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# How to make teenage girls love coding using Python and the visual arts orienting language Processing?

Maude Pupin, Philippe Marquet, Yann Secq

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# How to make teenage girls love coding using Python and the visual arts orienting language Processing ?

**Maude Pupin, Philippe Marquet, Yann Secq**

Ch'ti code  
[chticode.info/](http://chticode.info/)

*Introduction*

# **Women in computer science**

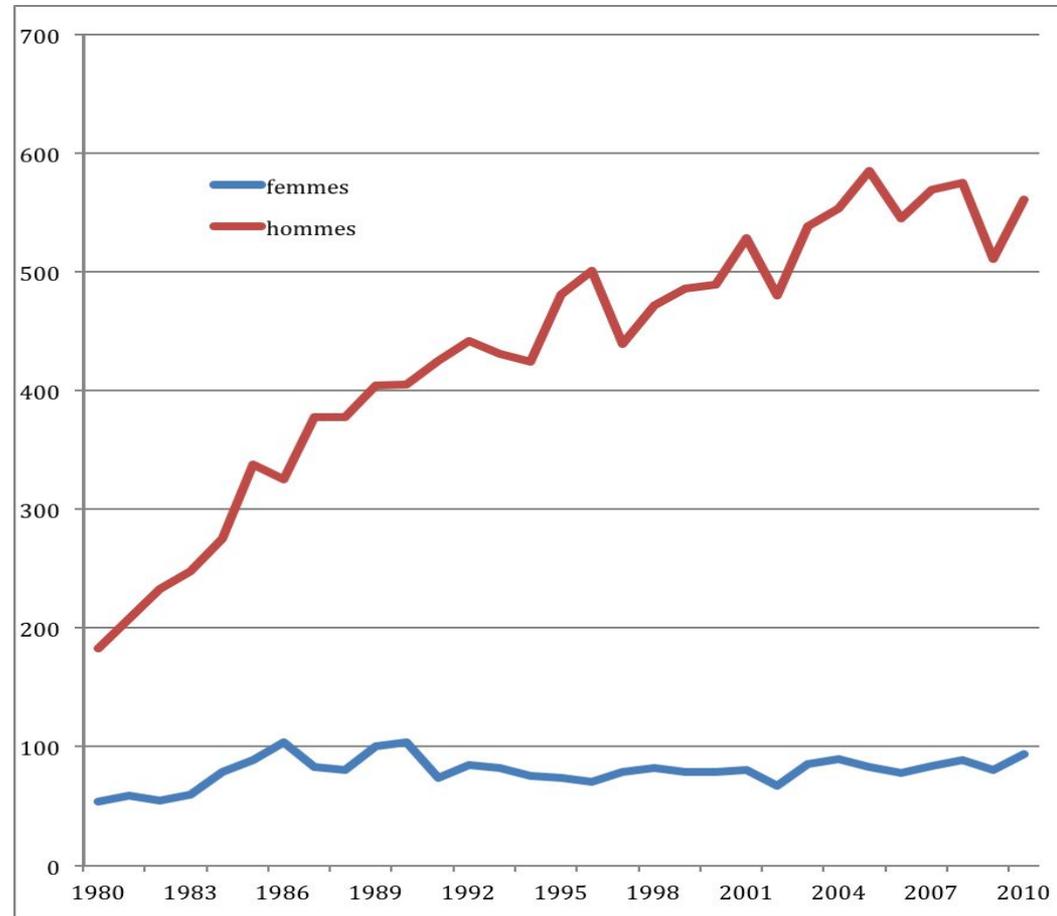
## Women in computer science...

**Computer science companies want more women in their teams  
& drop of women among computer science students proportion**

- **More women in CS companies**  
more employees, less women  
diversity of teams, ideas
- **Compagnies recruit students**
- **Few women among CS students  
And proportion decreases**  
80's advent of home PC  
Stereotype of the male geek

