

CREATIVE COMMONS



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CC-BY: Otto Visser, TU Delft | Labrador – 8 april 2022



Versnellingsplan
Onderwijsinnovatie
met ICT



Educational Innovation Projects

Labrador

or: how can we help our students better during practical sessions?

Otto Visser

In the beginning...

- 100 students, 5 TAs, 1 room:
 - TAs had fixed location in room; students came to TA. Sometimes “queue” of 5 students.
- 200 – 400 students, 15-ish TAs, multiple rooms:
 - Google enqueue form, TAs claimed student in Google spreadsheet by highlighting row in their colour.
 - Problems: concurrent editing, GDPR, and surprisingly: not scalable
- 500 – 900 students: up to 35 TAs, multiple rooms, multiple buildings:
 - First prototype version of Queue system

Queue

EIP

Queue My Courses Catalog Requests

CSE Teacher 1 ▾

This is a development version of the Queue.

Home

Home

Course overview

Calendar

Active courses you participate in

[Object-Oriented Programming \(OOP NOW\) \(Teacher\)](#)

- [OOP Lab 1 06 April 2021 12:24 - 06 April 2022 16:09](#) Active Open for enqueuing
- [Exam 06 April 2022 12:24 - 06 April 2022 16:09](#) Active Exam Open for enqueuing

Finished courses

[Algorithms & Datastructures \(ADS 19/20\) \(TA\)](#)

[Object-Oriented Programming \(OOP 19/20\) \(Teacher\)](#)

Queuing

EIP

Requests

Get next for OOP Lab 1 (4)

Get next for Exam (0)

Refresh

25 requests

Submit

Status	Type	Requested by	Room	Assignment	Course	Assigned	Handled
PENDING	Question	CSE Student 8	EWI - Ampère	Assignment 1 (Assignments) 2022-04-06 12:24	CSE1100 (OOP NOW)		
PENDING	Question	CSE Student 7	EWI - Ampère	Assignment 1 (Assignments) 2022-04-06 12:24	CSE1100 (OOP NOW)		
PENDING	Question	CSE Student 6	EWI - Ampère	Assignment 1 (Assignments) 2022-04-06 12:24	CSE1100 (OOP NOW)		
PENDING	Question	CSE Student 5	EWI - Ampère	Assignment 1 (Assignments) 2022-04-06 12:24	CSE1100 (OOP NOW)		
APPROVED	Question	CSE Student 5	EWI - Ampère	Assignment 1 (Assignments) 2022-04-06 12:24	CSE1100 (OOP NOW)	CSE Student 1 12:24	CSE Student 1 12:24

Queue

History

- Request created
Apr 06, 2022 at 12:24
- Request taken by CSE Teacher 1
Apr 06, 2022 at 15:11

Info

Request by
CSE Student 5

Course
Object-Oriented Programming

Lab
OOP Lab 1

Assignment
Assignment 1

Room
EWI - Ampère

Type
Question

Question
Ah well

Comment
What should I do here?

Assistant
CSE Teacher 1

Status
PROCESSING

Approve

Reject

Forward

Not found



The idea for our Surf project

- Old:
 - 2 times 4 hours of feedback per week on code assignment
 - Same 2 times 4 hours of being able to ask questions; often waiting >1 hour for answer: “No”; same question repeated many times
- Wish:
 - 24/7 at least basic feedback on code
 - Handle repeated questions automagically, automated hints

Automated feedback

EIP

- Students hand in their work
- Labrador starts a “script train” with every “wagon” a type of test:
 - Checks assignment requirements
 - Checks code style
 - Hidden: fraud checking

Feedback from script

Passed (Script) Line 41 is very long:
142 > 120
Line 85 is very long: 122 > 120
Line 94 is very long: 153 > 120

Feedback from script

Passed (Script) Syntax error starting at line 34, column 17: missing ')' at ','
Syntax error starting at line 34, column 26: mismatched input ')' expecting {'(', '/', '-', '+', '*',
StatementBreak}

Student & TA perspectives



- Wouter Polet
- Maurits Kienhuis

Stack Overflow

But what if there is no lab?



Labrador: automated answers

- Original ideas:
 - AI & chatbot
 - automated FAQ builders
- Complications:
 - Knowledge is per course (sometimes even per assignment)
 - last years knowledge obsolete or not?
 - Natural language parsing in multiple languages



Automated answers

- Stack Overflow project
 - Curated knowledge (by students, TAs, and staff)
 - Tags!
 - Year tags identify obsolete knowledge
 - Tags identify key words
 - Tags identify assignments
- Current solution: elastic search with last years SO as starting point
 - SO while there is no lab
 - Queue during labs (with knowledge gained from SO)

Automated answers

EIP

Question for Assignment 1 - Object-Oriented Programming

Hi! What's your question?

How do I test a scanner

Does any of this help?

[How to test a method that uses a Scanner?](#)

[How do I test if a piece of code throws an exception?](#)

[How do I make a textual menu loop?](#)

[How do I pass an array to a method?](#)

[Why do I get a RunningFailure in Weblab?](#)

None of these answers help me

Automated answers

EIP

Hi! What's your question?

