Chapter 5: `while` loop

Exercise 1

Write a `while` loop which print numbers from 0 to 20 in increasing order without using the instruction `if`:

```
sage: # edit here
```

Same question but in decreasing order:

```
sage: # edit here
```

Exercise 2

What is the below program doing?:

```
a, b, c = 1, 1, 1
while c < 11 :
    print(c, ": ", b)
    a, b, c = b, a+b, c+1

sage: # edit here
```

Exercise 3

Using a `while` loop, write a function `orbit_product_of_digits(n)` which returns the list of successive iterations of the function which returns the product of digits, that is, `[n, product_of_digits(n), product_of_digits(product_of_digits(n)), ..., z]` until a computed number `z<10` is reached that can be written with only one digit:

```
sage: # edit here
```

Can you find a number n such that the length of the orbit is larger than 5?:

```
sage: # edit here
```

... larger than 10?:

```
sage: # edit here
```

Exercise 4

The Taylor series of $\sin(x)$ is

$$\sin x = \lim_{n \to \infty} \sum_{k=0}^{n} \frac{(-1)^k}{(2k+1)!} x^{2k+1} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots$$

Write a function `taylor_sin(x)` which evaluates the Taylor series neglecting the terms of the sums that are less than 10^{-5} in absolute value:

```
sage: # edit here
```