

Stereotypes in Computer Science

Final presentation



THE TEAM



Alex



Ionut



Andrei



Dragos



Alin

Stereotypes in Computer Science



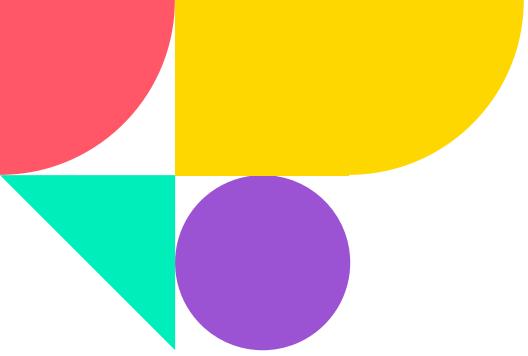
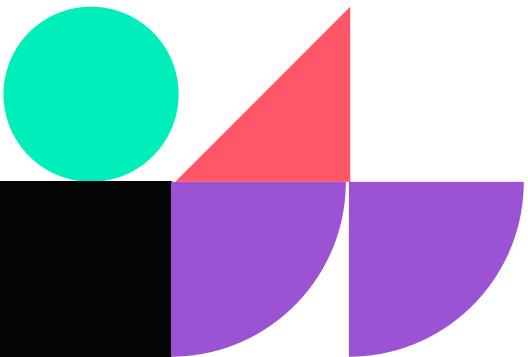


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Points of improvement and a
short summary

01

Problem introduction



Female students in ICT studies in Europe

37%

Maximum

17%

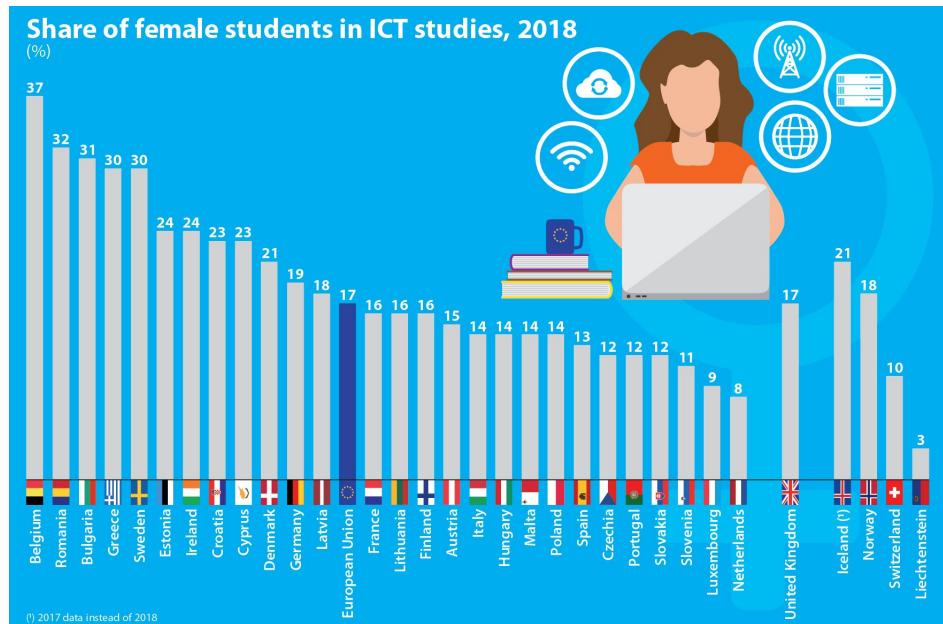
EU Average

3%

Minimum

8%

Netherlands



ec.europa.eu/eurostat

Share of female students in
ICT studies, taken from [1]

Similar statistics in US

31%

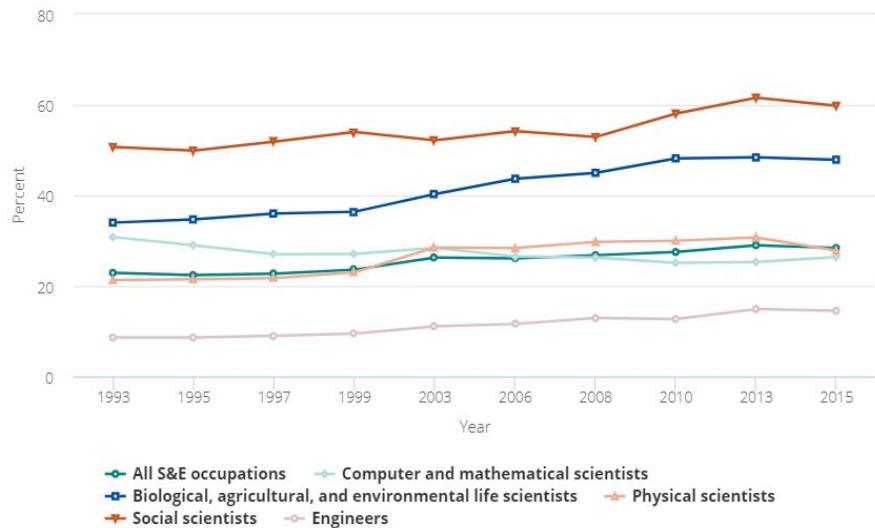
1993

26%

2015

28%

All S&E occupations
2015



Women in S&E occupations: 1993–2015, taken from [2]