**Shared statement of fact  
between Companies & Universities**

→ **Shared solutions!**



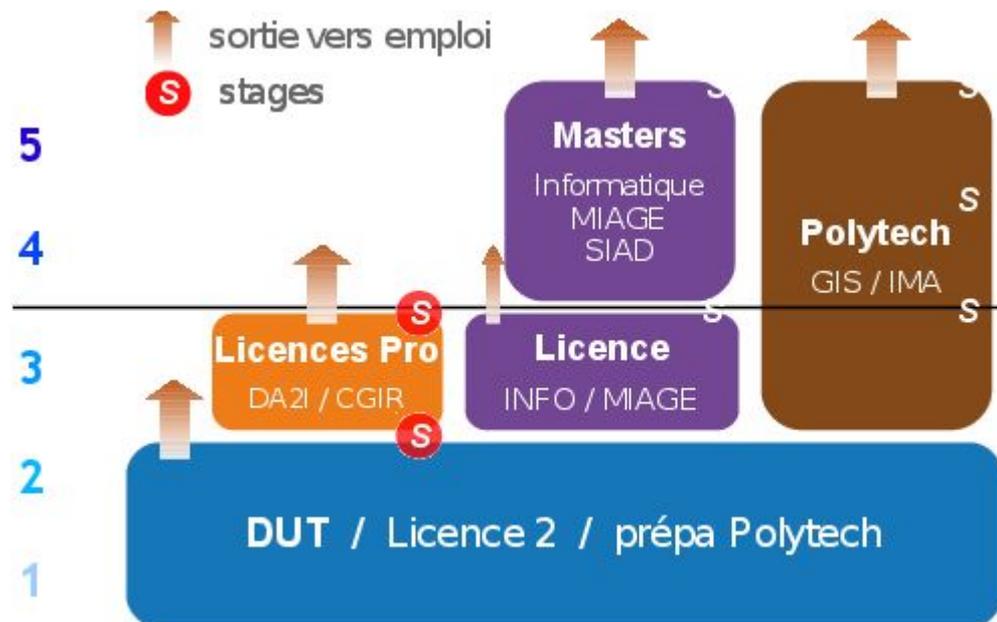
# Women in computer science... in Lille

## 2013 – CS Companies and University of Lille

- **“Women in IT” IBM & Euratechnologie**  
want to recruit women
- **Computer science at University of Lille**  
12% of women

**Working group @ Univ Lille**  
– CS teachers/researchers  
– companies relationship  
service

**Companies partnership**



# “Informatique au féminin” working group @UnivLille1

## *University and companies promote computer science to girls*

- **Observation**

Low number of women in computer science students

- **Round tables**

first grade students  
present the variety of computer science jobs  
ex-student testimony

- **Role model - videos**

large audience  
secondary school - guidance services  
3-4 minutes portraits of women in CS

- **Scientific Mediation**

secondary school girls invited by IT companies  
Unplugged CS booth

- **Communication**

femmes.fil.univ-lille1.fr/  
@InfoAuFeminin  
facebook.com/infoaufeminin

*and...*

*Scholarships to study computer science*



**Femmes et informatique**

**Informaticien, un métier d'homme ? Bien sûr que non !**

# Scholarships to study computer science

## *Flagship action of the "informatique au féminin" group*

- **4000€ / year**  
girls following CS courses up to BAC+3
- **Companies philanthropy and partnership**  
sponsorship  
participation in recruiting  
"marrainage" of female students
- **Students implication**  
ambassadors of the company
- **31 scholarships since 2015**  
currently 21 students

*and...*  
**"L codent, L créent"**



*L codent, L créent*

**Initiation to computer science  
through creative coding**



# “L codent, L créent”

## *An innovative activity to make girls enjoy coding*

- **A coding activity dedicated to young girls, hosted by young girls**
  - Girls are concerned, they can't censure
  - They have not yet amassed prejudices
  - The supervisors won't judge them, they are not teachers
- **Creative and innovative activity**
  - The main goal is to create digital works
  - Animations and interactivity is simple to handle
  - The only way to create an artwork is to code
- **Processing is the ideal language**
  - “Processing is a flexible software sketchbook and a language for learning how to code within the context of the visual arts.”



