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

Maude Pupin, Philippe Marquet, Yann Secq

Université de Lille 1 SCIENCES ET TECHNOLOGIES

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Ch'ti code
chticode.info/

Introduction

Women in computer science

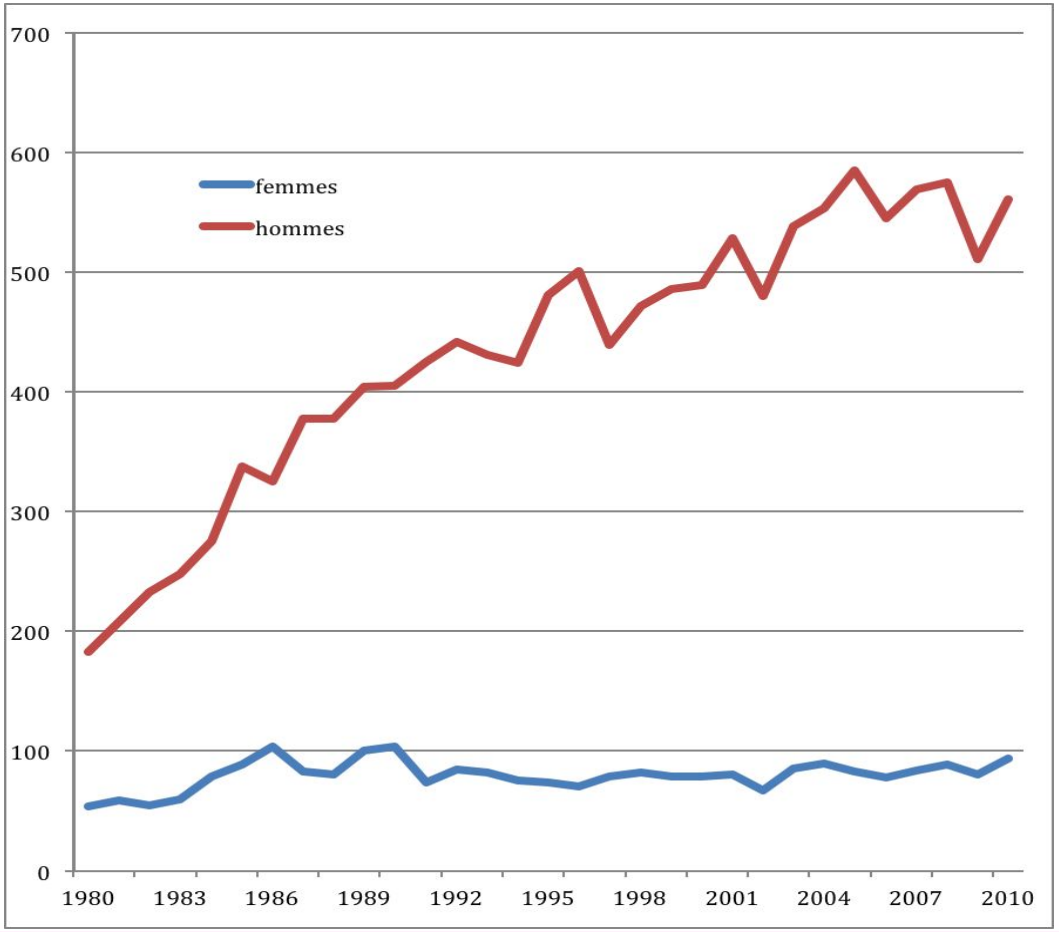
Women in computer science…

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!