Advantages of diversity

PERFORMANCE

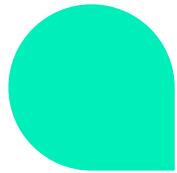
FINANCIAL ASPECT

CREATIVITY

TEAM DYNAMICS

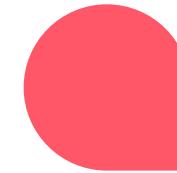


Current situation



EFFORTS

More attention is being devoted to solving the gender gap problem

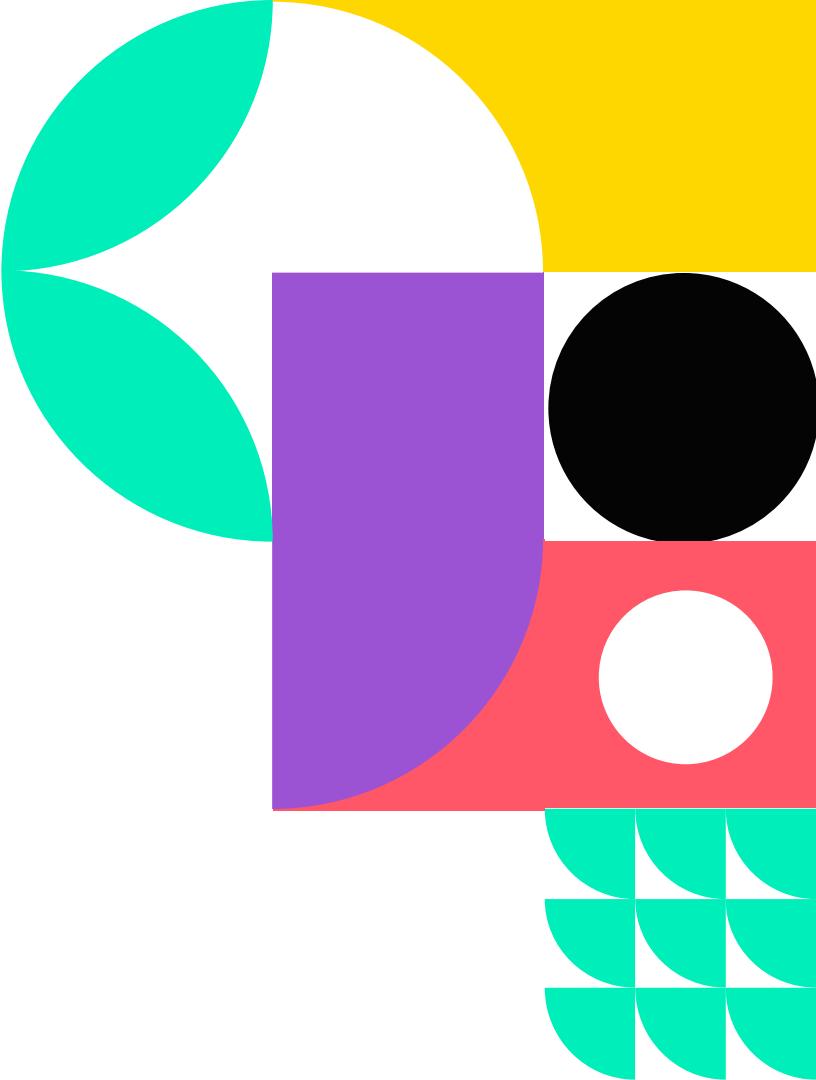


FORECAST

Gender parity in computer science around **2100 [4]**!

02

Project goals





LANDELIJK
EXPERTISEBUREAU
MEISJES/VROUWEN
EN BÈTA/TECHNIEK



vsnu



Digital
Society

COMMIT /



Universiteit
Leiden

TU Delft



Universiteit Utrecht 11

Three research goals

01

Stereotypes

Research stereotypes
children hold about
computer scientists

02

Intervention

Are children affected
by a virtual intervention
with a role model?

03

Explicit bias

Do visual and textual
instruments yield the
same results?

Two main applications

1

Data collection

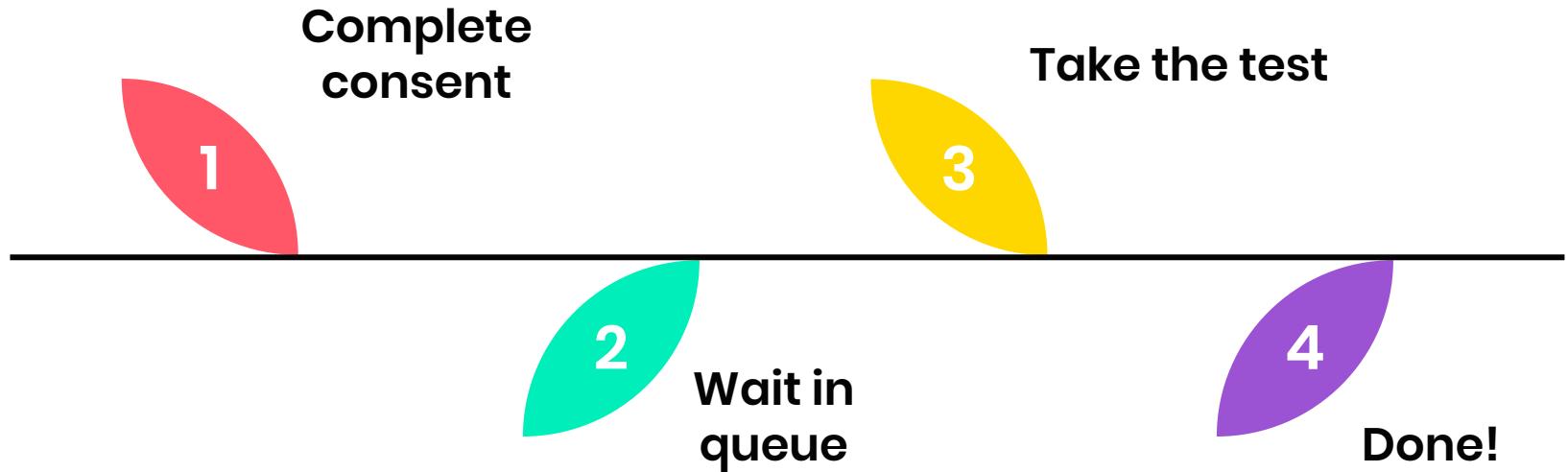
Children complete tests
on a laptop at NEMO
Science Live.

