# 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 ?

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Ch'ti code
**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!***

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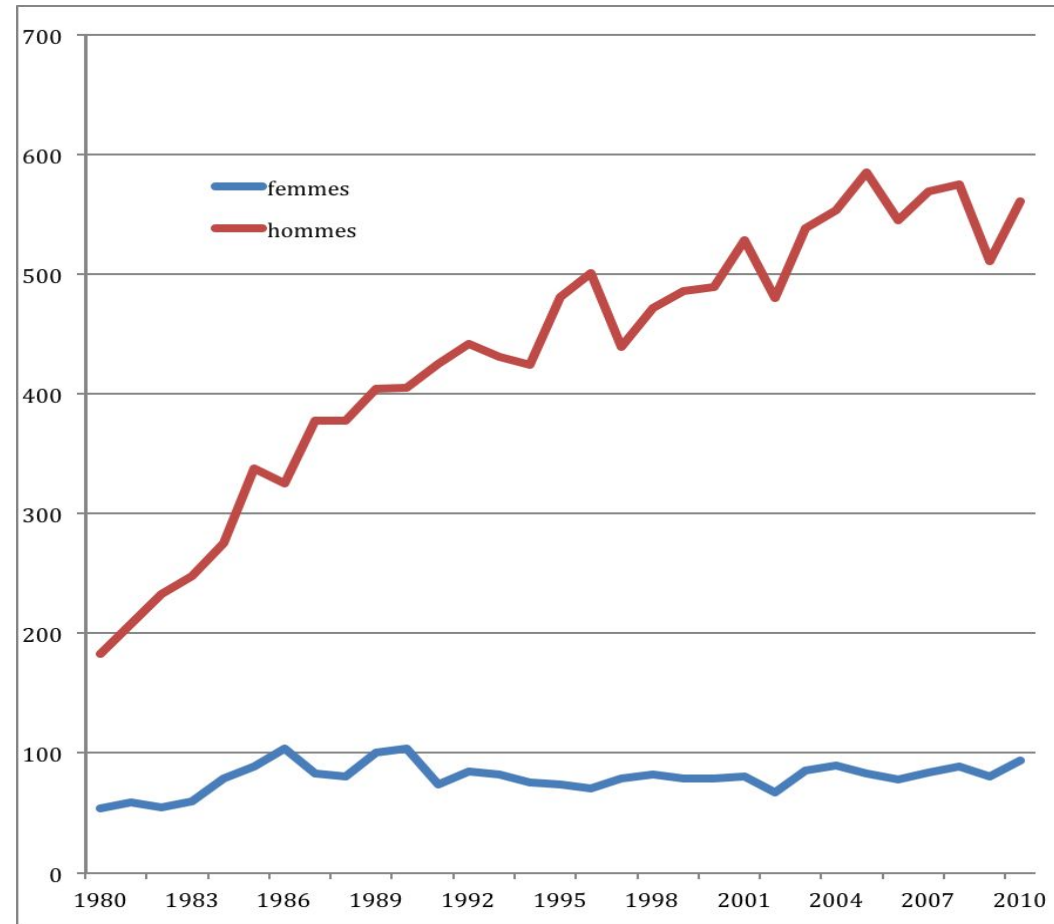
# Women in computer science... in Lille