# Is digital arts is a good way to discover programming ?

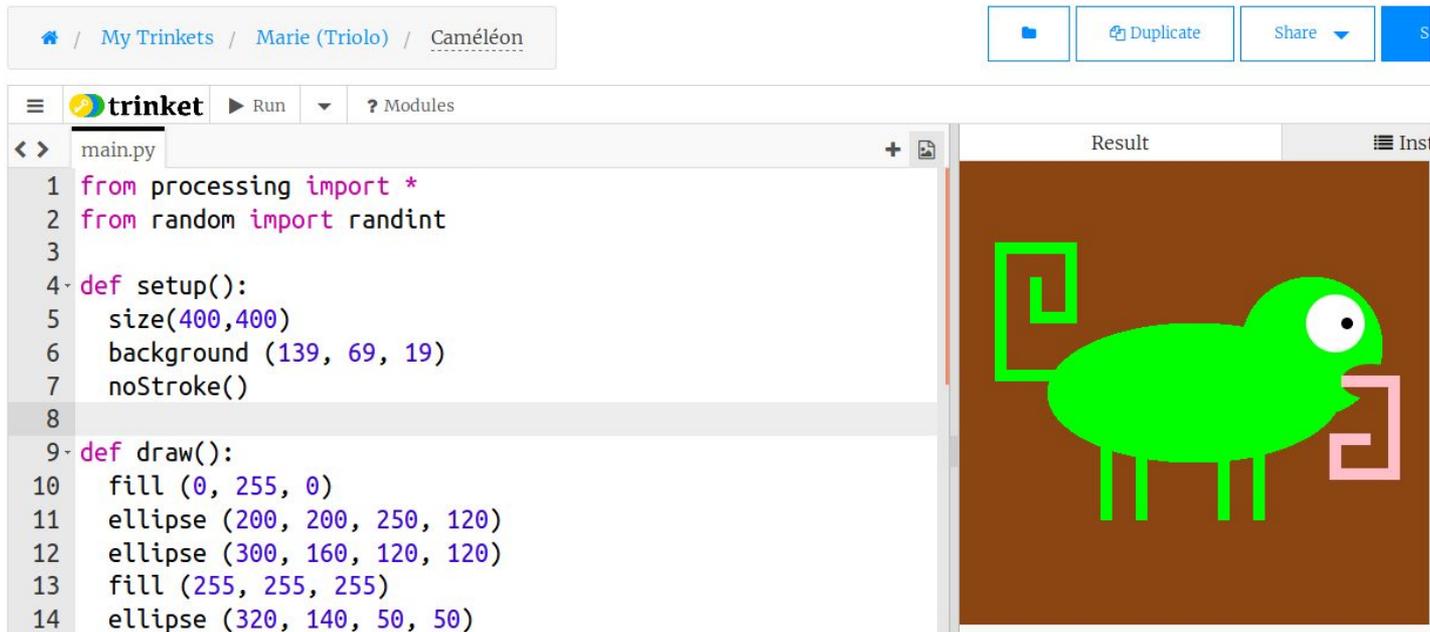
*Yes, because it associates coding to creation*

## Pros

Art is a creating pursuit  
Code is not seen as a creating pursuit  
although it is !

## Cons

Don't need to use advance coding  
instructions to create nice digital arts



The screenshot shows the Trinket IDE interface. The top navigation bar includes a home icon, the path "/ My Trinkets / Marie (Triolo) / Caméléon", and buttons for "Duplicate", "Share", and "S". Below the navigation bar is the Trinket logo, a "Run" button, and a "Modules" dropdown. The main editor area displays a Python script in a file named "main.py". The code defines a "setup()" function and a "draw()" function. The "draw()" function uses the "processing" library to create a green caterpillar with a white eye, pink antennae, and legs, set against a brown background. The rendered result is shown in a window titled "Result", displaying the green caterpillar with its pink antennae and legs.

```
1 from processing import *
2 from random import randint
3
4 def setup():
5     size(400,400)
6     background (139, 69, 19)
7     noStroke()
8
9 def draw():
10    fill (0, 255, 0)
11    ellipse (200, 200, 250, 120)
12    ellipse (300, 160, 120, 120)
13    fill (255, 255, 255)
14    ellipse (320, 140, 50, 50)
```

*So Processing is  
a good choice*

# Technical issues

*Processing is available with different languages, is Python better ?*

## Python

Simple to learn as a first language

You need to install an interpreter ...

=> Why have we used **Trinket** ?

- Run and write code in any browser, on any device.
- Work instantly, with no need to log in, download plugins, or install software.
- Easily share or embed the code with your changes when you're done.

## Javascript

Complex programming language

Directly interpreted in your browser

[openprocessing.org](https://openprocessing.org)

- Share your sketches with others
- Help and collaborate with the community
- Follow classes around the world teaching processing

*Outcome*

**Teenage girls like to create  
through code :)**

# “L codent, L créent”

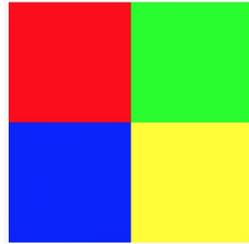
## *A condensed planning for the first year*

- **Planned in two secondary schools of Villeneuve d’Ascq**  
Among the 6 schools around University  
Simone de Beauvoir and Triolo  
Not too far from the University so the students can go there
- **During lunch time**  
45 min long  
Pupils have time to do non teaching activities during lunch  
Students are also available (they don’t miss courses)
- **Condensed on 1 month**  
2 sessions a week
- **Final step: public exhibition at Lille University**  
To motivate the girls to produce their own digital art  
To have an unusual and friendly event