2

Data dissemination

People can complete
similar tests on their
phone to learn about
their biases

Data collection workflow



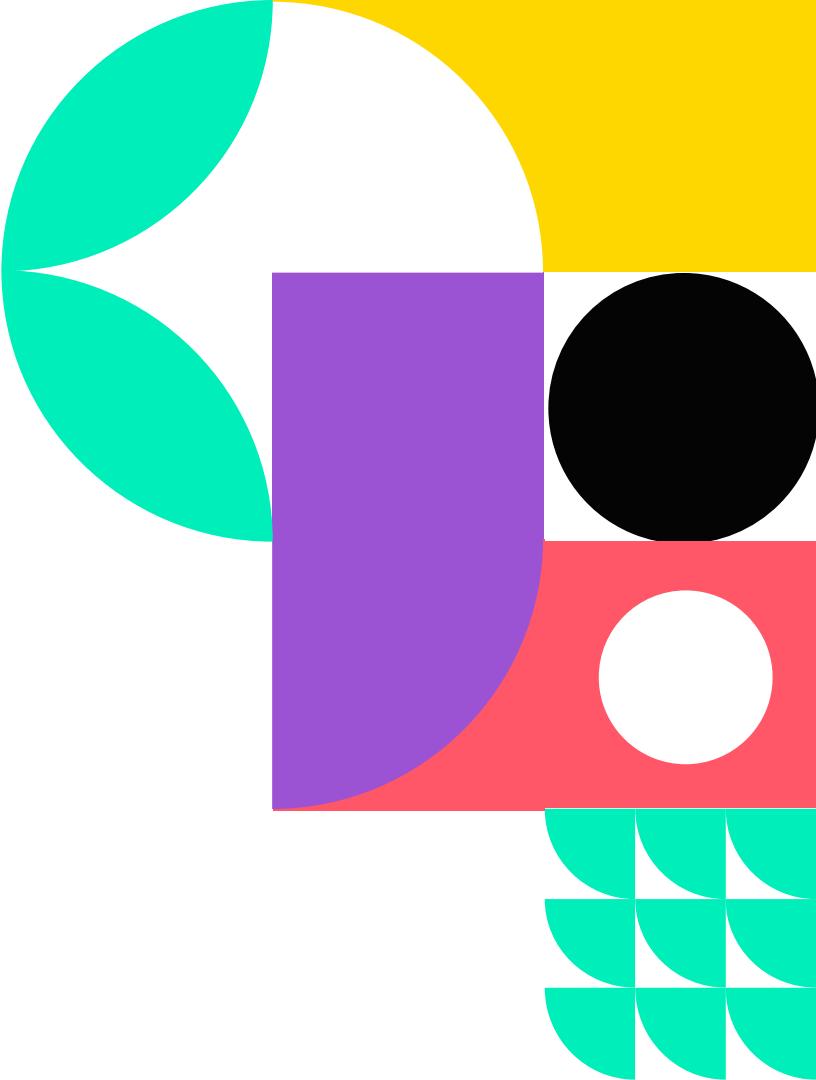
Data dissemination workflow



03

Process

An overview of the development process



Organization

Two smaller teams, pair
programming and more



Front end

Andrei & Dragos



Back end

Alex, Alin & Ionut

Organization

Two smaller teams, pair programming and more

Pair programming

VS Live Share

Daily stand-ups

Discord

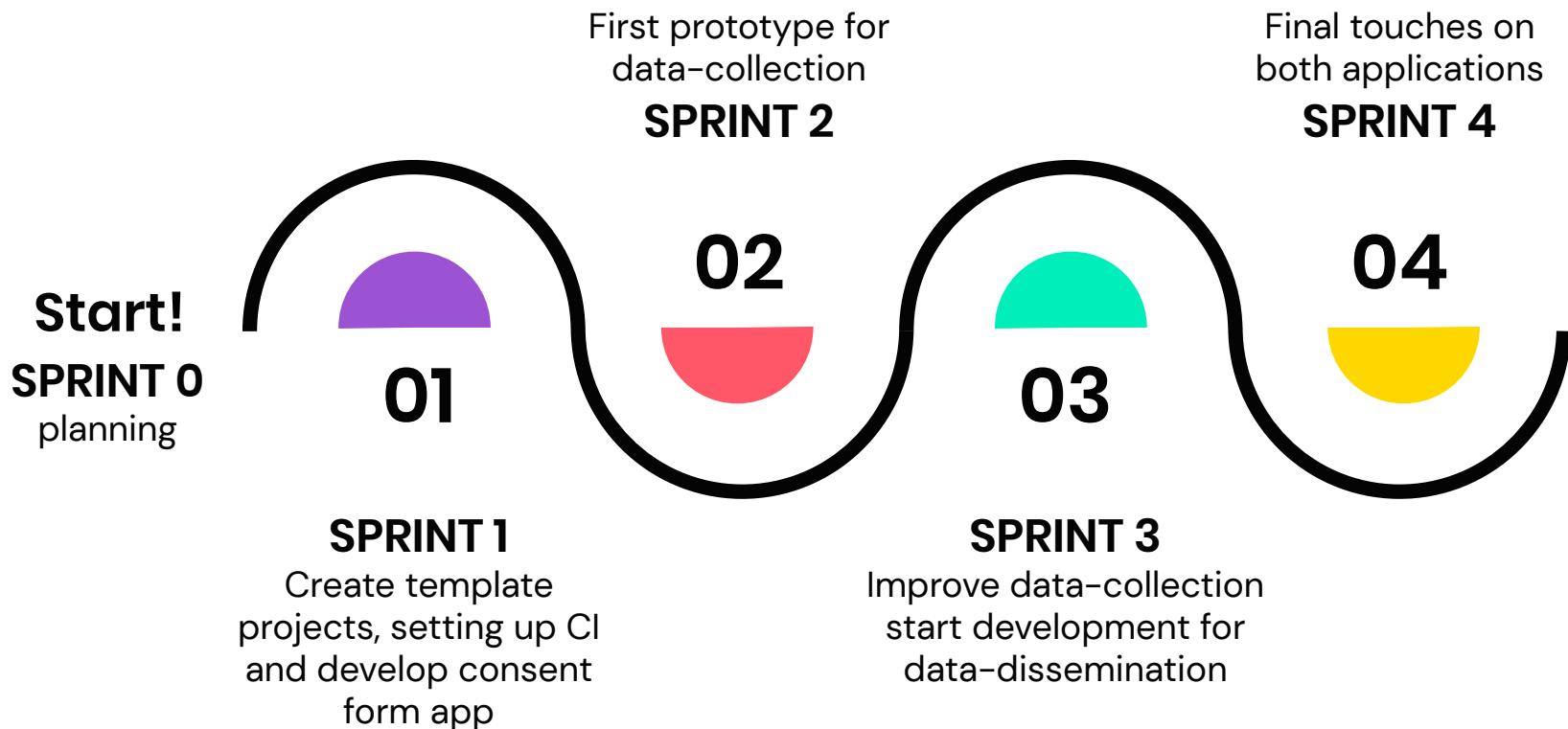
Weekly client meetings

MS Teams

Weekly TA meetings

Zoom

Agile development



Agile development

The image shows a Jira Agile board with three columns: Sprint backlog, Doing, and Testing. The Sprint backlog column contains three user stories:

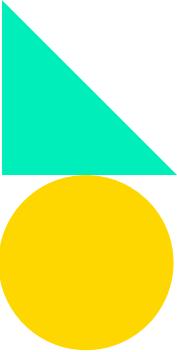
- #18: As a user, I must agree to some aspects regarding the IAT. Labels: Must Have, Product Backlog, application, dissemination.
- #16: As a user, I want to enter the application, so that I can take an implicit-association test. Labels: Must Have, Product Backlog, application, dissemination.