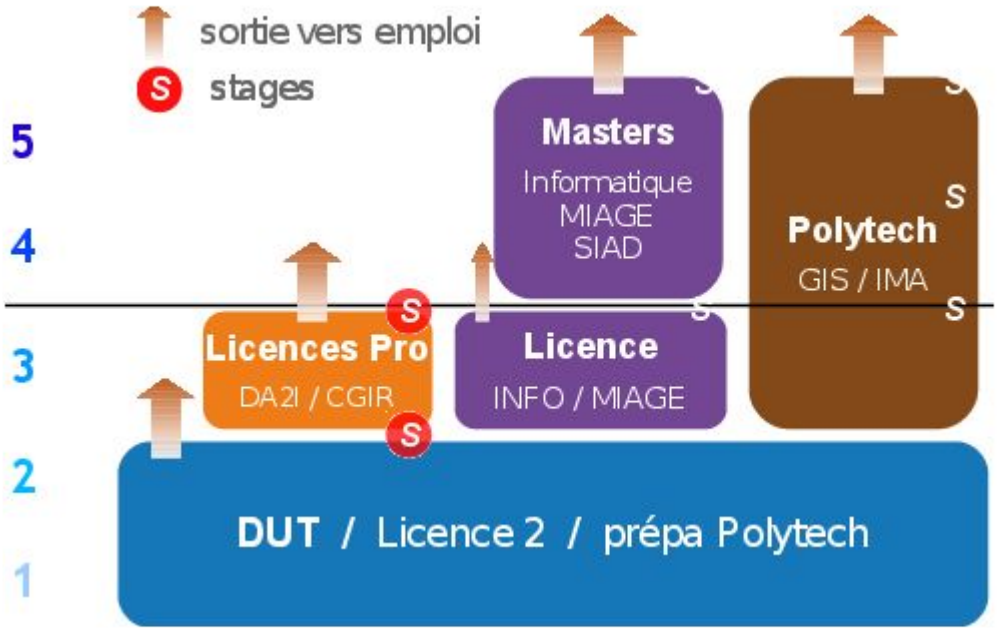
Women in computer science… in Lille

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

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"

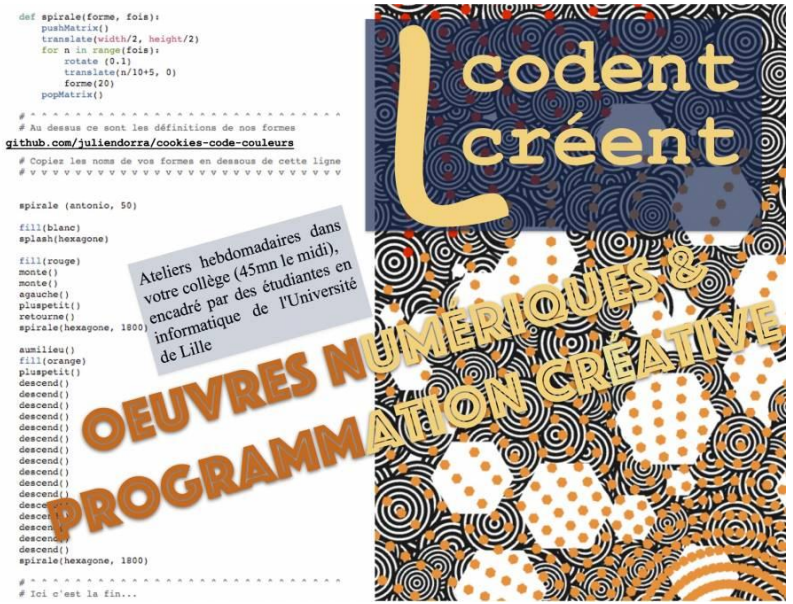
L codent, L créent

Initiation to computer science through creative coding

“L codent, L créent”

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.”

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

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

- 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 :)

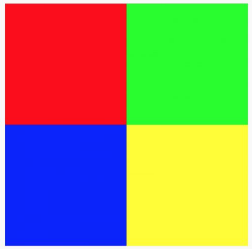
“L codent, L créent”

A condensed planning for the first year

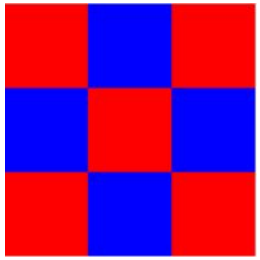
- **Planned in two secondary schools of Villeneuve d’Ascq**
  - Among the 6 schools around University
  - Simone de Beauvoir and Triolo
  - Not too far from the University so the students can go there
- **During lunch time**
  - 45 min long
  - Pupils have time to do non teaching activities during lunch
  - 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 !)

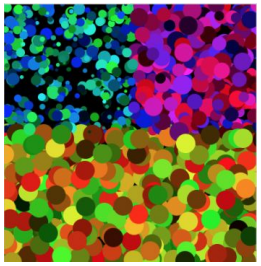
- **First session**
  Instruction, sequence of instructions, coordinate systems, colors in processing (everything within `setup()`)



- **Second session**
  Loops (for) and alternatives (if) and variables !
  Students are crucial for this step

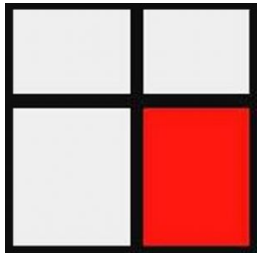


- **Third session**
  The principle of animation
  `setup()` + `draw()` !



