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Objektorientierte Programmierung, SoSe 17

Übung 05

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Tutorium 10

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1 Aufgabe 1 siehe handschriftliches Blatt

2 Aufgabe 2 siehe handschriftliches Blatt

3 Aufgabe 3 siehe handschriftliches Blatt

4 Türme von Hanoi in Python iterative lösung

Listing 1: Code zu Aufgabe 4

```
1 r"""
2 Übung 5
3 Aufgabe 4
4
5 Iterative Solution for Problem "Towers of Hanoi"
6
7 Similar to solution:
8 http://www.geeksforgeeks.org/iterative-tower-of-hanoi/
9
10 """
11
12 def hanoi_iterative(n, source, helper, target):
13
14     # calculate total number of moves
15     tot_mov = 2**n - 1
16
17     # if numbers of discs is even interchange target and helper
18     if n%2 == 0:
19         [aux,trg] = [target,helper]
20     else:
21         [aux, trg] = [helper,target]
22     i = 0
23     while i < tot_mov:
24         i = i + 1
25
26         if i%3 == 1:
```

```

27         legal_move(source,trg)
29     if i%3 == 2:
30         legal_move(source,aux)
32     if i%3 == 0:
33         legal_move(aux,trg)
35     print("{}: {} \t{}: {} \t{}: {}\n" .format(source[1], source[0], aux[1], aux[0],
trg[1], trg[0]))

38 def legal_move(pole1, pole2):
39     if not pole2[0]:
40         pole2[0].append(pole1[0].pop())
41         print("move disk {} from {} to {}".format(pole2[0][-1], pole1[1], pole2[1]))

43     elif not pole1[0]:
44         pole1[0].append(pole2[0].pop())
45         print("move disk {} from {} to {}".format(pole1[0][-1], pole2[1], pole1[1]))

47     elif pole2[0][-1]>pole1[0][-1]:
48         pole2[0].append(pole1[0].pop())
49         print("move disk {} from {} to {}".format(pole2[0][-1], pole1[1], pole2[1]))

51     else:
52         pole1[0].append(pole2[0].pop())
53         print("move disk {} from {} to {}".format(pole1[0][-1], pole2[1], pole1[1]))

56 if __name__ == '__main__':
57     n = int(input("How many discs?:\n"))

59     source = list(range(1,n+1)) # Creates list from 1 to n
60     source = (source[::-1], "Anfang") # Invertes the order
61     target = ([], "Ziel")
62     helper = ([], "Hilfsstab")
63     hanoi_iterative(n,source,helper,target)

```