- #17: As a user, I want to provide my email after taking the IAT so that the results can be sent to me. Labels: Must Have, Product Backlog, application, dissemination.

The Doing column contains several tasks:

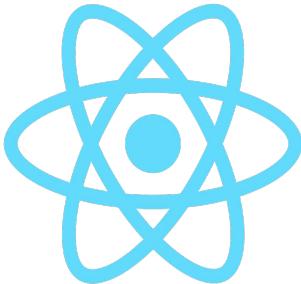
- #97: Fix image validation. Labels: Back-end, effort: low, priority 1.
- #96: Setup Cloudinary. Labels: Back-end, effort: low, priority 3.
- #95: Queue management interface. Labels: Front-end, application, collection, priority 1.
- #94: Create landing and agreement page. Labels: Front-end, application, dissemination, effort: medium, priority 1.
- #53: Setup automatic redirection to HTTPS. Labels: Back-end, effort: low, priority 3.
- #59: Insert data-collection object into db (quiz answers). Labels: Back-end, effort: high, priority 1.
- #58: Add keyboard controls to the quiz. Labels: Front-end, application, collection, effort: high, priority 2.
- #47: Setup database schema for IAT. Labels: Back-end, effort: medium, priority 1.

The Testing column contains one task:

- #77: Create modal for exiting quiz prematurely. Labels: Front-end, application, collection, effort: high, priority 1.



