

Here is my output on running the brute force function

```
$ python3 brute_force.py
```

Found key: 1601

Key in binary: 0000011001000001

Decrypted message: The inscription on the One Ring, which was forged by Sauron in Mount Doom around 1600 in the Second Age of Middle-earth: One ring to rule them all, one ring to find them, one ring to bring them all, and in the darkness bind them.

## CODE EXPLANATION

The cryptBreak function implements differential XOR decryption with a 16-bit key, processing ciphertext in 16-bit blocks using a PassPhrase to generate an initialization vector. Each block is XORed with both the previous block and the key, following the principle of differential XORing which helps destroy repetitive patterns in the encrypted message. The function is designed for single-key attempts, enabling brute force testing across the 16-bit keyspace (0-65535) until finding text containing "Sauron". Block-by-block decryption is achieved through BitVector operations for key and text processing, with optimized 16-bit block size for efficient processing. The implementation closely follows the decryption logic from the original script but is modified to work with a parameterized key input rather than user prompts, making it suitable for automated testing of multiple keys.