*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*

sortie vers emploi

**S** stages

5

**Masters**
Informatique
MIAGE
SIAD

**Polytech**
GIS / IMA

4

**Licences Pro**
DA2I / CGIR

**Licence**
INFO / MIAGE

3

2

**DUT** / Licence 2 / prépa Polytech

1
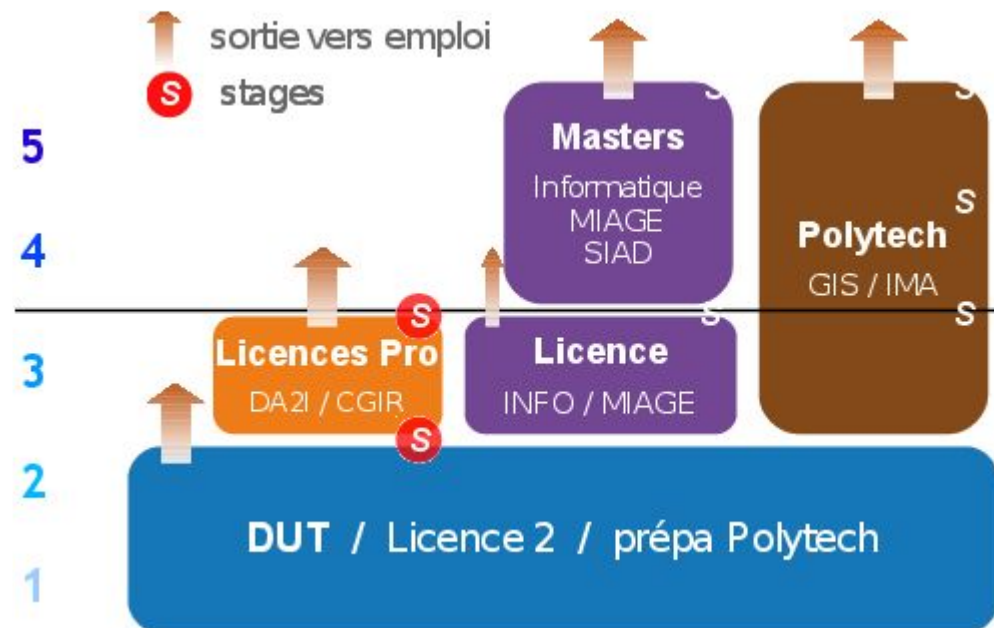
# "Informatique au féminin" working group @UnivLille1

*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 !**

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# 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"*



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*L codent, L créent*

**Initiation to computer science through creative coding**

# "L codent, L créent"

*13-15 years old girls discover computer science via art creation supervised by female computer science students*

- **Action towards young girls**
  early years of secondary school

- **Creative and innovative activity**
  creation of digital works via programming

- **Between girls**
  hosted by female CS students

- **Course materials (in French)**
  prepared by CS teachers
  freely available

- **Practical organization**
  during lunch break
  schools close to the University
  8 sessions

- **Companies support**
  to pay CS students
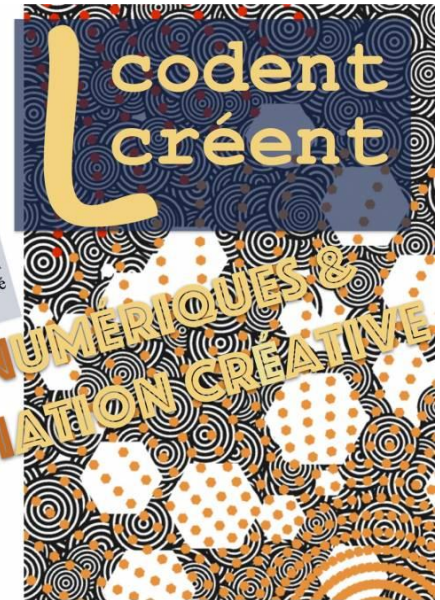
# "L codent, L créent"

*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 amass 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."



Processing.py

Cover
Reference
Tutorials
Examples
Bugs

Python Mode for Processing

You write Processing code. In Python.

