



Programming for Data Science: Lab04 Recursion

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Exercise 1

- Given a decimal number as input, we need to write a program to print the given decimal number in equivalent binary number.

```
In [38]: 1 binarise(9)
```

```
1001
```

```
In [39]: 1 binarise(4)
```

```
100
```

Fibonacci series

- The Fibonacci Sequence is the series of numbers such that each number is the sum of the two preceding ones, starting from 0 and 1
 - $x(n) = x(n-1) + x(n-2)$
- The first 10 terms are
0, 1, 1, 2, 3, 5, 8, 13, 21, 34

Exercise 2

- Given n as an input, write a recursive function that compute the n -th term of the series

```
In [44]: 1 fibonacci(6)
```

```
Out[44]: 5
```

```
In [45]: 1 fibonacci(9)
```

```
Out[45]: 21
```

Exercise 3

- Write a function to count the digits of a given number using recursion

```
In [50]: 1 digit_count(1000)
```

```
Out[50]: 4
```

```
In [51]: 1 digit_count(4)
```

```
Out[51]: 1
```

Exercise 4

- Write a function to get the largest digits of an integer using recursion

```
In [57]: 1 largest_digit(8712)
```

```
Out[57]: 8
```

```
In [58]: 1 largest_digit(4321)
```

```
Out[58]: 4
```



Exercise 5

- Given a range of numbers specify by ***min***, ***max*** and ***step***, write a function to calculate a sum of numbers in the range.
 - the last number in the range is a number less than or equal to ***max***

- Example

```
In [69]: 1 range_sum(1,5,1)
```

```
Out[69]: 15
```

```
In [67]: 1 range_sum(1,5,2)
```

```
Out[67]: 9
```

```
In [68]: 1 range_sum(1,5,3)
```

```
Out[68]: 5
```



Exercise 6

- Given an integer and its number of digits, write a function that returns True if the given number is palindrome, else False.
- For example, 12321 is palindrome, but 1451 is not palindrome.

Examples

```
In [27]: 1 palindrome(12321,5)
```

```
Out[27]: True
```

```
In [28]: 1 palindrome(1232,4)
```

```
Out[28]: False
```

```
In [25]: 1 palindrome(55,2)
```

```
Out[25]: True
```

```
In [26]: 1 palindrome(4,1)
```

```
Out[26]: True
```