

# Basic algorithmics: getting started

IGNITE workshop - Nadège Guiglielmoni

# Basic algorithmics

## What is an algorithm ?

- consecutive operations/instructions to obtain a result
- solving a problem with a step-by-step solution
- from input to output

# Basic algorithmics

## Example : doing the dishes

You : Do the dishes.

Kid :



# Basic algorithmics

**Example : doing the dishes**

Procedure : doing the dishes

*Input* : dirty plate

Start...End

*Output* : clean plate

# Basic algorithmics

## Example : doing the dishes

Procedure : doing the dishes

*Input* : dirty plate

Start

- Take sponge, plate

- Wet sponge, plate

- Put dish soap on sponge

- Scrub the plate

- Rince the plate

- Put plate on rack

End

*Output* : clean plate

# Basic algorithmics : loops

## Repeating an action : for loops

```
for ( an element in a list of elements )  
do  
    ...
```

ex :      for i in 0 to 5 :  
             print i

displays 0, 1, 2, 3, 4

# Basic algorithmics : loops

## Example : doing the dishes

Procedure : doing the dishes

*Input* : pile of dirty dishes

Start

for dish in pile\_of\_dishes :

    Take sponge, dish

    Wet sponge, dish

    Put dish soap on sponge

    Scrub the dish

    Rince the dish

    Put dish on rack

End

*Output* : pile of clean dishes

# Basic algorithmics : loops

## Repeating an action : while loops

```
while ( condition is true )  
do  
    ...
```

```
ex :      i = 0          ← variable  
          while ( i < 5 ) :  
              print i  
              i = i + 1
```

displays 0, 1, 2, 3, 4



# Basic algorithmics : loops

## Example : doing the dishes

Procedure : doing the dishes

*Input* : pile of dirty dishes

Start

while (pile\_of\_dishes is not empty) :

    Take sponge, dish

    Wet sponge, dish

    Put dish soap on sponge

    Scrub the dish

    Rince the dish

    Put dish on rack

End

*Output* : pile of clean dishes

# Basic algorithmics

- **Variables** : to keep a value (integers, floats, characters...)  
name = value
- **For loops** : repeat an action over a list of elements
- **While loops** : repeat an action as long as a condition is true
- **Tests**

# Basic algorithmics : conditions

**Tests : if ... else if ... else ...**

Execute an action only if the condition is true

ex 1 :           if (dish is dirty) :  
                  wash dish

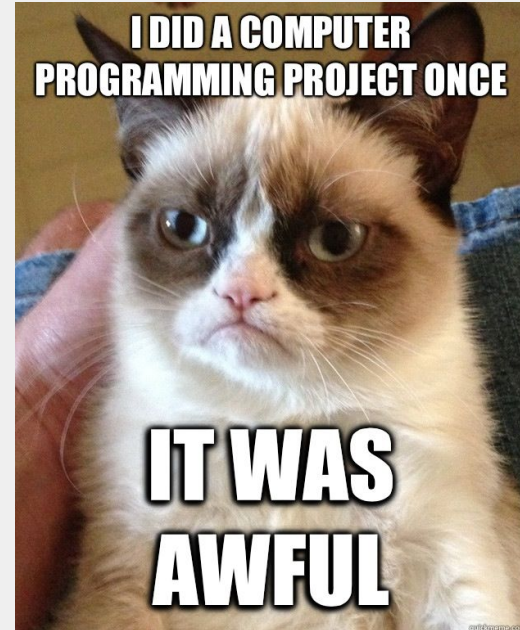
ex 2 :           if (dish is dirty) :  
                  wash dish  
          else :  
                  put dish back in drawer

# Basic algorithmics : conditions

```
ex 3 :      if (dish is dirty) :  
              wash dish  
  
            else if (dish is wet) :  
              put dish on rack  
  
            else :  
              put dish back in drawer
```

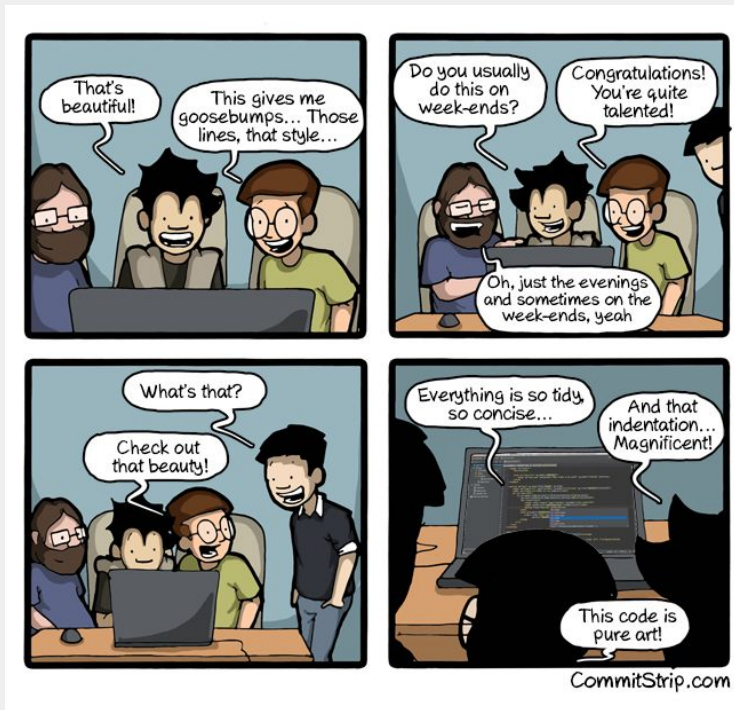
# Good practices in coding

## I. Think before you code



# Good practices in coding

## II. Write clean code and comment #



# Good practices in coding

## III. Test your code



# Good practices in coding

## IV. When in doubt :

RTFM

Google it





# Practical time

Connecting to LRZ :

- open terminal
- type : `ssh yourusername@lxlogin8.lrz.de`

Getting the workshop archive :

- git clone [https://gitlab.lrz.de/ru45nih/ITN\\_IGNITE\\_workshops](https://gitlab.lrz.de/ru45nih/ITN_IGNITE_workshops)