algorithmica

Programming Language Learning Series
Mastery of Python Language
(Interview Questions/Assignment-Functional Style)

Q1: Starting with range(1, 20), make a list of the squares of each odd number in the following ways:

- With a for loop
- Using a list comprehension
- Using map and filter

Q2: Rewrite the following code into functional form using lambdas, map, filter and reduce:

```
n = 10
s = 10
for i in range(n):
    if i % 2:
        s |= i**2
s
```

Q3: How many numbers in range(100, 1000) are divisible by 17 after you square them and add 1? Find this out using only lambda functions, map, filter and reduce on xs, where xs = range(100, 10000). Hint: In pseudo-code, the logic looks like this

```
xs = range(100, 10000)
count(y for y in (x**2 + 1 for x in xs) if y % 17 == 0)
```

Q4: Write a flatmap function that works like map except that the function given takes a list and returns a list of lists that is then flattened.In other words, flatmap takes two arguments, a function and a list (or other iterable), just like map. However the function given as the first argument takes a single argument and returns a list (or other iterable). In order to get a simple list back, we need to unravel the resulting list of lists, hence the flatten part. For example,

```
flatmap(lambda x: x.split(), ["hello world", "the quick dog"])
                should return
["hello", "world", "the", "quick", "dog"]
```