Technologies used



React logo, taken from [6]

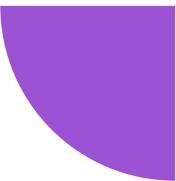


Flask
web development,
one drop at a time

Flask logo, taken from [5]

SQLAlchemy

SQLAlchemy logo, taken from [7]



Testing

coverage 98.00%



Front end

- Mocking
- Exploratory
- User testing



Back end

- From unit testing to end-to-end testing with pytest
- 98% branch coverage

CI \ CD

pipeline passed



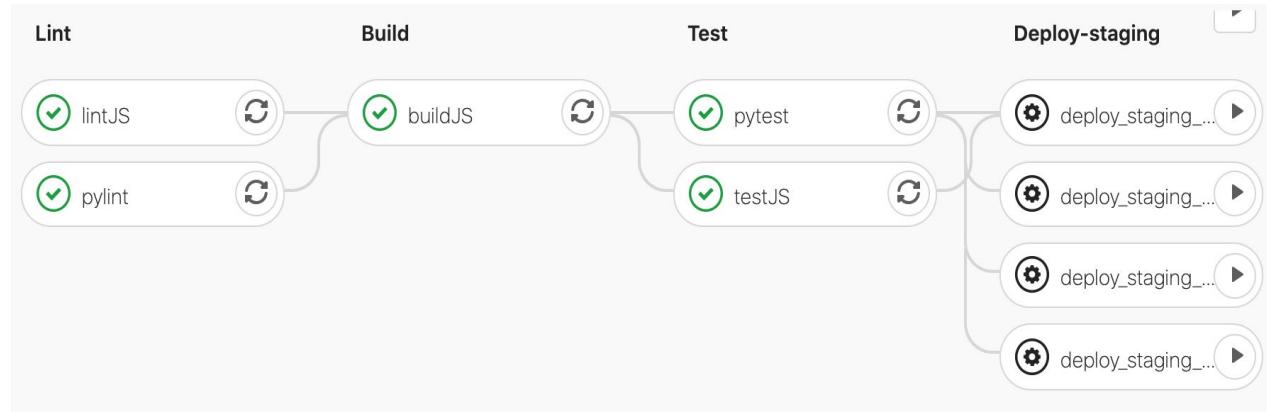
CI

3 stages



CD

automated deployment on
heroku



Static analysis tools

pylint 9.91



Front end

ESLint, Prettier



Back end

Pylint

Documentation

Great README, Swagger
and more

The screenshot shows a Swagger UI interface for a RESTful API. At the top, there's a header with a file icon, the text "README.md", and a logo featuring a cartoon character. Below the header, a "Servers" dropdown is set to "https://nemo-live-science-dev.herokuapp.com". To the right of the dropdown is a "Development server for testing" link and a green "Authorize" button.

The main content area is divided into sections:

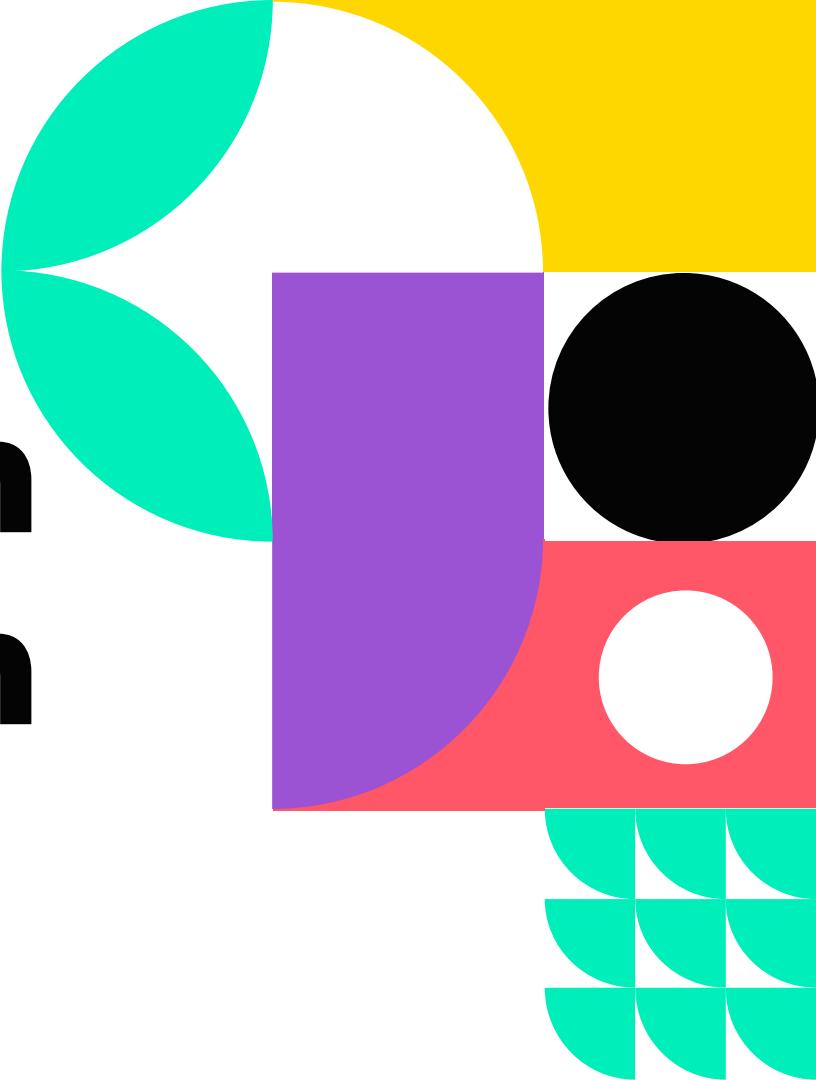
- dissemination** Related to data dissemination application
 - POST /calculate** Calculates the result (stereotypes found or not) for the Gender-Profession IAT
 - GET /iat** Returns an IAT
- collection** Related to data collection application
 - POST /login** Login route for the project administrator
 - POST /refresh** Refresh route for tokens
 - GET /quiz-versions** Returns a mapping of identifiers to quiz types
 - GET /results** Returns a list of current results in the database
 - GET /stats** Returns a list of current stats from the database
 - GET /active-participants** Returns a list of participants during the last hour

