

Object Oriented Caesar Cipher

Rewriting with Encapsulation

CaesarCipher

```
public class CaesarCipher {  
    public String encrypt(String input, int key) {  
        String alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";  
        String shiftedAlphabet = alphabet.substring(key) +  
                                   alphabet.substring(0,key);  
  
        StringBuilder sb = new StringBuilder(input);  
        for (int i = 0; i < sb.length(); i++) {  
            char c = sb.charAt(i);  
            int idx = alphabet.indexOf(c);  
  
            ....  
        }  
    }  
}
```

CaesarCipher

```
public class CaesarCipher {  
    public String encrypt(String input, int key) {  
        String alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";  
        String shiftedAlphabet = alphabet.substring(key) +  
                                   alphabet.substring(0,key);  
  
        StringBuilder sb = new StringBuilder(input);  
        for (int i = 0; i < sb.length(); i++) {  
            char c = sb.charAt(i);  
            int idx = alphabet.indexOf(c);  
  
            ....  
        }  
    }  
}
```

CaesarCipher

```
public class CaesarCipher {
```

```
    private String alphabet;
```

```
    private String shiftedAlphabet;
```

```
    public CaesarCipher(int key) {
```

```
        alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
```

```
        shiftedAlphabet = alphabet.substring(key) +  
                             alphabet.substring(0,key);
```

```
    }
```

```
    public String encrypt(String input) {
```

```
        StringBuilder sb = new StringBuilder(input);
```

```
        for (int i = 0; i < sb.length(); i++) {
```

```
            char c = sb.charAt(i);
```

CaesarCipher

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public class CaesarCipher {
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    private String alphabet;
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    private String shiftedAlphabet;
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```
    public CaesarCipher(int key) {
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```
        alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
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```
        shiftedAlphabet = alphabet.substring(key) +  
                           alphabet.substring(0, key);
```

```
    }
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```
    public String encrypt(String input) {
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        StringBuilder sb = new StringBuilder(input);
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        for (int i = 0; i < sb.length(); i++) {
```

```
            char c = sb.charAt(i);
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CaesarCipher

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public class CaesarCipher {
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```
    private String alphabet;
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```
    private String shiftedAlphabet;
```

```
    public CaesarCipher(int key) {
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```
        alphabet = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
```

```
        shiftedAlphabet = alphabet.substring(key) +  
                             alphabet.substring(0, key);
```

```
    }
```

```
    public String encrypt(String input) {
```

```
        StringBuilder sb = new StringBuilder(input);
```

```
        for (int i = 0; i < sb.length(); i++) {
```

```
            char c = sb.charAt(i);
```

CaesarCipher

```
}  
public String encrypt(String input) {  
    StringBuilder sb = new StringBuilder(input);  
    for (int i = 0; i < sb.length(); i++) {  
        char c = sb.charAt(i);  
        int idx = alphabet.indexOf(c);  
        if (idx != -1) {  
            c = shiftedAlphabet.charAt(idx);  
            sb.setCharAt(i, c);  
        }  
    }  
    return sb.toString();  
}
```

Old Way: No Encapsulation

- Old way:
 - CaesarCipher held no data
 - Passed in message + key

message: FIRST LEGION ATTACK EAST FLANK

key: 23

CaesarCipher

.encrypt(message, key)

Old Way: No Encapsulation

- Old way:
 - CaesarCipher held no data
 - Passed in message + key

CFOPQ IBDFLK XQQXZH BXPQ CIXKH

CaesarCipher

`.encrypt(message, key)`

New Way: Encapsulate Key

- New way:
 - CaesarCipher encapsulates key
 - Pass in message only (CaesarCipher has key)

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CaesarCipher

ABCDEFGHIJKLMNOPQRSTUVWXYZ
XYZABCDEFGHIJKLMNOPQRSTUVWXYZ

.encrypt(message)

What Is Benefit?

- Same functionality
 - What is benefit of OO approach?
 - Easier to think of Cipher as logical unit w/ key

Old

message: FIRST LEGION ATTACK EAST FLANK

key: 23



CaesarCipher



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New

message: FIRST LEGION ATTACK EAST FLANK



CaesarCipher

ABCDEFGHIJKLMNOPQRSTUVWXYZ
XYZABCDEFGHIJKLMNOPQRSTUVWXYZ



CFOPQ IBDFLK XQQXZH BXPQ CIXKH