

Week 5

Friday 10/3/2025

## More about Iteration

### A. Iteration

· Meaning: repeated execution of a sequence of statements

e.g.  $\begin{matrix} \text{for} \\ \text{while} \end{matrix} \leftarrow \begin{matrix} \text{for } f \text{ in } ["A", "B", "C"] : \\ \text{for } i \text{ in range}(1, 9) : \end{matrix}$

### B. The While Statement

e.g. `while aNumber <= 10:`

`return theSum`

Fun: create a turtle until goes out of screen

### C. The 3n+1 sequence

```
while n != 1:
    print(n)
    if n % 2 == 0:
        n = n // 2
    else:
        n = n * 3 + 1
    print(n)
```

★

### D. Newton's method

```
def newtonSqrt(n, howmany):
    approx = 0.5 * n
    for i in range(howmany):
        betterapprox = 0.5 * (approx + n / approx)
    return betterapprox
```

### E. Other uses of while

#### 1. Sentinel values

· zero is the sentinel value

e.g. checking out the price at the store

#### 2. Validating input

· Use to receive the valid answer

↳ use the `upper()` method (mentioned in string methods)

### F. Algorithms

#### G. 2-Dimensional iteration: image processing

##### 1. The RGB color model

##### 2. Image Objects