On the right side of the interface, there are several small icons, likely for navigation or filtering. At the bottom, there's a sidebar with a list of links:

- INTEGRATING THE RESULTS
- Coding style
- Deployment
- Contributing
- Issue Board
- Authors

04

Application design



Architecture choices

We follow the classic Client-server architecture:

- Centralization of control
- Easy maintenance
- Scalability

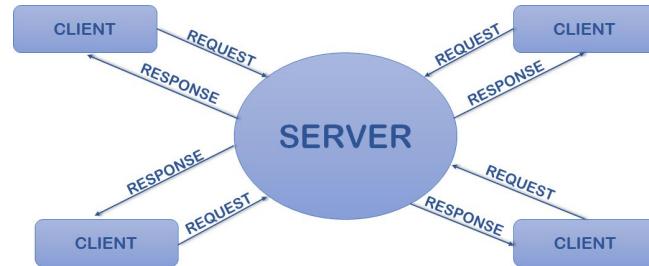
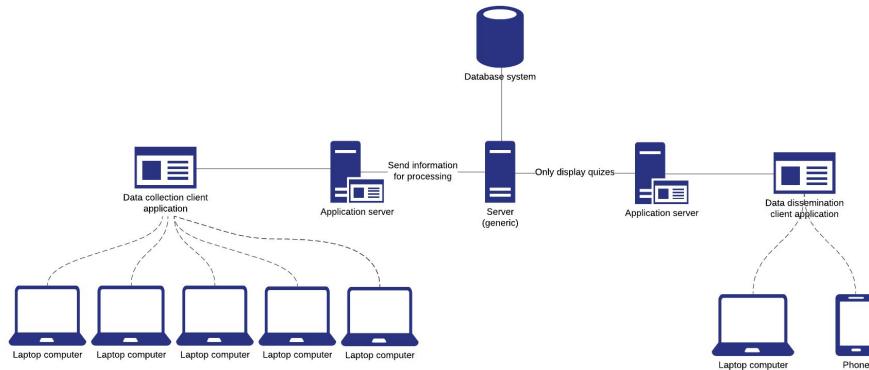


Figure 1. Visualization of client-server architecture. From Tech Blog, by MSA Technosoft , 2017, retrieved from <https://msatechnosoft.in/blog/tech-blogs/types-of-client-server-architecture>

Architecture choices

- REST API as provider of dynamic resources
- Different servers for serving static content
- Separations of concerns principle

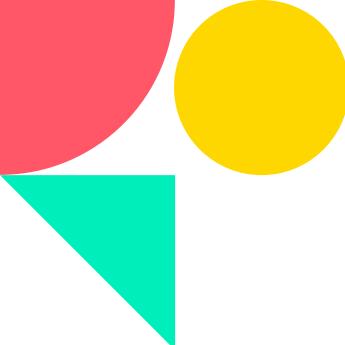


Design patterns

Higher Order Component

```
/*
Create mapping between type and Component to be rendered
*/
const mapTypeToComponent = {
  binary: BinaryQuestion,
  likert: LikertScaleQuestion,
  video: Video,
  information: Information,
  finish: Finish,
  mc_single_answer: MultipleChoice,
  mc_multiple_answer: MultipleChoiceSpecial,
  open_question: OpenQuestion,
  researcher_notes: ResearcherNotes,
  binary_information: BinaryInformation
};
```

```
return (
  <React.Fragment>
    <Test {...this.props}>
      <TestContentType/>
    </Test>
  </React.Fragment>
);
```



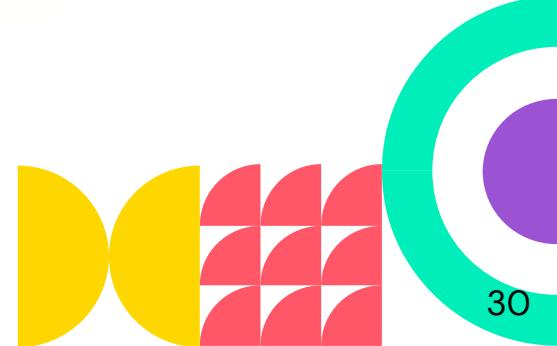
Design patterns

Higher Order Component

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Create mapping between type and Component to be rendered
*/
const mapTypeToComponent = {
  binary: BinaryQuestion,
  likert: LikertScaleQuestion,
  video: Video,
  information: Information,
  finish: Finish,
  mc_single_answer: MultipleChoice,
  mc_multiple_answer: MultipleChoiceSpecial,
  open_question: OpenQuestion,
  researcher_notes: ResearcherNotes,
  binary_information: BinaryInformation
};
```

