

Turn these ideas into functions

See [03-05-substitution-cipher-small-with-functions.py](#)

Creating a Random Key

Generate random permutation of alphabet with length n:

```
key = ''
for i in range(n):
    select char ch at random from the alphabet
    add ch to the key
    remove ch from the alphabet
```

See [03-06-substitution-cipher-small-with-random-key.py](#)

Creating a Key from a Password

Password can only have characters from the alphabet

1. Remove all duplicate chars from password
2. before = all alphabet chars **before** last char of password
3. after = all alphabet chars **after** last char of password
4. remove password chars from **before** & **after**
5. Concatenate the following:
 - key = password + after + before

Example

```
alphabet = 'abcdef'
pw = 'bedebceed'
```

1. Remove duplicates from PW
pw = 'bedc'
2. Make **before** (alphabet letters before 'c')
before = 'ab'
3. Make **after** (alphabet letters after 'c')
after = 'def'
4. Remove PW chars from **before** & **after**
before = 'a'
after = 'f'
5. Concatenate pw + after + before
key = pw + after + before
= 'bedc' + 'f' + 'a'
= 'bedcfa'

Two Helper Functions:

1. `removeDups(aString)` → Removes all duplicates from `aString`
2. `removeMatches(aString, removeChars)`
→ Remove all chars that are in 2nd string from 1st string

See [03-07-substitution-cipher-small-with-password.py](#)

A Reasonable Alphabet

```
import string
alphabet = string.ascii_letters
          + string.digits
          + string.punctuation
          + string.whitespace
```

Make a function called `getAlphabet()`

See [03-08-substitution-cipher-small-with-alphabet-function.py](#)

Alphabet in a Global Variable

1. How things are added to a namespace:
 - a. Assignment
 - b. import statement
 - c. Function definition
2. The global namespace contains things created outside of any function.

See [03-09-globals.py](#)

3. `fun_A()` Access global variable from inside a function
4. `fun_B()` Assignment creates local variable that *hides* global variable
5. `fun_C()` Use keyword `global` to access global variable
6. `fun_D()` Create global variable from inside a function
7. `fun_E()` Interesting error with `global += value`
8. `fun_F()` Access global variable even when it is hidden by a local variable
9. `fun_G()` Create global var from inside a function, even though its hidden

See [03-10-substitution-cipher-small-with-global-alphabet.py](#)