

# Quiz 1 Hints

## (1) The cycles

A cycle is a list of **keys** `[k1, k2, k3, ..., kn]` where the first key **k1** of the list is the **value** of the last key **kn**, that is, the following **key:value** elements must exist in the mapping (or dictionary):

`{k1: k2}, {k2: k3}, ..., {kn-1: kn}, and {kn: k1}`

For instance, in the example with `10 9` as input, there is one cycle:

`[1, 5, 6, 7]`

since the following **key:value** elements are in the mapping (or dictionary):

`{1: 5}, {5: 6}, {6: 7}, and {7: 1}`

Please also note that the keys in the cycle are not necessarily ordered. The only requirements is that the first elements of the cycles are in order (and not the elements within the cycle) as shown in the example below:

```
$ python3 quiz_1.py
```

Enter two integers: `12 38`

The generated mapping is:

```
{1: 11, 2: 13, 3: 38, 4: 38, 5: 6, 6: 36, 7: 9, 8: 37, 9: 4, 10: 9,
11: 36, 12: 6, 13: 3, 15: 29, 16: 8, 17: 13, 19: 22, 20: 3, 21: 38,
22: 33, 24: 12, 25: 4, 27: 11, 28: 23, 29: 22, 30: 3, 31: 11, 32:
17, 33: 9, 34: 26, 35: 30, 36: 31, 37: 22, 38: 37}
```

The keys are, from smallest to largest:

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19, 20, 21,
22, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38]
```

Properly ordered, the cycles given by the mapping are:

```
[[4, 38, 37, 22, 33, 9], [11, 36, 31]]
```

The two cycles above are not ordered. However, looking at the first elements of the cycles only, the two cycles are ordered since **4** is smaller than **11**

The (triply ordered) reversed dictionary per lengths is:

```
{1: {8: [16], 12: [24], 17: [32], 23: [28], 26: [34], 29: [15], 30:
[35], 31: [36], 33: [22]},
2: {4: [9, 25], 6: [5, 12], 13: [2, 17], 36: [6, 11], 37: [8, 38]},
3: {3: [13, 20, 30], 9: [7, 10, 33], 11: [1, 27, 31], 22: [19, 29,
37], 38: [3, 4, 21]}}
```

## (2) The (triply ordered) reversed dictionary per lengths

```
$ python3 quiz_1.py
```

Enter two integers: 0 4

The generated mapping is:

```
{2: 3, 4: 1}
```

The keys are, from smallest to largest:

```
[2, 4]
```

Properly ordered, the cycles given by the mapping are:

```
[]
```

The (triply ordered) reversed dictionary per lengths is:

```
{1: [4], 3: [2]} ← first generate the reversed dictionary
```

```
{1: {1: [4], 3: [2]}} ← final result
```

```
$ python3 quiz_1.py
```

Enter two integers: 0 6

The generated mapping is:

```
{1: 1, 3: 3, 5: 6, 6: 6}
```

The keys are, from smallest to largest:

```
[1, 3, 5, 6]
```

Properly ordered, the cycles given by the mapping are:

```
[[1], [3], [6]]
```

The (triply ordered) reversed dictionary per lengths is:

```
{1: [1], 3: [3], 6: [5, 6]} ← first generate the reversed dictionary
```

```
{1: {1: [1], 3: [3]}, 2: {6: [5, 6]}} ← final result
```