```
return (
  <React.Fragment>
    <Test {...this.props}>
      <TestContentType/>
    </Test>
  </React.Fragment>
);
```

Test page dynamically
updates the question
type



05

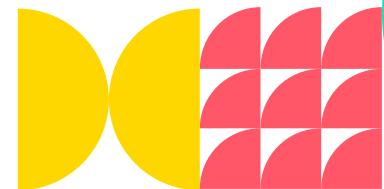
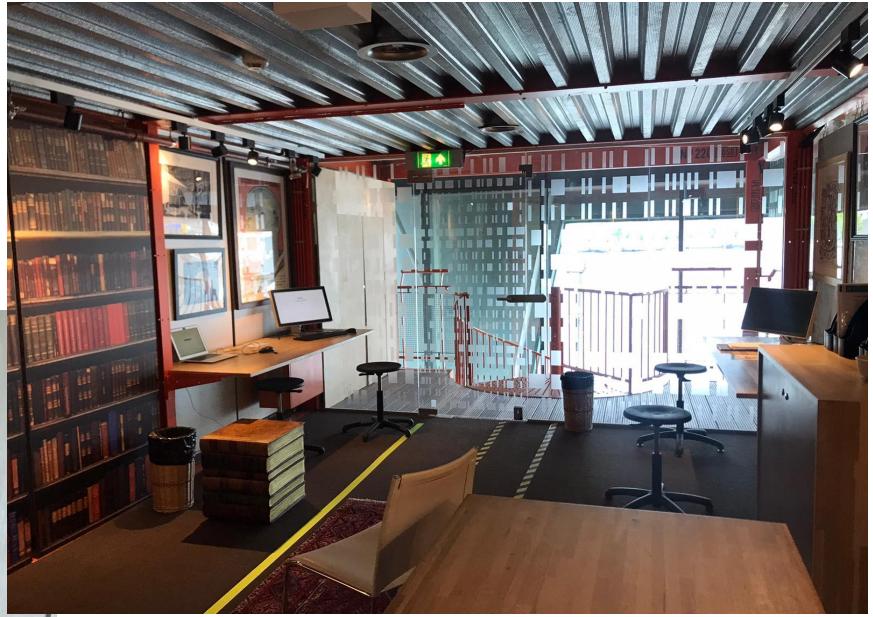
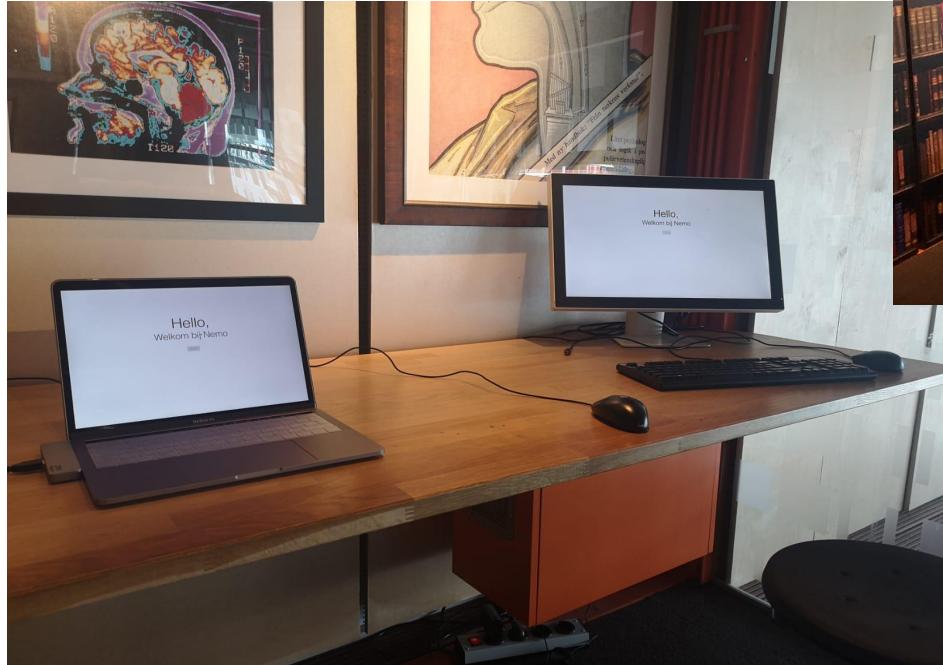
Pilot and demo

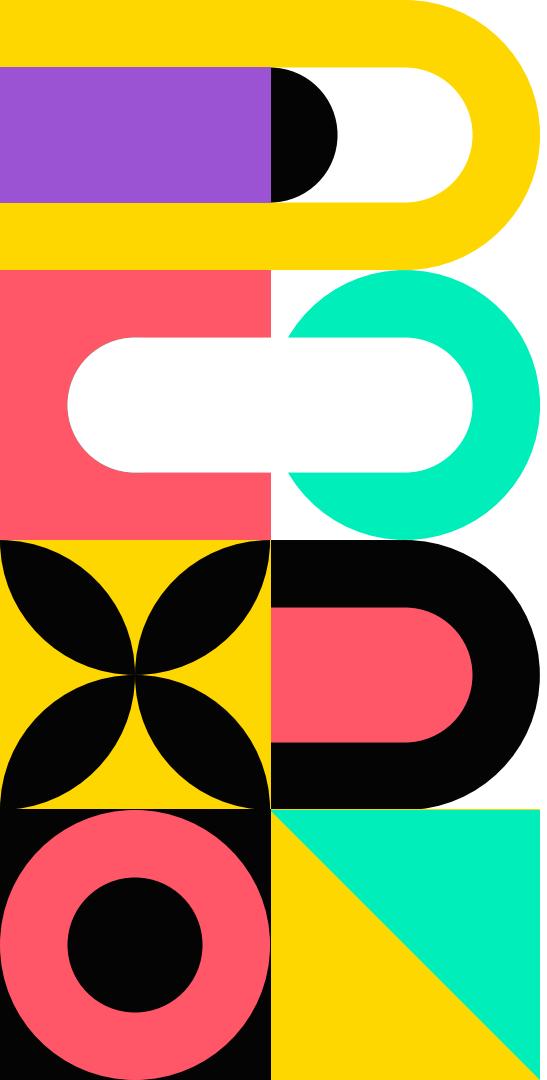




Pilot at NEMO Science Live

NEMO SCIENCE MUSEUM





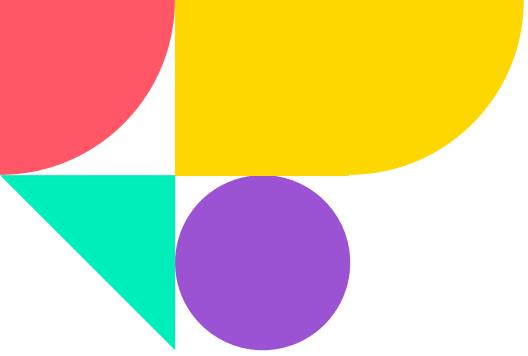
DEMO TIME!

We will show a pre-recorded video.

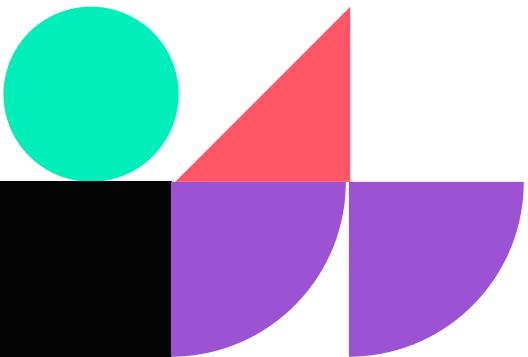
6

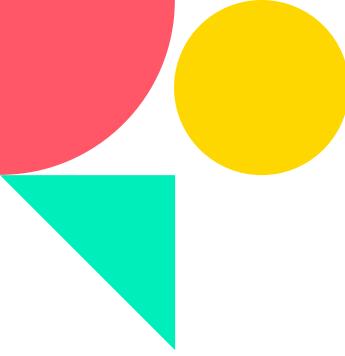
Conclusion



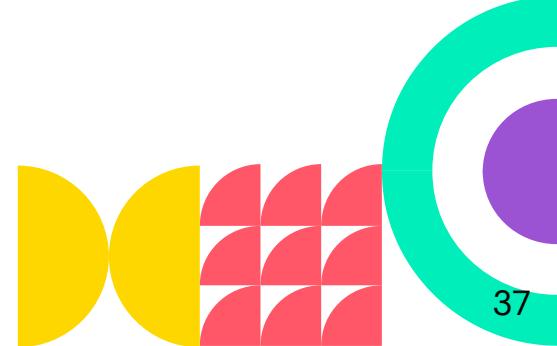


RECAP

- 
- 01** **Problem introduction**
Explaining the gender gap problem
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 - 02** **Project goals**
Mentioning our goals for the
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Insight into our findings from
the pilot and a demo



Points of improvement

- Administration panel for the data collection application
 - Small IAT example while waiting to take the real test
 - Receive custom recommendations based on answers for the data dissemination
- 

THANK YOU!

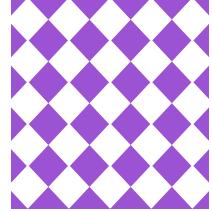
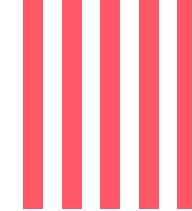


References

1. Eurostat. (2018). Share of female students in ict studies, 2018, [Online]. Available at:
<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20200423-1>