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

  `mouse.x / mouse.y`



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

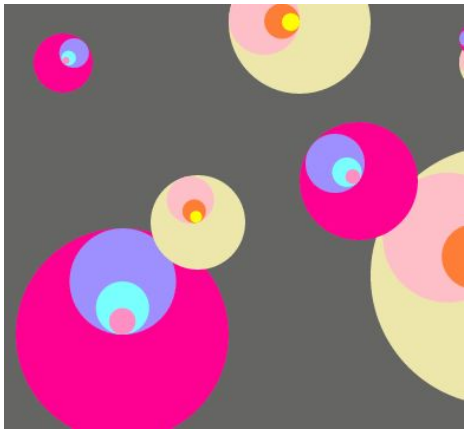
- **Sixth session**
  Some examples to be inspired … created by students :)

- **Seventh and eighth sessions : building your own digital art !**
  https://wikis.univ-lille1.fr/chticode/wiki/ecoles/lclc/2017/home

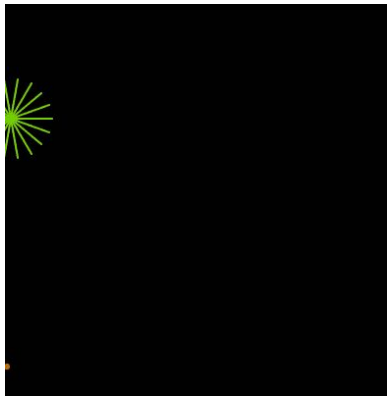
“L codent, L créent”

A final exhibition

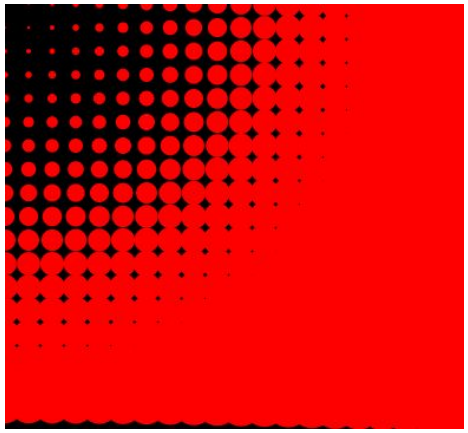
- At the University with teenage girls and their families
- Professional and academic background of women working in CS
- Presentation of a digital artist planned (but canceled)
- Presentation of PhD students working in the HMI research field
- Presentation of teenage girls visual work of art



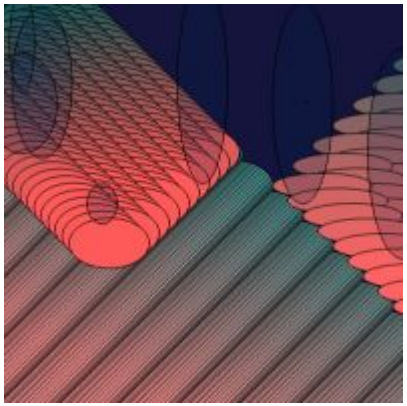
Salomé, (Triolo)



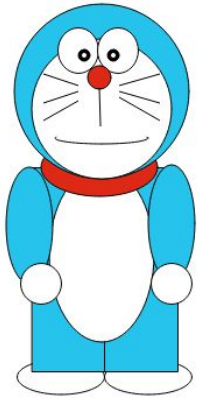
Élina et Lucie (SdB)



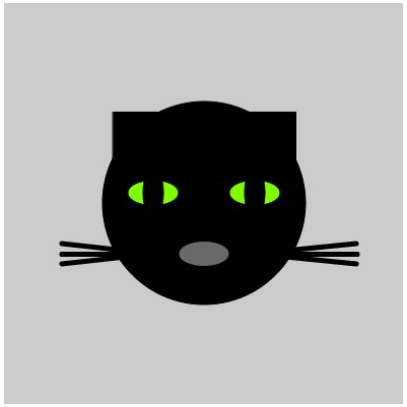
Océane (Triolo)



