Improving the first encounter with programming for students in computer engineering

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Motivation

- Bad ”genomströmning” in our data programs (HIng and CivIng)
- Many female students vanish early
  – acc. to studievägledare they miss confidence in programming skills

- Survey among CivIng students shows that more than 50% students start without programming experience

- Difficulties in programming courses due to large heterogeneity

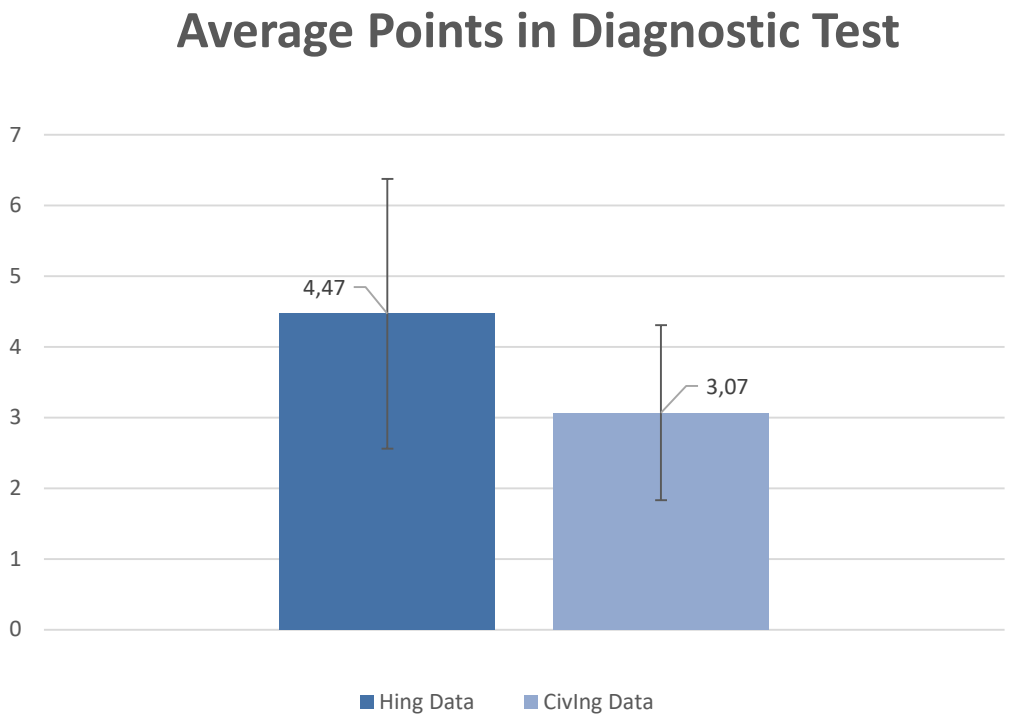
Two project elements

1. Learn about the prerequisistes of our students
2. Provide a better start

1. Diagnostic Test

- 10 questions, increasingly more technical
  - Start with Parsons Problem of making scrumbled eggs
  - Work with coordinate systems
  - Understand algorithms, identify bug
  - Create algorithms, compare algorithms
  - Terms related to data structures
  - General question on OOP

- During the first meeting with the program responsible, we asked all students to fill the test on paper
  - 47 CivIng Datateknik students
  - 33 HIng Datateknik students


Average Points in Diagnostic Test
7
6
5
4
3
2
1
0
4,47
3,07
Hing Data
CivIng Data

2. The ”Programmeringprep”

- short, informal introduction to computational thinking, algorithms and programming
- focus on students who never programmed before

→ Give those students a better start and more self confidence

→ Show that programming is actually fun and creative activity

Programmeringsprep

- 23/24 August (Thursday/Friday before the Introduction Week)
  - Deemed acceptable based on a survey from spring among all HIng and CivIng students about the introduction week
  - impossible to integrate this into the current introduction week (even not allowed to use the terms ”introduction” or ”course” in our announcement)

- Ca. 33 students (out of 41 ”registered”)
- Ca. 50% CivIng, 50% Hing, 2 females
- 4 teaching assistants (2 HIng, 2 CivIng students)

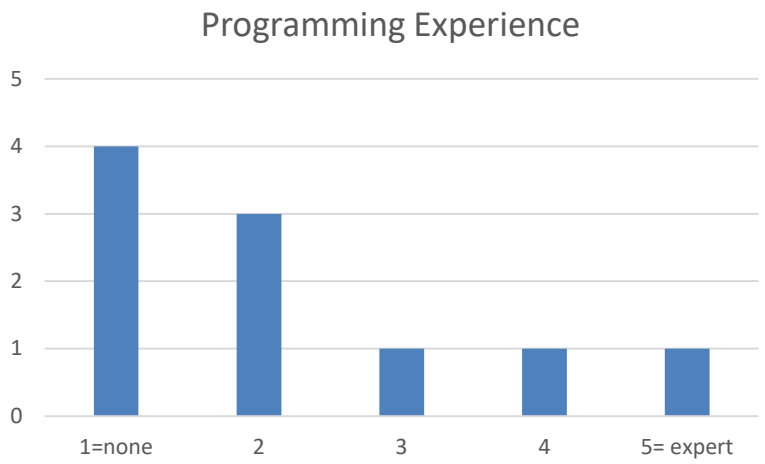
What did we do?

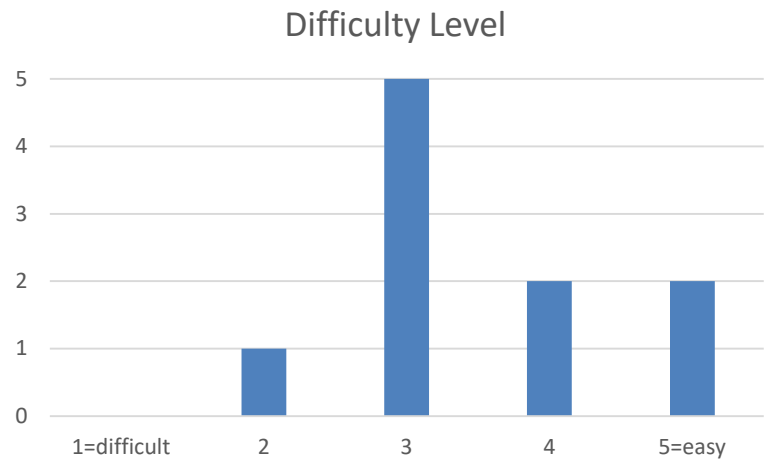
- 1st day - Basics
  - Basics of computational thinking,
  - What is an algorithm?
  - Elements of programming languages
  - Basic intro to Python

- 2nd day – Fun
  - Programming ”Hangman Game”
  - Playing with the Python Turtle module

Feedback

- 10 students answered the feedback questionaire
  (5 CivIng, 5 Hing)
- 100% recommendation
  (also enthusiastic feedback from teaching assistants)





Conclusion

- Diagnostic test as interesting tool to observe changes during the next year → needs some improvement in the tasks
- Very successful programmeringsprep → repetition is a must
  - But, better ”logistics”
  - Extension to 3 days with a little fun/game project
  - Better synchronization with programming tasks in the first courses
  - Maybe extension to other engineering programs?