2. National Science Board (2018). Science & Engineering indicators, Figure 3-27 [Online]. Available at: <https://nsf.gov/statistics/2018/nsb20181/figures>
3. N. C. Women and I. Technology. (2014). What is the impact of gender diversity on technology business performance? research summary, [Online]. Available:www.ncwit.org/businesscase. (accessed:27.04.2020).
4. L. L. Wang, G. Stanovsky, L. Weihs, and O. Etzioni, "Gender trends in computer science authorship",arXiv preprint arXiv:1906.07883, 2019.

References

5. [https://en.wikipedia.org/wiki/Flask_\(web_framework\)](https://en.wikipedia.org/wiki/Flask_(web_framework))
6. <https://commons.wikimedia.org/wiki/File:React-icon.svg>
7. <https://www.sqlalchemy.org/>



Q&A

Nu gaan we plaatjes combineren.

Wanneer je een plaatje ziet van een jongen of programmeur verplaats je deze naar links door op de 'e' te tikken op het toetsenbord. Dat zijn dus deze plaatjes.



Wanneer je een plaatje ziet van een meisje of schrijver verplaats je deze naar rechts door op de 'i' te tikken op het toetsenbord. Dat zijn dus deze plaatjes.



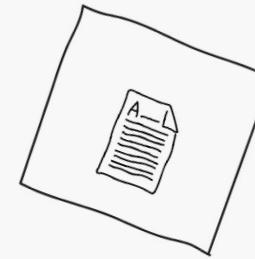
Zet je linker wijsvinger op de 'e', en je rechter wijsvinger op de 'i', zo kun je snel plaatjes verplaatsen! Ben je er klaar voor? Druk dan op volgende.

NEXT

Hello,
Andrei Geadau
Welkom bij Nemo

BEGIN

Programmeur
of
Jongen



Schrijver
of
Meisje