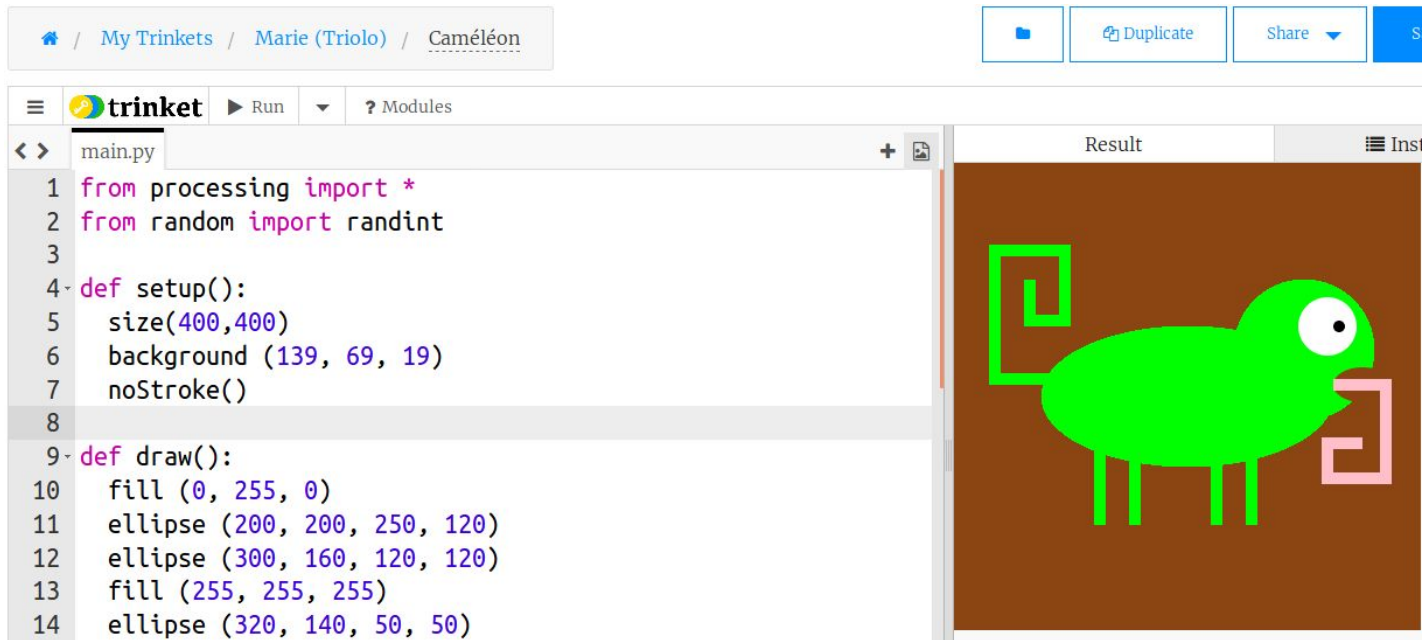# Is digital arts is a good way to discover programming ?

*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



*So Processing is a good choice*

# Technical issues

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

| **Python** | **Javascript** |
|---|---|
| Simple to learn as a first language | Complex programming language |
| You need to install an interpreter ... | Directly interpreted in your browser |

=> 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.

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

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**Teenage girls like to create through code :)**
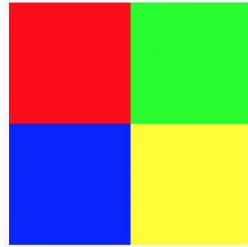
# "L codent, L créent"

## *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
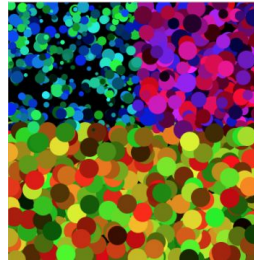
# Pedagogical progression (really fast !)

- **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**
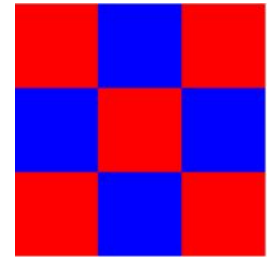  Interactivity: "event-based" programming (mouse)

  `mouse.x / mouse.y`

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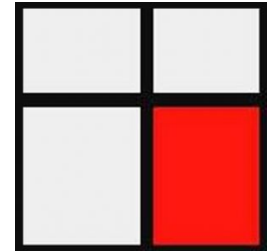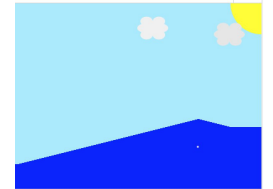  `def xx() : +`
  `def keypressed() :`