# Pedagogical progression (really fast !)

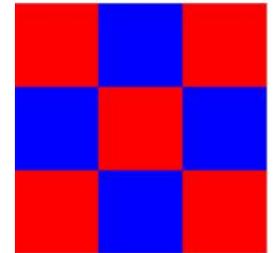
- **First session**

Instruction, sequence of instructions, coordinate systems, colors in processing (everything within `setup()`)



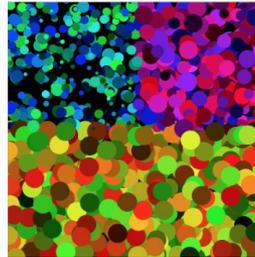
- **Second session**

Loops (for) and alternatives (if) and variables !  
Students are crucial for this step



- **Third session**

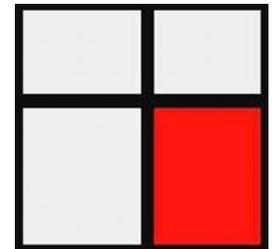
The principle of animation  
`setup() + draw() !`



- **Fourth session**

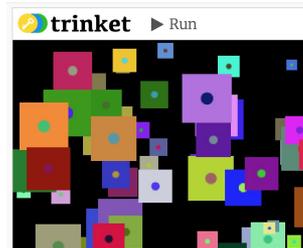
Interactivity: "event-based" programming (mouse)

`mouse.x / mouse.y`



- **Fifth session**

Create your own function ... + event-based prog.  
`def xx() : +`  
`def keypressed() :`



- **Sixth session**

Some examples to be inspired ... created by students :)



- **Seventh and eighth sessions : building your own digital art !**

<https://wikis.univ-lille1.fr/chticode/wiki/ecoles/lclc/2017/home>

# “L codent, L créent”

## A final exhibition

- At the University with teenage girls and their families
- Professional and academic background of women working in CS
- Presentation of a digital artist planned (but canceled)
- Presentation of PhD students working in the HMI research field
- Presentation of teenage girls visual work of art

## Collèges Simone de Beauvoir & Triolo Université de Lille - Sciences & Technologies

9h15  
9h30

**Accueil à LILLIAD  
Learning Center Innovation**

9h30  
9h45

**Présentation de l'action**  
« L codent, L créent »

9h45  
10h30

**Témoignages de doctorantes**  
Amira CHALBI et Nicole PONG

10h30  
11h15

**Exposition des oeuvres**  
numériques réalisées par les  
collégiennes de 4ème et 3ème

11h15  
12h00

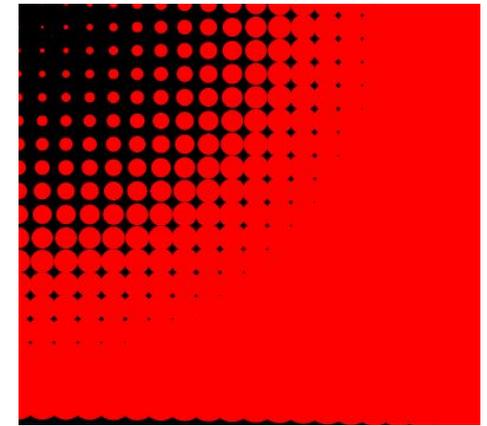
**Pot de clôture**



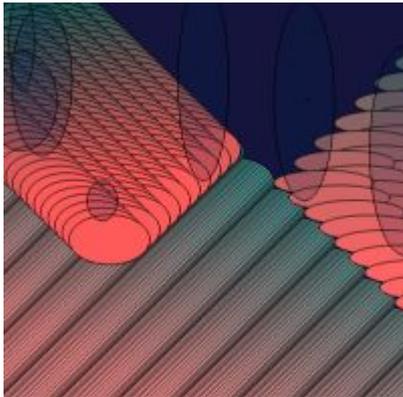
Salomé, (Triolo)



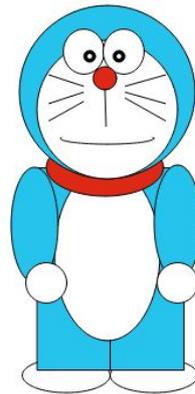
Élina et Lucie (SdB)



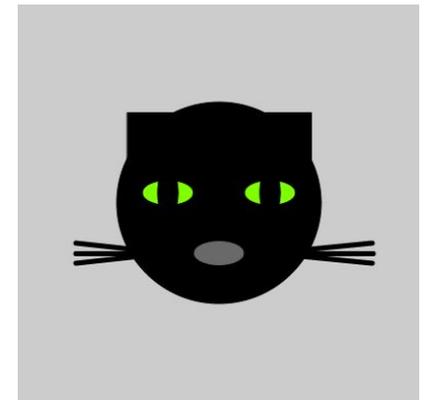
Océane (Triolo)



Imana (Triolo)



Imane (SdB)



Marie (Triolo)

## The coding activity was plebiscited



- **22 schoolgirls exhibited their works**  
They appreciate coding and creating nice and funny visual works
- **55 people visited the exhibition**  
The pupil parents came, and also colleagues from schools or university
- **Teachers and school principals wanted to continue next year**  
They were happy to offer a new activity to their pupils because the teenage girls like it and because it opens to business world

WE LEARN  
SO MUCH !