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

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

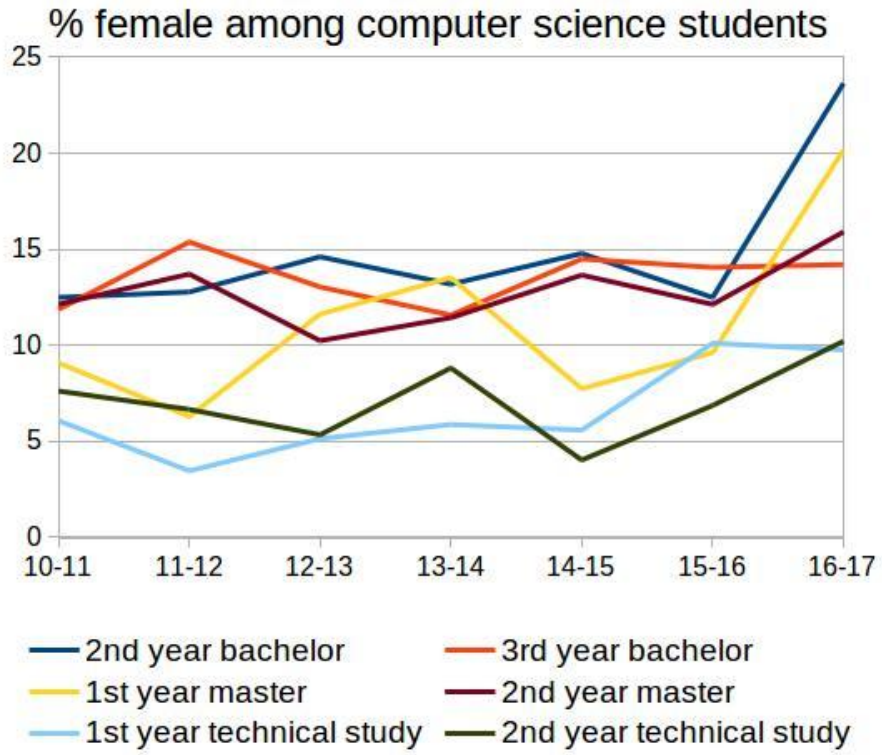
- **Female computer science students led the sessions in the schools**
  A complicity has borned between the teenage girls and the female students
  Teenage girls see that women enjoy studying computer science at university

- **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

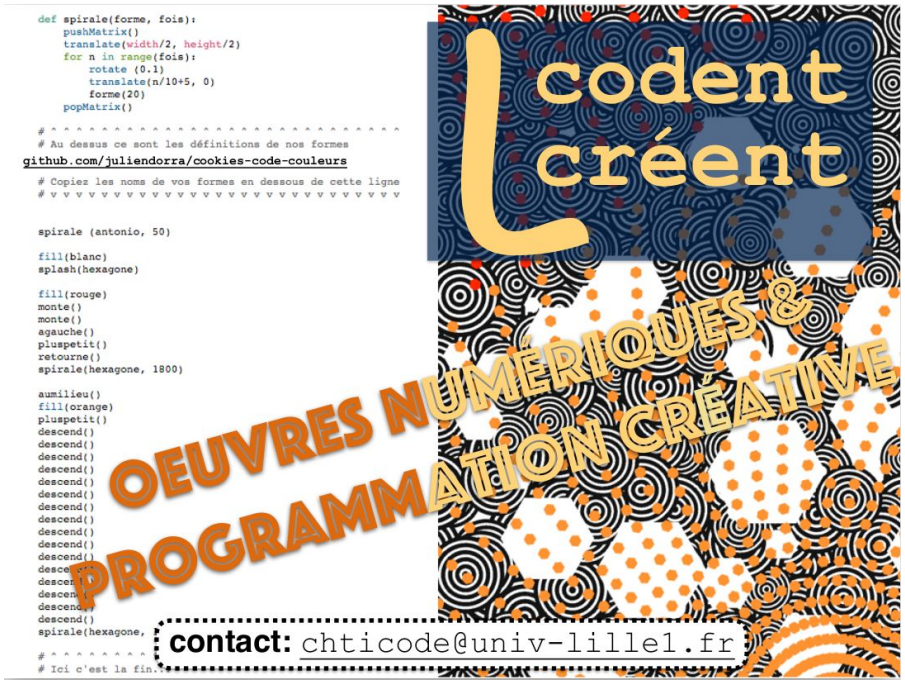


- ***2nd year bachelor, more details***
  28% of the students taking their exams are females
  7 females are in the 14 better students
  13 females are in the 30 better students
  31 females among the 8
  9 graduates

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

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 ?

Informatique au féminin

Ch'ti code
chticode.info

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

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