrypt a plaintext message using deterministic encryption, the encryption algorithm takes the encryption key and the plaintext as inputs and produces a fixed-length cipher-text. The encryption process ensures that the same plaintext always results in the same cipher-text.

**3. Decryption**: The decryption process in deterministic encryption is the reverse of the encryption process. It takes the encryption key and the cipher-text as inputs and produces the original plaintext message.

Format Preserving Encryption (FPE) is an example of deterministic encryption that preserves the format and length of the original plaintext. It is often used to encrypt sensitive data, such as credit card numbers or Social Security numbers, while maintaining their original structure for compatibility with existing systems.