

Complexity Economics: Problem Set Lab 1

Please proceed as follows:

- Solve problems 1-4 together in pairs. Try different programming techniques. See what works for you.
- Keep an eye on the time. It is not important to complete all problems, but to do those well, that you want to do. Do the ones you find interesting first.
- After ca. 60 minutes, we will discuss the solutions. In case you have time left, consider problem 5.
- Claudius and Torsten are around. Talk to us whenever you have questions. And even if you don't have questions.

1. Write a python script to compute the sum of all integer numbers between 0 and 100 that are not evenly (without remainder) divisible by either 4 or 5. That is, the numbers

$$\{1, 2, 3, 6, 7, 9, 11, 13, 14, 17, 18, \dots\}.$$

2. Consider the code in problem 1 again and rewrite the computation as a function such that the intervals (from 0 to 100 in problem 1) can be passed as arguments. Use this function to compute the sums of all integers not divisible by 4 or 5 in the following intervals [100, 300], [100, 300], [10000, 20000].

3. Consider the Fibonacci series, defined as

$$a_n = a_{n-1} + a_{n-2} \quad \text{for } n > 2 \quad \text{with } a_1 = 1, a_2 = 1,$$

thus {1, 1, 2, 3, 5, 8, 13, 21, 34, 55}. Write a python function to compute the n'th Fibonacci number. E.g, the function called with argument 9 should return 34; with argument 10, it should return 55 etc.

4. Use the function from problem 3 to compute the 40th Fibonacci number.

5. Consider the following code listings. In each code listing there is a mistake. Correct the mistakes.

Script 0

```
1 """Sum integers from 1 to 10"""
2 result = 0
3 for i in range(10)
4     result += i
```

Script 1

```
1 """Sum integers from 1 to 10"""
2 result = 0
3 i = 1
4 while i <= 10
5     result += i
```

Script 2

```
1 """Function to compute relation of two arguments a and b"""
2 def rel(a, b):
3     return a / b
4
5 a = "2"
6 b = 20
7 result = rel(a, b)
```

Script 3

```
1 """Function to compute factorial of integer b"""
2 def factorial(result, a):
3     if a > 1:
4         result = factorial(result, a-1)
5     result *= a
6     return result
7
8 b = 20
9 result = factorial(b)
```

Script 4

```
1 """Function to compute factorial of integer b"""
2 def factorial(result, a):
3     if a > 1:
4         result = factorial(result, a-1)
5     result *= a
6
7 b = 20
8 result = factorial(1, b)
```

Script 5

```
1 """Function to compute factorial of integer b"""
2 def factorial(result, a):
3     while a > 1:
4         result = factorial(result, a-1)
5     result *= a
6     return result
7
8 b = 20
9 result = factorial(1, b)
```