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Objektorientierte Programmierung, SoSe 17

Übung 01

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Tutorium 10

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1 Aufgabe: Wochentage

(10 Punkte)

Berechnet den Wochentag anhand des Datums

Listing 1: Beispiel: Code zu Aufgabe 1

```
1 def weekdays(day, month, year):
2     r"""
3
4     Parameters
5     -----
6     day: integer value,
7         day of the month, has to be between 1 and 31
8     month: integer value,
9         month as in the gregorian calender, has to be between 1 and 12
10    year: integer value,
11        year
12
13    Returns
14    -----
15    weekday: string
16
17    """
18
19    # check input data
20    if not (day > 0 and day <= 31):
21        raise ValueError('please, choose a day between 1 and 31.')
22    if not (month > 0 and month < 12):
23        raise ValueError('please, choose a month between 1 and 12.')
24    if (month == 2 and day > 29):
25        raise ValueError('The Month February as maximal 29 days')
26    if (month in [4, 6, 9, 11] and day > 30):
27        raise ValueError('April, June, September and November have just 30 days')
28
29    # initialize weekday list
30    weekday = ['Sunday', 'Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Saturday']
31
32    # Calculate Weekdays by Georg Glaeser
33    # https://de.wikipedia.org/wiki/Wochentagsberechnung
34    transformed_month = ((month - 3) % 12) + 1
```

```

35 century = int(year/100)
36 decade = year - century*100

38 #adapted decade and century

40 if (month == 1) | (month == 2):
41     decade = (decade - 1) % 100
42     if decade == 99:
43         century -= 1

45 w = int((day + (2.6 * transformed_month - 0.2) + decade + (decade/4) + (century/4) - 2
46         * century) % 7)

47 return weekday[w]

49 print('script gives you the weekday of the entered date')
50 date = input('Enter date in form day,month,year :')
51 date = date.split(',')
52 day, month, year = int(date[0]), int(date[1]), int(date[2])

54 weekday = weekdays(day, month, year)
55 print(day, '.', month, '.', year, 'is a', weekday)

```

2 Aufgabe: Summen berechnen

(12 Punkte)

Listing 2: Beispiel: Code zu Aufgabe 2

```

1 # Definition of functions
2 # The end of the sum is passed as an argument

4 def sum_1(maximum):
5     sum = 0

7     for i in range(1, maximum+1):
8         sum += i

10    return sum

12 def sum_2(maximum):
13     sum = 0

15     for i in range(1, maximum+1):
16         sum += 1/i

18    return sum

20 def sum_3(maximum):
21     sum = 0

23     for i in range(1, maximum+1):
24         sum += 1/i**2

26    return sum

28 def sum_4(maximum):
29     sum = 0

31     for i in range(1, maximum+1):
32         sum += 1 / fac(i)

34    return sum

36 def fac(i):
37     if i < 2:

```

```

38         return 1
40
41     faculty = 1
42
43     for k in range(2, i+1):
44         faculty *= k
45
46     return faculty
47
48 # User interaction
49 sum_no = int(input("Which sum would you like to calculate? "
50                  "Choose a Number between 1 and 8:\n"))
51
52 # Process input
53 if sum_no == 1:
54     print(sum_1(100))
55 elif sum_no == 2:
56     print(sum_1(100000))
57 elif sum_no == 3:
58     print(sum_2(100))
59 elif sum_no == 4:
60     print(sum_2(100000))
61 elif sum_no == 5:
62     print(sum_3(100))
63 elif sum_no == 6:
64     print(sum_3(100000))
65 elif sum_no == 7:
66     print(sum_4(20))
67 elif sum_no == 8:
68     print(sum_4(1000))
69 else:
70     print("Wrong input.")

```

3 Aufgabe: Multiplikation

(8 Punkte)

Listing 3: Beispiel: Code zu Aufgabe 3

```

1 print('perform a multiplication with a value greater than 0 or terminate the program with 0
2 ')
3 x = int(input('Enter a number :'))
4 #check initial value
5 if x == 0:
6     raise ValueError('number has to be different from zero')
7 #set y=1 to enter while loop
8 y = 1
9 while y!= 0:
10     y = int(input('Enter a number, to terminate enter zero:'))
11     if y<0:
12         x *= y
13     elif y > 0:
14         x *= y
15     print(x)
16     else:
17         break
18 print('result of the product of all inserted number is: ',x)

```