- **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**

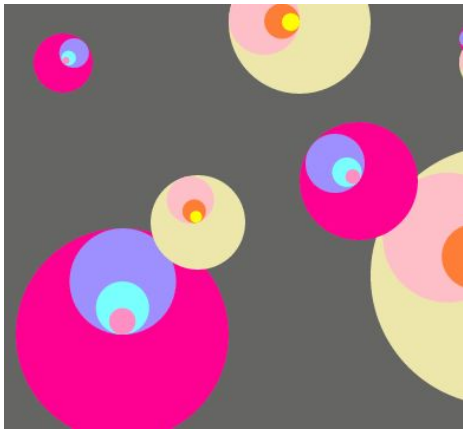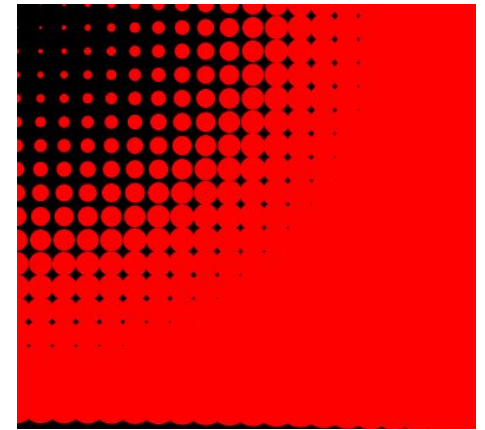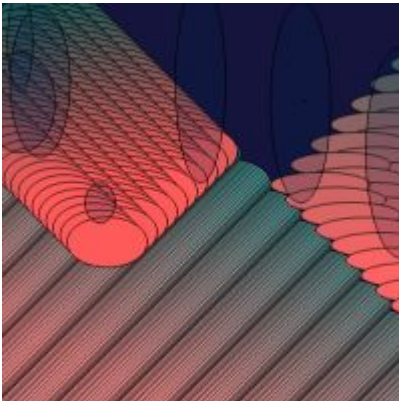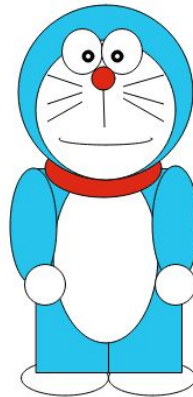| | |
|---|---|
| 9h15 9h30 | **Accueil à LILLIAD** **Learning Center Innovation** |
| 9h30 9h45 | **Présentation de l'action** « L codent, L créent » |
| 9h45 10h30 | **Témoignages de doctorantes** Amira CHALBI et Nicole PONG |
| 10h30 11h15 | **Exposition des oeuvres** numériques réalisées par les collégiennes de 4ème et 3ème |
| 11h15 12h00 | **Pot de clôture** |

Salomé, (Triolo)
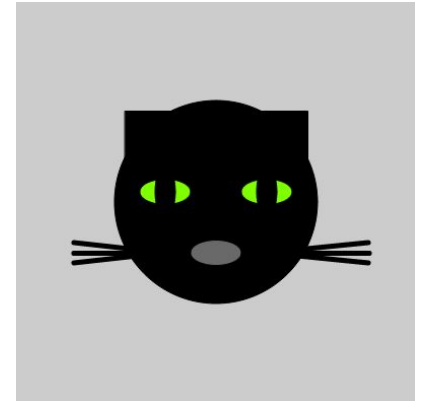


Élina et Lucie (SdB)



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



**A LA DÉCOUVERTE DES SCIENCES EN HAUTS-DE-FRANCE !**

Nord Êka !

