



# DNA Fountain

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## Overview

This project demonstrates a simplified DNA Fountain encoding and decoding system. It encodes binary data into "droplets" (small units) using an XOR-based combination of data chunks and maps the resulting binary data to a DNA sequence using the nucleotides A, C, G, T.



## Key Components

- **DNAFountain**: Core class that implements the encoding and decoding routines.
- **DNAFountainTester**: Helper class that runs tests on a set of binary messages to ensure that encoding to DNA and decoding back to binary works correctly.
- **main**: Entry point for command-line execution, which configures logging and runs tests.



## Features

- **Encoding Strategy**: Uses a pre-defined "degree table" that assigns a degree (number of chunks to combine) to each droplet based on its seed value. The droplets are generated using a local random generator (seeded by the droplet's binary seed) so that the same combination of chunks can be reproduced during decoding.
- **Binary to DNA Mapping**: Maps binary data to DNA sequences and vice versa.



## Setup

1. Ensure you have Python 3 installed.
2. Clone the repository:

```
git clone https://github.com/v1t3l50n/DNA-fountain.git
```

3. Navigate to the project directory:

```
cd DNA-fountain
```

4. Run the tests:

```
python3 main.py
```



## Usage

The main entry point for the project is the `main.py` file, which configures logging and runs tests using the `DNAFountainTester` class.

## License

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