

```
import string
import collections

# List of the most common English letters for frequency substitution
english_common = ['E', 'T', 'A']

# --- Read ciphertext from file ---
with open("ciphertext.txt", "r") as file:
    ciphertext = file.read().strip() # Remove any leading/trailing whitespace
    print("Ciphertext:", ciphertext)

# --- Count letter frequency ---
def count_letter_frequency(ciphertext):
    """
    Counts the frequency of each letter (A-Z) in the ciphertext.
    Non-letter characters are ignored.
    Returns a dictionary with letters as keys and counts as values.
    """

    # Keep only alphabetic characters
    ciphertext = ''.join([c for c in ciphertext if c in string.ascii_letters])

    # Count frequency of each letter (case-insensitive)
    frequency = collections.Counter(ciphertext.upper())

    # Make sure every letter A-Z is represented, even if frequency is 0
    full_freq = {letter: frequency.get(letter, 0) for letter in string.ascii_uppercase}

    return full_freq

# --- User substitution (protecting certain letters) ---
def user_replace_letter(ciphertext):
```

"""

Allows the user to manually replace letters in the ciphertext.

Protects letters 'E', 'T', 'A' from being replaced.

"""

```
ciphertext = ciphertext.upper()
```

```
protected_letters = ['E', 'T', 'A'] # Letters that cannot be changed
```

```
print(f"Current ciphertext: {ciphertext}")
```

```
while True:
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```
    # Ask user for the letter they want to replace
```

```
    old_letter = input("Enter the letter you want to replace (or 'exit' to finish): ").upper()
```

```
    if old_letter == 'EXIT':
```

```
        break
```

```
    if old_letter in protected_letters:
```

```
        print(f"Letter '{old_letter}' is protected and cannot be replaced. Please try again.")
```

```
        continue
```

```
    if old_letter not in ciphertext:
```

```
        print(f"Letter '{old_letter}' not found in the ciphertext. Please try again.")
```

```
        continue
```

```
    # Ask for the new letter
```

```
    new_letter = input(f"Enter the new letter to replace '{old_letter}': ").upper()
```

```
    if len(new_letter) != 1 or new_letter not in string.ascii_letters:
```

```
        print("Please enter a single valid letter.")
```

```
        continue
```

```
# Replace all occurrences of old_letter with new_letter
```

```
ciphertext = ciphertext.replace(old_letter, new_letter)
```

```
    return ciphertext
```

```
# --- Atbash cipher mapping ---
```

```
def atbash_c_
```