

## Solutions for Section #5

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### Solution 1: Finding duplicates in arrays

```
def findDuplicate(array):
    for i in range(len(array)):
        elem = array[i]
        if elem in array[i + 1:]: return elem
    return None
```

### Solution 2: Playfair Ciphers

```
def construct_table(passphrase):
    '''
    Constructs a Playfair table as described in the problem statement.
    '''
    if not passphrase.isupper(): return None
    ALPHABET = 'ABCDEFGHIJKLMNOPRSTUVWXYZ' # note Q is omitted
    passphrase += ALPHABET

    square = [[], [], [], [], []]
    count = 0
    for i in range(len(passphrase)):
        ch = passphrase[i]
        if ch.isupper() and ch not in passphrase[:i]:
            square[count // 5].append(ch)
            count += 1
    return square
```

### Solution 3: Reading data structures from files

```
def readEnigmaCodebook(filename):
    codebook = {}
    with open(filename) as inFile:
        lines = inFile.read().splitlines()
        for line in lines:
            columns = line.split(' ')
            date = columns[0]
            order = columns[1]
            setting = columns[2]
            pairings = columns[3:]
            codebook[date] = {
                "rotorOrder": order,
                "rotorSetting": setting,
                "steckerPairing": pairings,
            }
    return codebook
```