THANK YOU  
TO ALL

THIS WAS  
TOO SHORT

NICE  
PROJECT

NOT ENOUGH  
SESSIONS

# They speak of us



- **In regional education authority**  
The digital director wants to extend our action to other schools
- **In Lille University**  
Announced in the newsletter  
Colleagues want to join us  
CS department dynamics
- **In Nord'Eka**  
A pluri-media magazine to discover sciences in North of France  
Dedicated to teenagers
- **In Conferences**  
PyParis 2017 ;)   
womENCourage 2017 (ACM event)

<http://nord-eka.fr/femmes-et-informatique-vision-des-jeunes-sur-linformatique/>

*Outcome*

**Conclusion and perspectives**

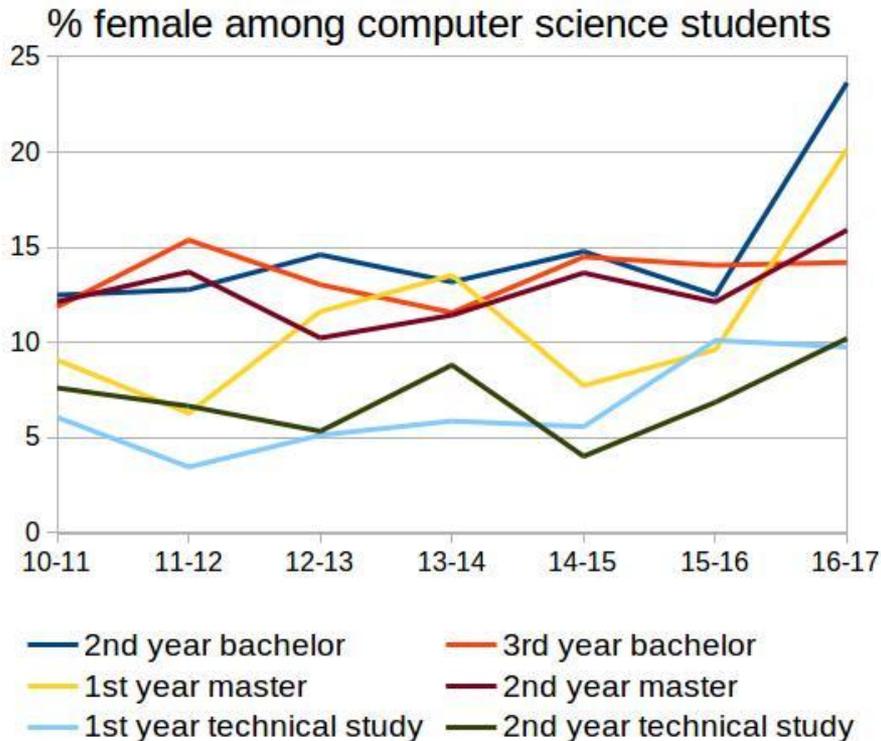
# How to promote our diploma and ITs job ?

*By making students coming to schools and pupils coming to university*

- **Female computer science students led the sessions in the schools**  
A complicity has borned between the teenage girls and the female students  
Teenage girls see that women enjoy studying computer science at university
- **Teenage girls and their parents came to the university**  
It's not far from their house  
Nice working environment
- **Presentation of scientific and technical jobs linked to computer science**  
Female PhD student and manager testimonies  
Yes, women works in IT and like it  
Yes, companies want to hire women in their IT teams  
IT jobs are various

## Actions of *Info au féminin* are successful

### Proportion of female computer science students grows at Lille university



- **2nd year bachelor, more details**

- 28% of the students taking their exams are females
- 7 females are in the 14 better students
- 13 females are in the 30 better students
- 31 females among the 89 graduates

- **3rd year bachelor, more details**

- 6 females are in the 20 better students



## Acknowledgments

*Thanks to all who made this project a success*



- **Informatique au féminin and their partners**

IT companies and services sponsored actions of the collective and so financed the salaries of the female students

- **Secondary schools teachers**

They promoted the activity to the pupils and organized locally the practical sessions

- **Female computer science students**

They supervised the practical sessions



**FIL**  
Formations  
en Informatique  
de Lille