ACCUEIL » DOSSIERS » FEMMES ET INFORMATIQUE : VISION DES JEUNES SUR L'INFORMATIQUE

DOSSIERS

Femmes et informatique : vision des jeunes sur l'informatique

par **MAËLYS POUBLANC** Le 30 MARS 2017 ⌕ 0 COMMENTAIRES

- **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/

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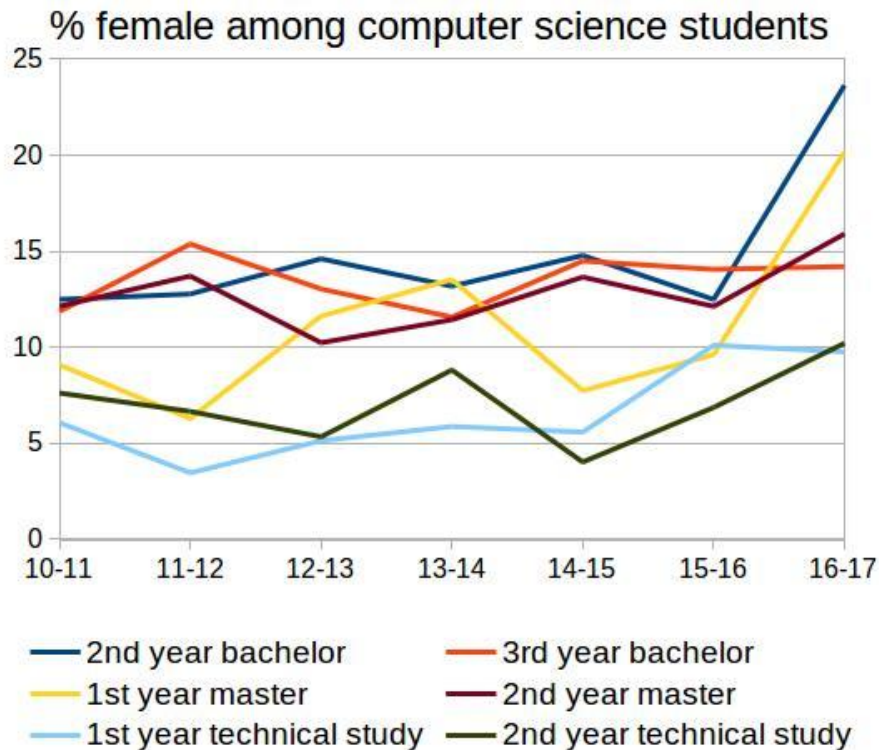*Outcome*
**Conclusion and perspectives**

# 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*

% female among computer science students



2nd year bachelor
1st year master
1st year technical study
3rd year bachelor
2nd year master
2nd year technical study

- ***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 8
  9 graduates
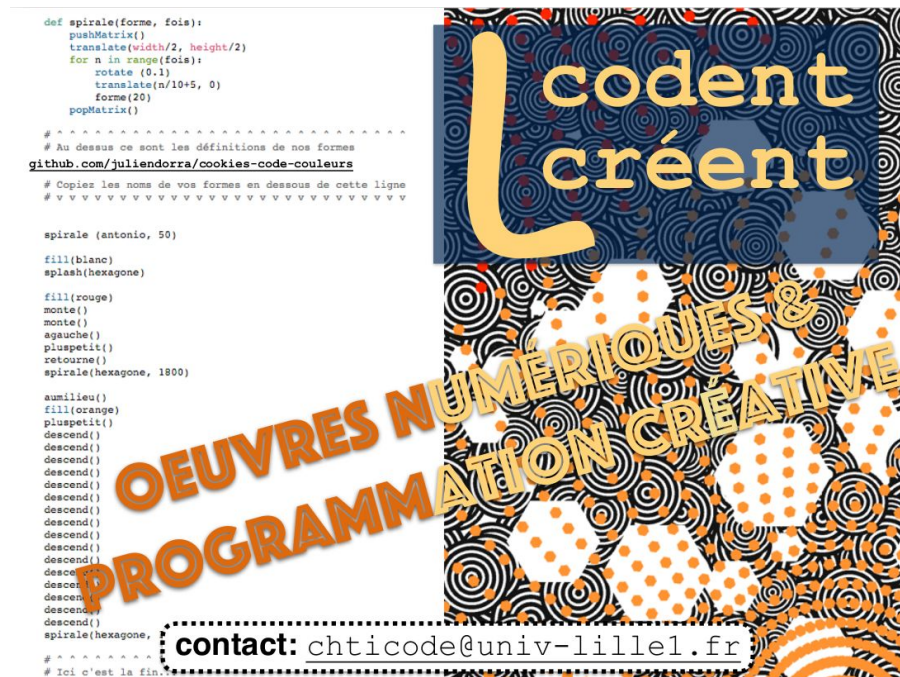
- **3nd year bachelor, more details**
  6 females are in the 20 better students

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# What's next now ?



*L codent, L créent (season 2)*
*More students, more teenage girls, more schools involved !*

- **Scaling this first experiment**
  Difficulty: students are studying, college should not be too far …

- **Feedback within each secondary school**
  Exposition within the University is a key part to demystify the place … but feedback within the school to show others what has been done is also important.

- **Secure enterprise philanthropy**
  Is a "low" investment, at least lower than scholarships

- **Keep an eye on future students**
  Teenage girls have three more years before reaching University … will we see some of them in computer science training ?

# Acknowledgments

**chticode.info**