How do I test a scanner

Does any of this help?

[How to test a method that uses a Scanner?](#)

Test answer

This answer helped me

Automated answers



- TA can add knowledge by entering answer afterwards

248	my program segfaults when running mandelbrot and hanoi, and i have a lot of trouble telling why. Ive looked on stackoverflow and I think im handling nested loops right but it still doesnt work	Check edge cases for opening and closing brackets. After encountering an opening bracket, at which closing bracket do you stop and vice versa?	None	22 October 2021 15:39
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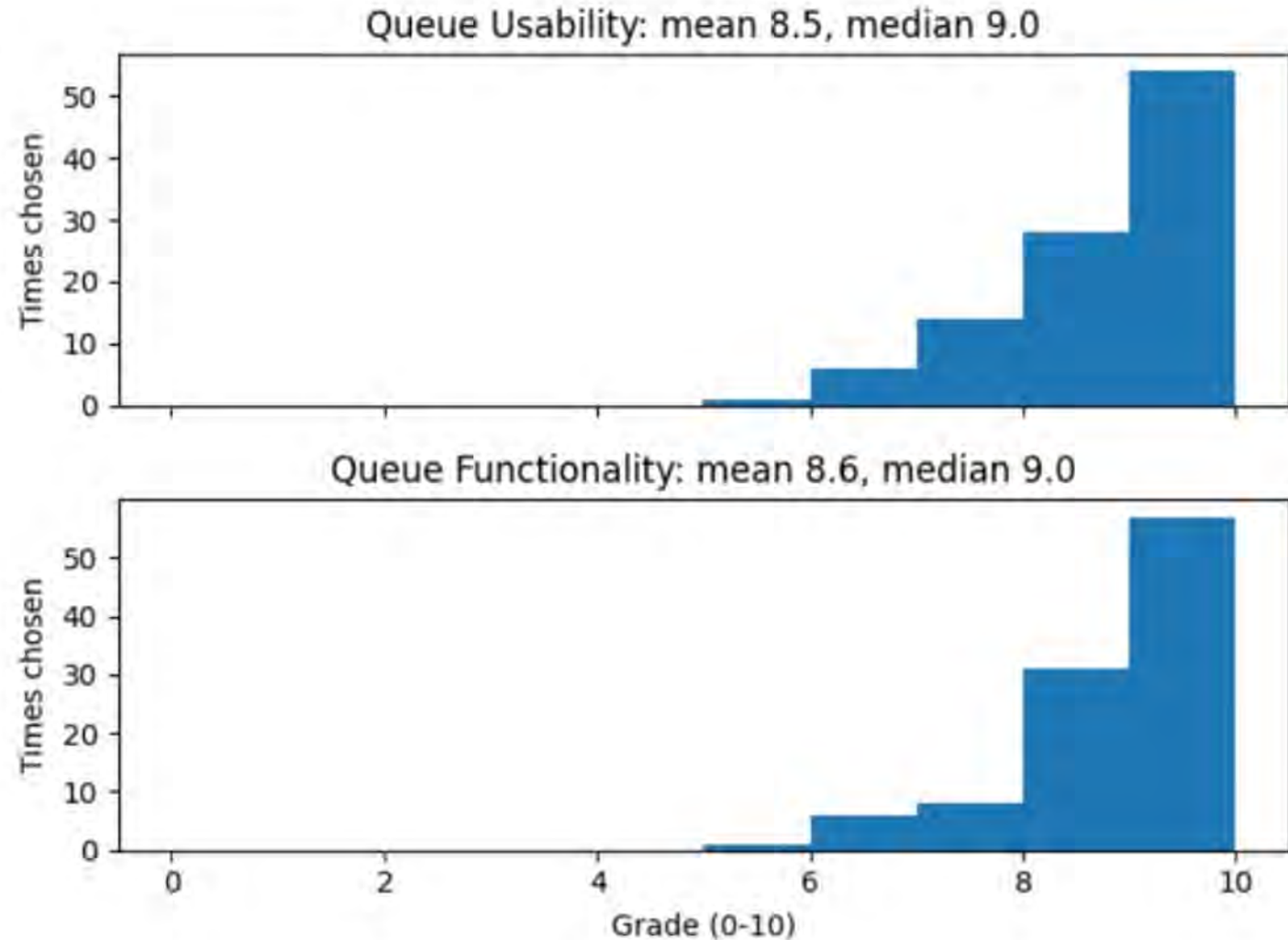


Evaluation

EIP

- All faculties at least 1 course
- > 200 courses
- > 3500 labs
- > 15.000 code submissions
- > 175.000 requests

- Students evaluation:





Future work

- Better integration within Labrador
- Can we use Stack Overflow API to automate seeding Queue answers?
- Consistency & UI/UX
- Securing lasting funding and promote outside of the university
- Motivate students to better describe their problem