Lesson 5: Exercises

5.1 Write a conditional statement that prints:

- a number if the number is even
- the string `odd` if the number is odd.

Entrée [ ]:

5.2 Rewrite the code from 5.1 using a ternary operator.

Entrée [ ]:

5.3 Write a loop that prints the squares of integers between 1 and 100.

Entrée [ ]:

5.4 Rewrite the code from 5.3 such that the squares of integers (starting from 1) is printed as long as the squares are not greater or egal to a value limit given a priori.

Entrée [ ]:

5.5 Given a number N,

- print `Tik` if N is divisible by 3,
- print `Tok` if N is divisible by 5,
- print `TikTok` if N is divisible by 3 and 5,
- Otherwise just print the number itself

Entrée [ ]:

5.6 Write a function `add_one` that adds 1 to its input.

Entrée [ ]:

5.7 By two different ways, use broadcast to increment every element of matrix `A` 2x2 by 1 and assign it to a variable `A1` .

Entrée [ ]:

5.8 Consider the function waouh defined as follow:

```
waouh(x::Int64) = println("waouh with one integer represented on 8 bytes!")
```

1. Extend the function `waouh` , adding a method that takes only one input argument, which is of type Bool, and prints "waouh with one boolean!"
2. Check that the method being dispatched when you execute

```
waouh(true)
```

is the one you wrote.

Entrée [ ]:

5.9 Application:

We consider a series of measures given. For example: `1 1 3 4 6 2`

Code a program which returns one of this symbol among $-$, $+$, $=$, $\sim$ if the series is

- constant ($=$)
- monotonic ($+$)
- nonmonitonic ($-$)
- otherwise ($\sim$)

Examples:

- `5 3 1` $\Rightarrow$ $-$
- `1 1 3` $\Rightarrow$ $+$
- `4 4 4 4` $\Rightarrow$ $=$
- `1 1 3 4 6 2` $\Rightarrow$ $\sim$

Entrée [ ]:

5.10 Application:

Let $f : [a; b] \to \mathbb{R}$ a function strictly monotonic on the interval $[a, b]$. We suppose the equation $f(x) = 0$ has one and only one solution on the interval. Determine this value for a given precision using a dichotomic principle.

Entrée [ ]:

5.11 Application:

For the unidimensional 01 knapsack problem,

$$z = \max \left\{ px \mid wx \leq c,\ x \in \{0, 1\}^n \right\}$$

with

- $n = 5$
- $p = (5, 3, 2, 7, 4)$
- $w = (2, 8, 4, 2, 5)$
- $c = 10$

compute the linear relaxation.

Entrée [ ]: