Inspiring children - a journey: Diversity and computing education

Celine Boudier - 11th July 2017 - EuroPython

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Hi, I'm Celine

Celine Boudier

Code For Life Team Lead at Ocado

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Dinosaurs
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♥ Mazes and Microscopes

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Where are the stairs / lifts / ladders / ropes / Boulders... ??

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Mentor: Primary school teacher

First computers!Theory of evolution! Newts!...

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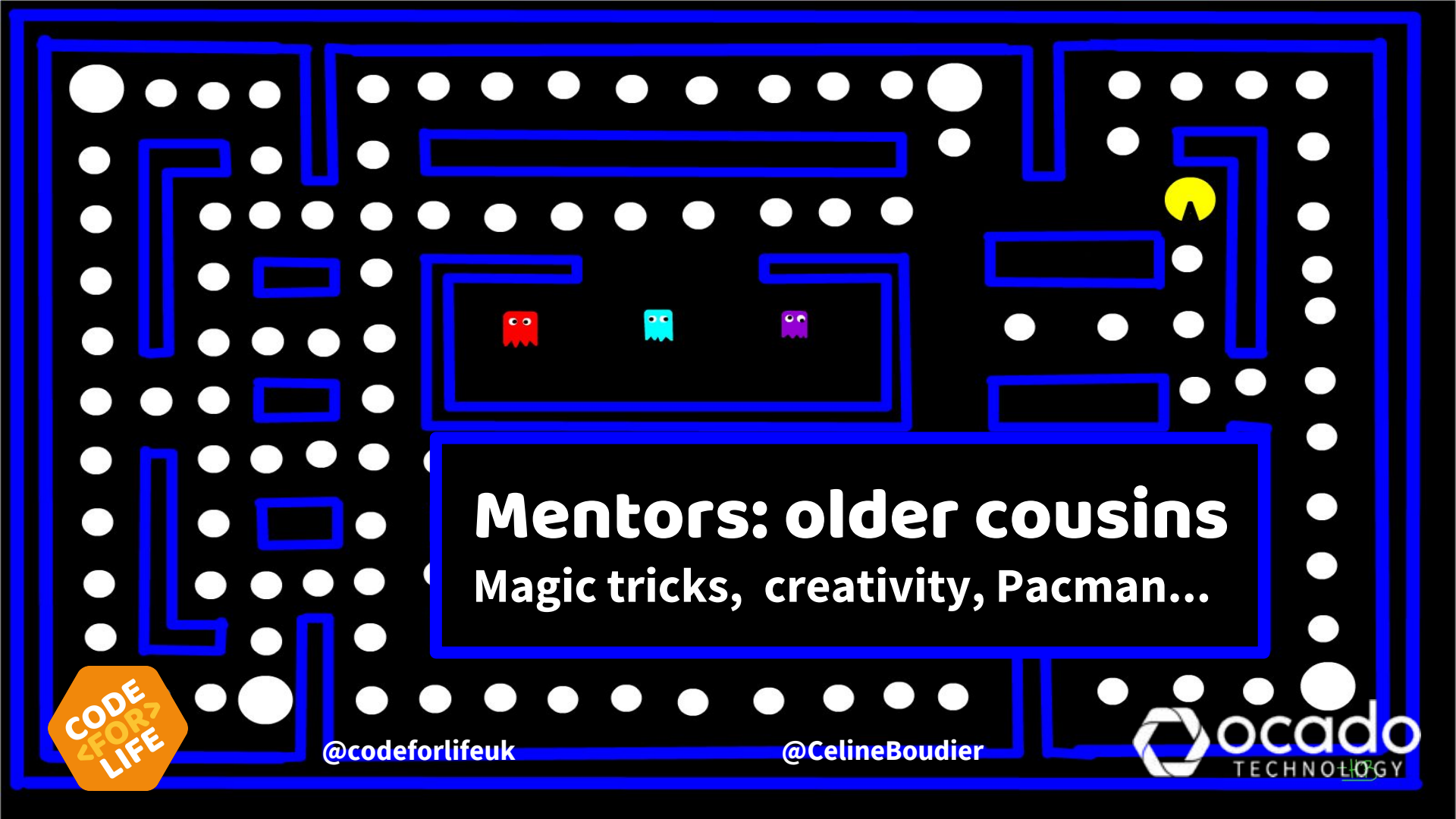
Mentors: older cousins
Magic tricks, creativity, Pacman...
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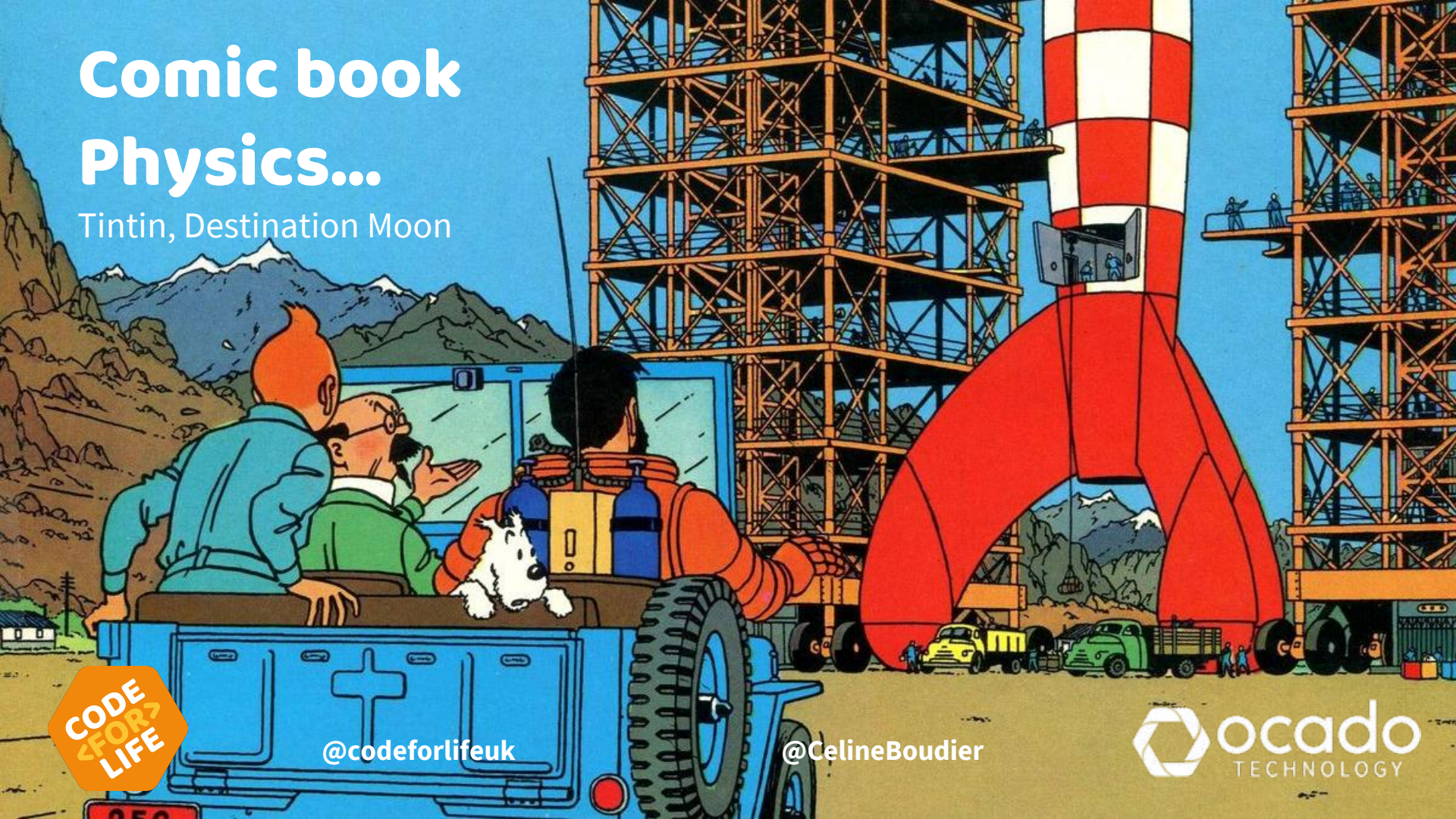
Comic book Physics...

Tintin, Destination Moon



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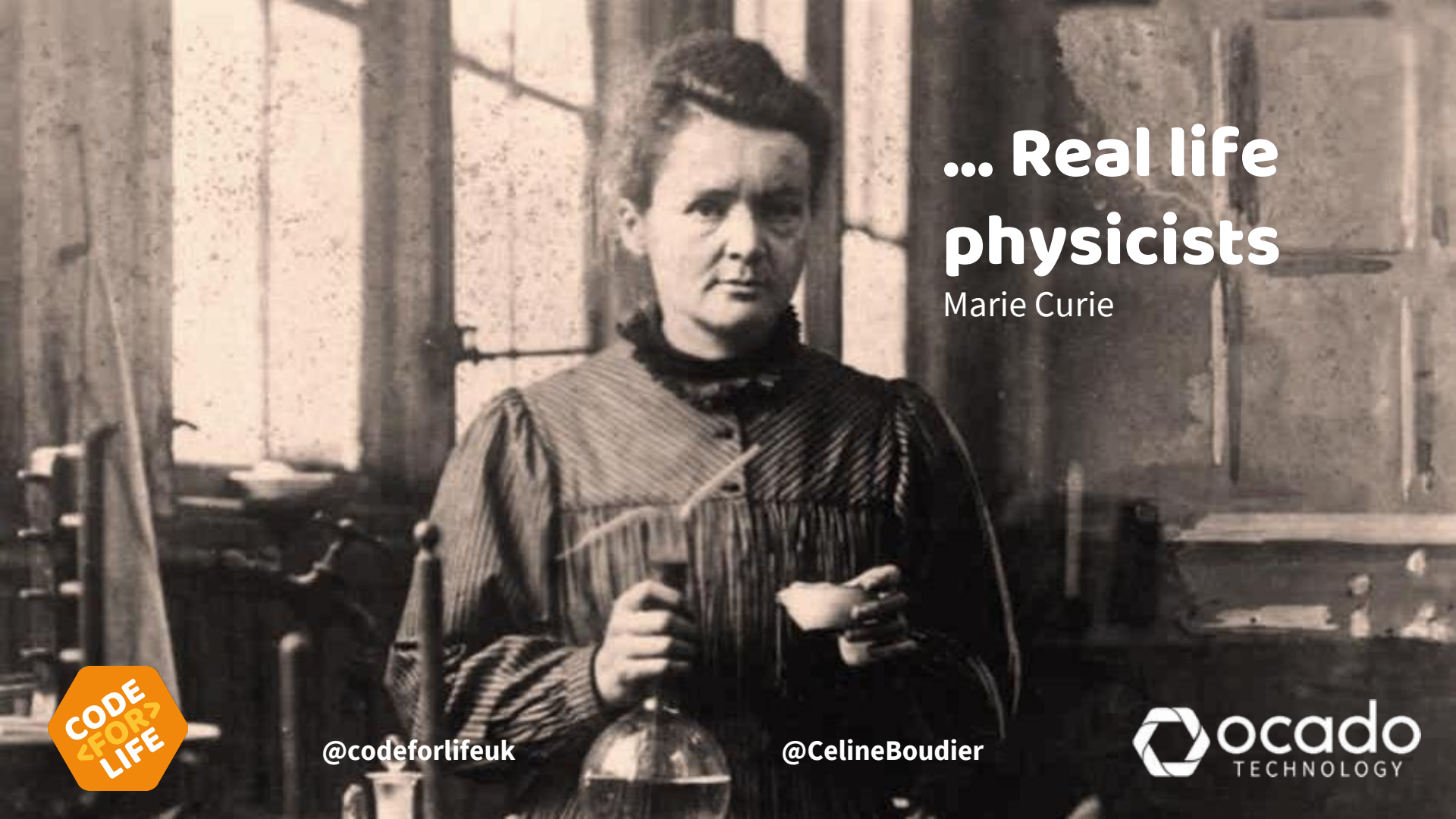

… Real life physicists

Marie Curie

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Vocations?

Science?
Literature?

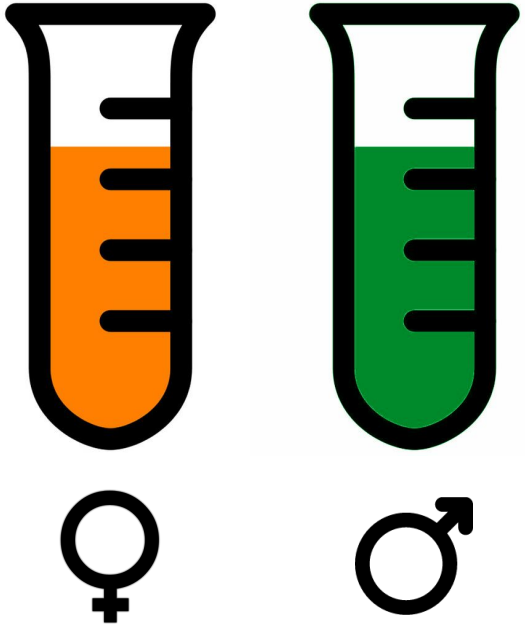
Vocations?

First programs!

Science!

Linguistics,
Computer science...

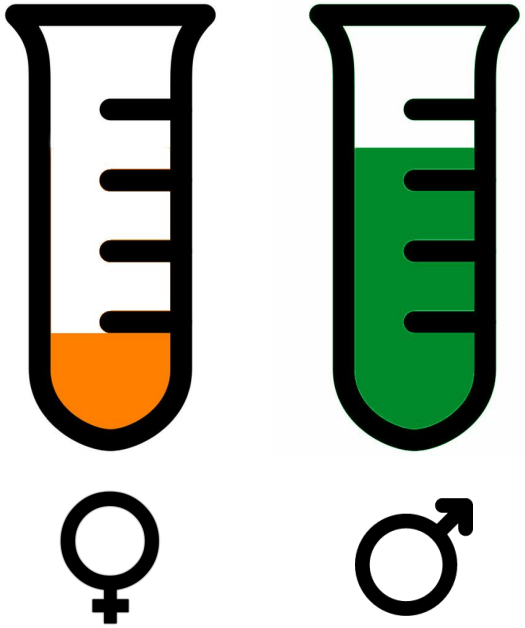
Vocations?



Lycée V. Duruy, Paris, 2002-2003

My final year of High School, spec. Science
~50% women

Vocations?



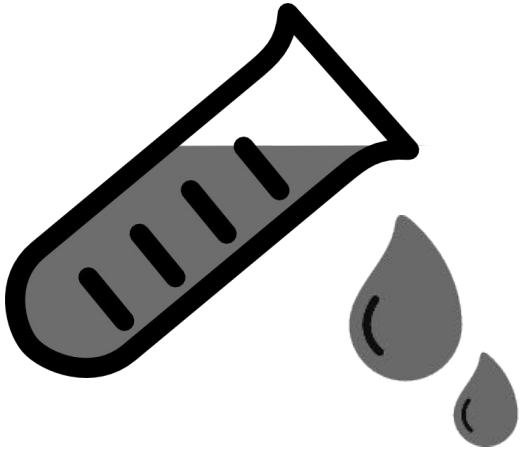
Lycée Louis Le Grand, Paris, 2003

20% women in my preparatory class for engineering schools

Vocations?

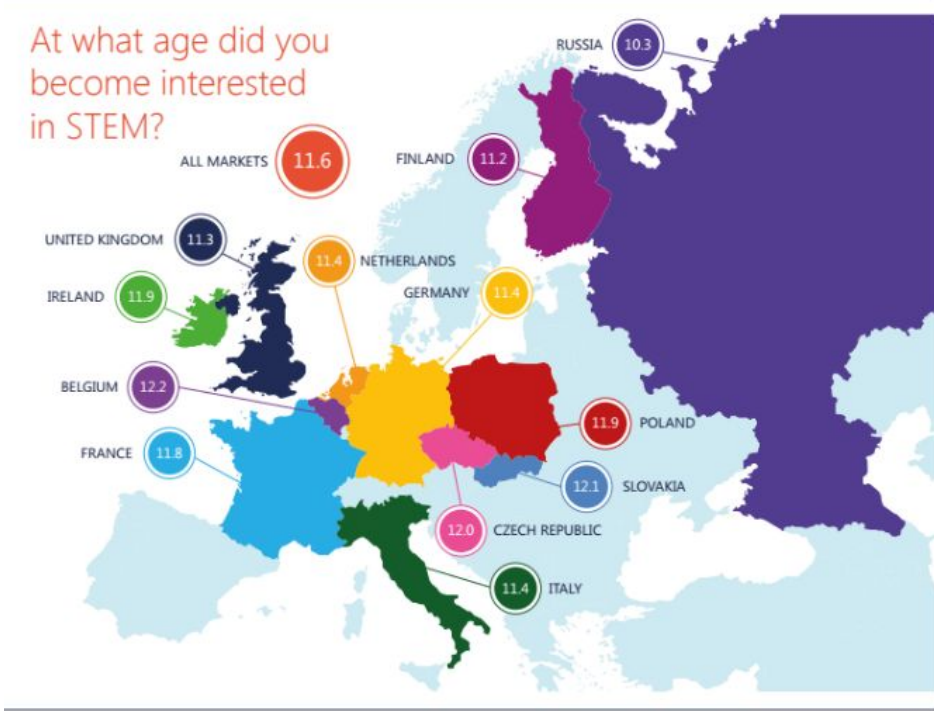
In France, 2008

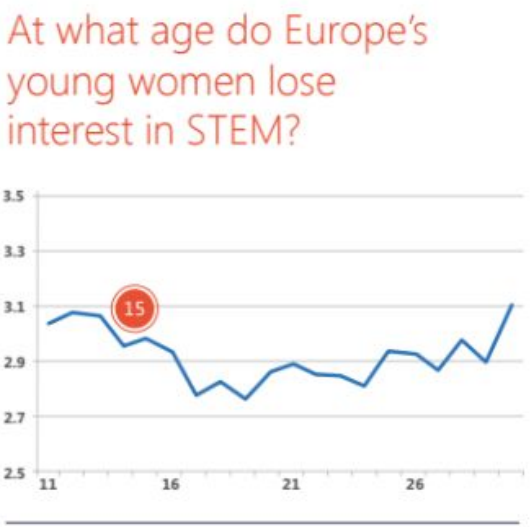
31% women go to non medical scientific studies after scientific high school (vs **53% men**)



Just 13% computer science students in the UK were **women** in 2014

Vocations?



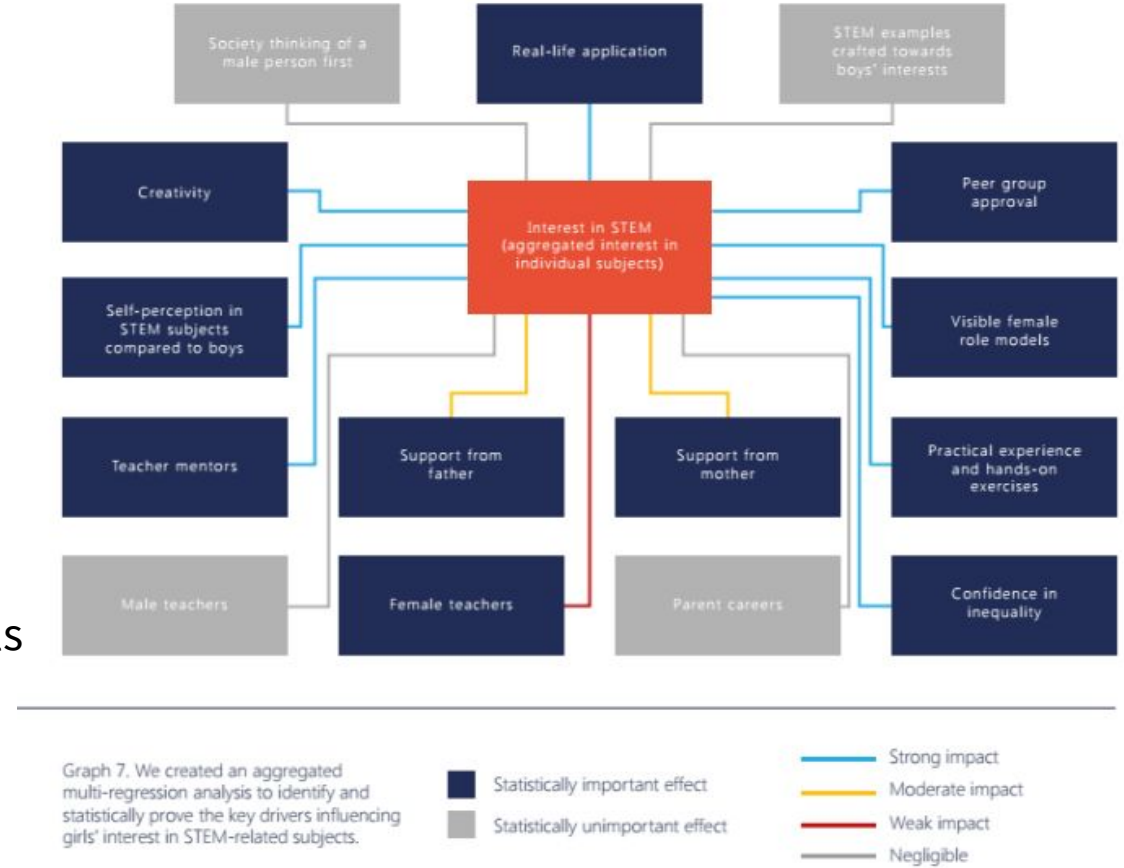


Graph 2. We asked school girls (11-18) and young women (19-30): 'Rate on a scale from 1 to 5: how interesting do you consider STEM subjects and at what age did you start feeling this way?'

Microsoft study

Vocations?

Agathe Begault - Women on Rails
+ Speaks in schools



Microsoft study

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Vocations?

40% women, 2005 (record breaking)

~Master of engineering Computer Science! Robots! AI! Quantum physics! Art History! Lots of other things!

Vocations?

Software Engineer Internship at Exalead - working closely with a diverse team, 2008

Computer Science R&D + Languages!

Vocations?

ALDEBARAN Robotics

Only permanent full time female software engineer, 2008

Few female software leads, 2013

Product owner + lead, 2014

SoftBank Robotics

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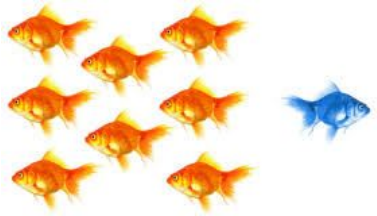
Changing Mind

Before

Enjoyed being an outsider



Wanted the world to change magically

After

Bad experiences

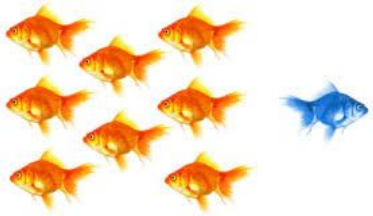
Hidden problems

Less hidden problems

Changing Mind

Before

Enjoyed being an outsider

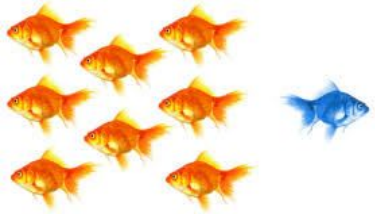


Wanted the world to change magically

After

Bad experiences

Hidden problems



Less hidden problems

Changing Lives - Ask NAO

ASK NAO
AUTISM SOLUTION FOR KIDS

Teaching tool for learning goals
Repetitive, never gets angry, non judgemental
Bridge between computers and humans

We changed a few lives, including ours

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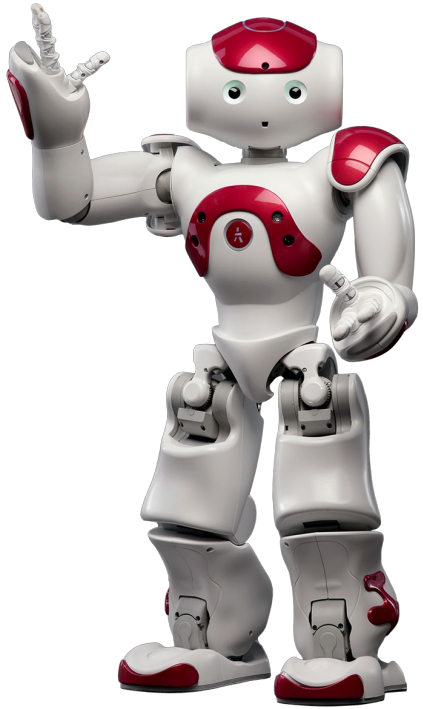
Moving - New minds to change

Moving - New minds to change

Paris

London

Moving - New minds to change



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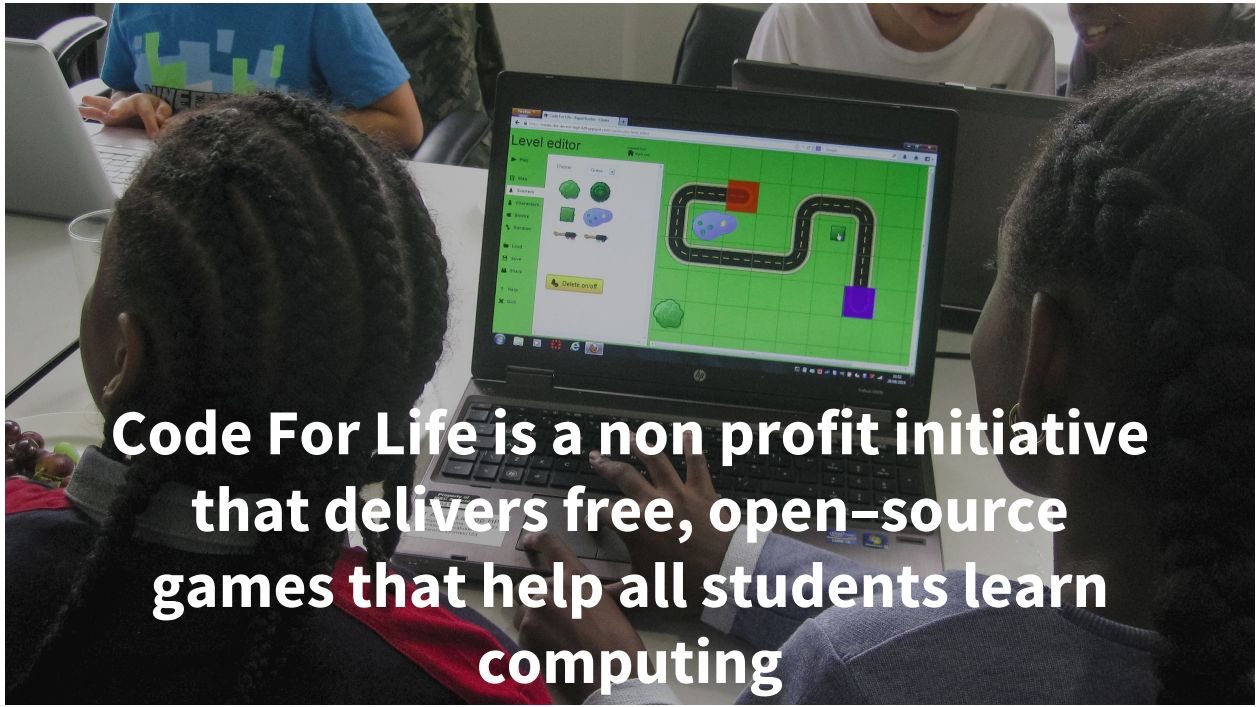

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Wait, what?

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Why?

2014

UK introduces computing in the primary school curriculum

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Yes, but why?

“Teaching children to program is not just about nurturing the next generation of software engineers; being able to write code is a transformative and disruptive meta-skill that needs to be seen as being of huge potential value whatever your future holds.
I would go so far as to say that it is a survival skill that our children need to acquire to flourish in the increasingly digital and online future that awaits them.”

Paul Clarke, Ocado CTO

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Linda Liukas - Hello Ruby, a delightful way to teach kids about computers

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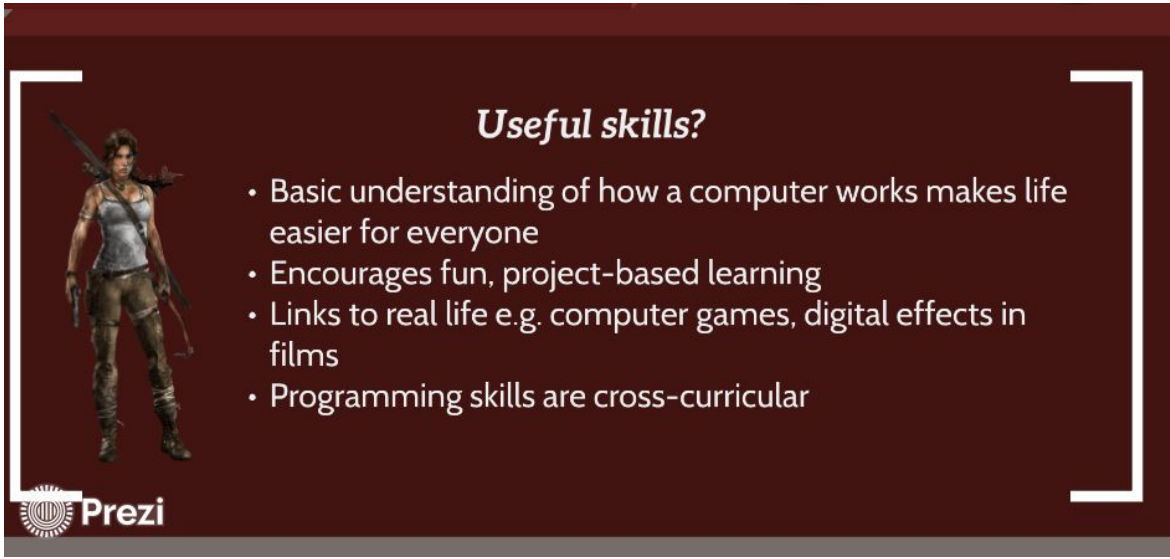
Cat Lamin - Why do kids need to learn how to code



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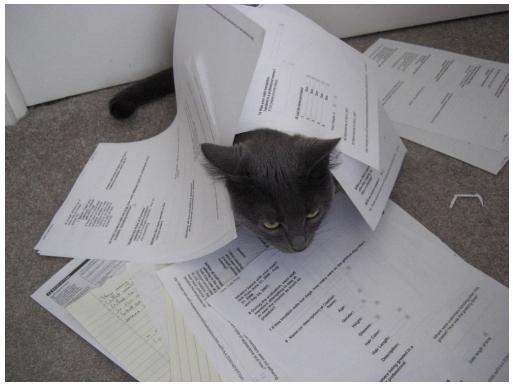
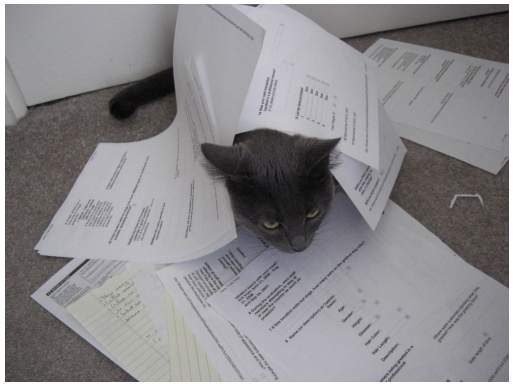
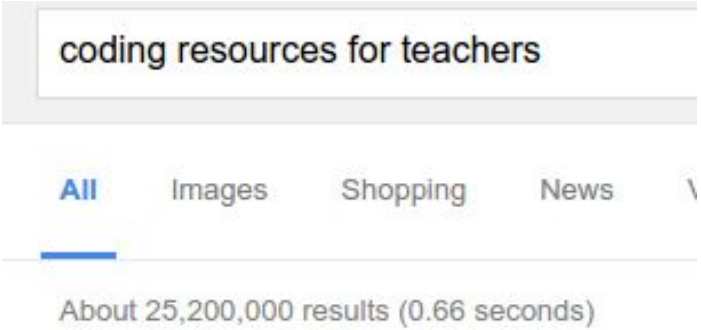
What about the teachers?

What about the teachers?



What about the teachers?





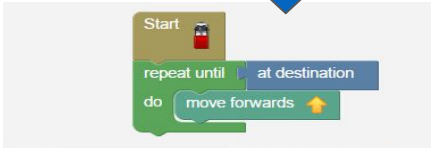
What about the teachers?

Rapid Router: From Blockly to Python

1st game, for primary schools

From visual programming in Blockly to Python

Progression in computing concepts



This is what your program would look like in Python:

```
import van

v = van.Van()

while not (v.at_destination()):
  v.move_forwards()
```

```
import van

v = van.Van()

while not v.at_destination():
  v.move_forwards()
```

Rapid Router

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Materials and Role Models

- Lesson plans
- Unplugged activities
- Teacher solutions
- How to guides
- Students' progress

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Materials and Role Models

Dedicated to Sharon Harrison

1956 — 2015

Sharon was instumental in helping to create Code for Life. At the beginning of 2014 she was recruited to act as our Educational Consultant. The project drew on her previous skills as a pioneering computing teacher and education consultant.

Sharon has left a lasting legacy by creating something which will help teach STEM skills to the next generation of computer scientists across the world.

Videos of Ocado employees: what they do, coding concepts

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User Interviews

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Old Vs New

codeforlife.education

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Games are programmed...

```
import van

v = van.Van()

while not v.at_destination():
  v.move_forwards()
```

Console Output

??

```
from django.contrib.auth.models import User
from django.db import models
from django.utils.translation import ugettext


from portal.models import UserProfile, Student


def theme_choices():
    from game.theme import get_all_themes
    return [(theme.name, theme.name) for theme in get_all_themes()]


def character_choices():
    from game.character import get_all_character
    return [(character.name, character.name) for character in get_all_character()]


class Block(models.Model):
    type = models.CharField(max_length=200)

    def __unicode__(self):
        return self.type


class Episode(models.Model):
    '''Variables prefixed with r_ signify they are parameters for random level generation'''

    name = models.CharField(max_length=200)
    next_episode = models.ForeignKey("self", null=True, default=None)
    in_development = models.BooleanField(default=False)

    r_random_levels_enabled = models.BooleanField(default=False)
    r_branchiness = models.FloatField(default=0, null=True)
```

FUTUREWORLD

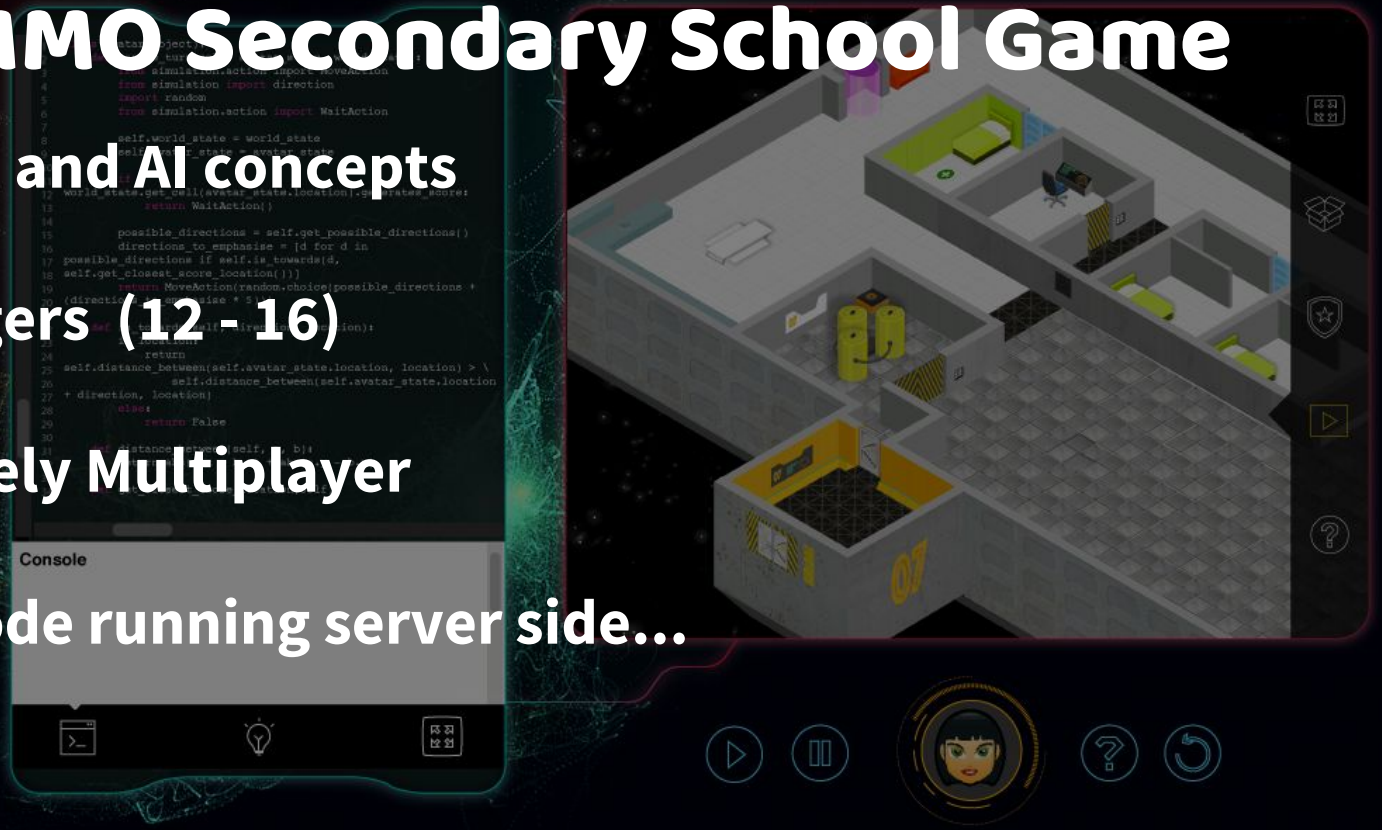
AI:MMO Secondary School Game

Python and AI concepts

Teenagers (12 - 16)

