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### **Project Statement: Bash Script for Caesar Cipher Encoding and Decoding**

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#### **Objective:**

The goal of this project is to develop a Bash script that performs both encoding and decoding of text using the Caesar cipher. The Caesar cipher is a classic substitution cipher where each letter in the plaintext is shifted a certain number of places down or up the alphabet.

#### **Features:**

- 1. User Input: [2 points]**
  - The script will prompt the user to input the text they want to encode or decode.
  - Specify whether to encode or decode based on options for the script.
  - Ensure that the input is case-insensitive and supports both uppercase and lowercase letters.
- 2. Shift Value: [1 point]**
  - The user will specify the shift value (key) for encoding or decoding.
  - The shift value should be a positive integer within a specified range (e.g., 1 to 25).
- 3. Encoding: [2 points]**
  - The script will encode the input text by shifting each letter by the specified value.
  - Non-alphabetic characters (numbers, punctuation, spaces) should remain unchanged.
- 4. Decoding: [2 points]**
  - The script will decode the input text using the inverse shift of the specified value.
  - Similar to encoding, non-alphabetic characters should remain unchanged.
- 5. Output:**
  - Display the result of the encoding or decoding operation to the user.
- 6. Validation: [2 points]**
  - Ensure that the input text contains only valid characters (alphabetic and non-alphabetic).
  - Validate the shift value to be a positive integer within the specified range.
- 7. Error Handling: [1 point]**
  - Provide informative error messages for any input or execution errors.

#### **Usage:**

```
./caesar_cipher.sh -e  
Enter text to encode: Hello, World!  
Enter shift value (1-25): 3  
Encoded text: Koor, Zruog!
```

```
./caesar_cipher.sh -d
Enter text to decode: Kloor, Zruog!
Enter shift value (1-25): 3
Decoded text: Hello, World!
```

**Deliverables:**

- caesar\_cipher.sh: The main Bash script file.
- README.md: Documentation on how to use the script, including examples.

**Additional Challenges (Optional): [3 points]**

- Extending the script to handle multiple encoding or decoding operations for the special characters (numbers, punctuation, spaces) in a single run.

**Usage:**

```
./caesar_cipher.sh -e -s
Enter text to encode: Hello, World!
Enter shift value (1-25): 3
Encoded text: Kloor/ Zruog$
```

```
./caesar_cipher.sh -d -s
Enter text to decode: Kloor/ Zruog$
Enter shift value (1-25): 3
Decoded text: Hello, World!
```

**Note:** The project aims to create a simple yet effective Caesar cipher tool in Bash, providing users with an easy and secure way to encode and decode messages.