Massively Multiplayer

User code running server side...



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AI:MMO - Next steps

User research / Design

Good fit to teenagers' current skillset and tastes

Computing GCSE 'leaves girls and poorer students behind'

Rory Cellan-Jones
Technology correspondent

19 December 2016 | Technology | Share

GETTY IMAGES

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Some other next steps

Code for Life has **100,000 users** across the world.
MORE!! Translations in progress

crowdin

iOS app for iPads:
Used in schools
Offline mode
Accessibility (mouse-free)

Essex Library Services:
Not everyone has a computer

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Time Travel

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What if?
GoldieBlox
Invention Mansion
MINI-FIGURES INCLUDED
OPPENHEIM TOY PORTFOLIO BEST TOY AWARD PLATINUM
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The BlocShop
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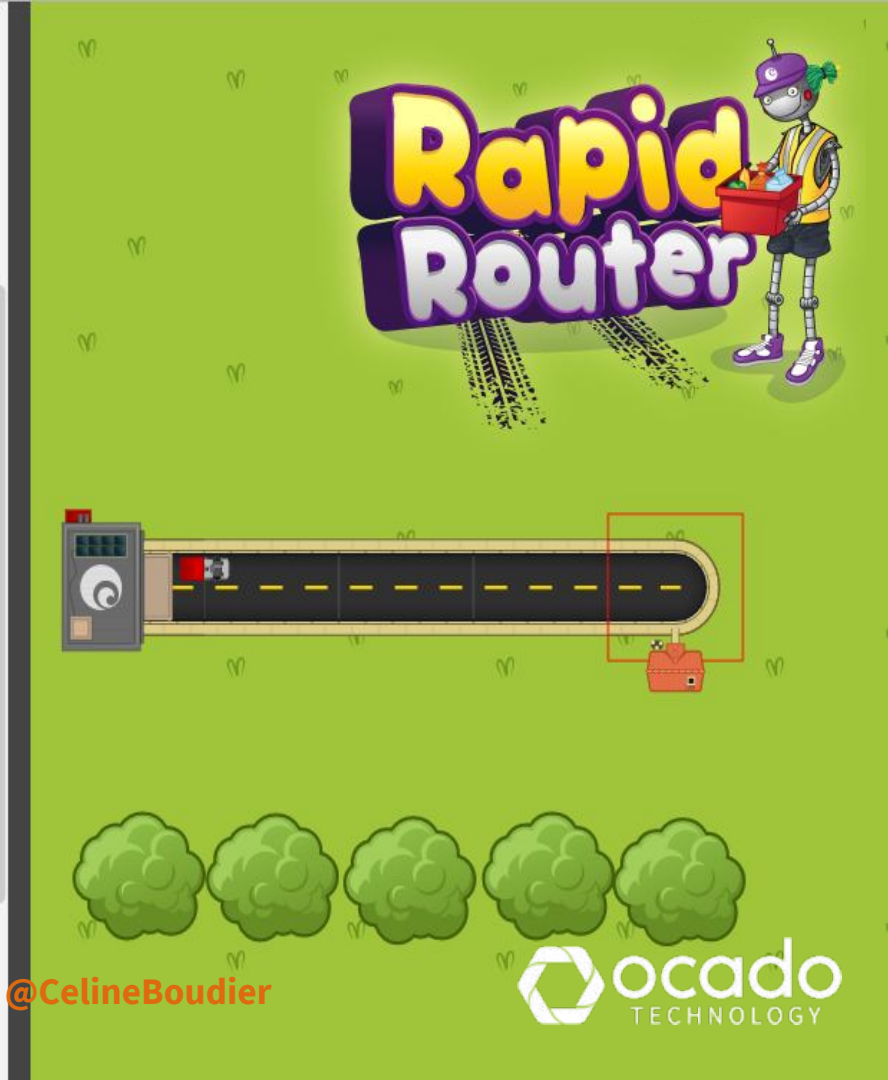
What if?



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What if?

What if?

{code club}

STEM ettes

pyladies

black girls CODE
imagine. build. create.

greenlight for girls
The future is full of possibilities

tech&ladies

WOMEN ON RAILS

django girls

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Code for Life Volunteers

Inspire kids

Free, fun, open source games

Diversity

2017 Women in IT AWARDS

Learning ourselves

Still a lot of children to reach!

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Get involved

www.codeforlife.education

codeforlife.education/help/#contact

https://github.com/ocadotechnology/codeforlife-portal
https://github.com/ocadotechnology/rapid-router
https://github.com/ocadotechnology/aimmo
https://github.com/ocadotechnology/rapid-router-unity

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https://crowdin.com/project/code-for-life (translations)

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Thanks! Questions?

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Annex - Stack

Google Cloud Platform

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