Achievement-based examination revisited

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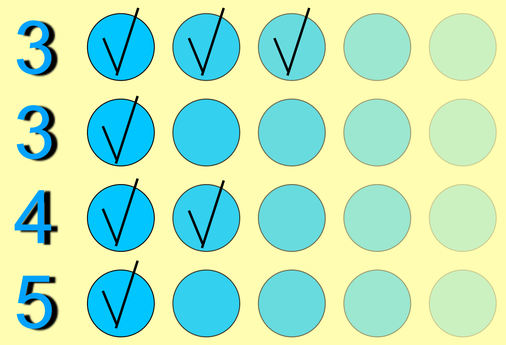
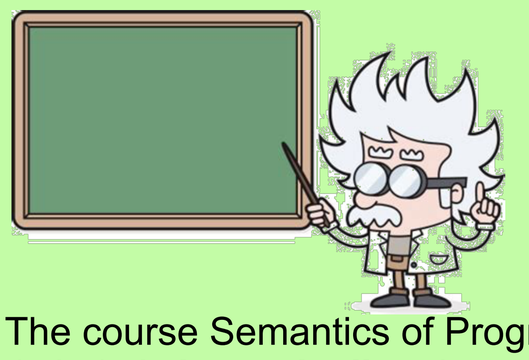
Achievement-based examination: The learning objectives of a course are broken down into a large number of "achievements". Achievements are examined continuously during the course. Students sign up with teachers or TAs to make short presentations or demonstrations that show evidence of the achievement. Several achievements can be covered by a single presentation. Students determine their own pace and order of attempting achievements. To get a particular grade, the student has to pass every achievement at that grade level and lower levels.

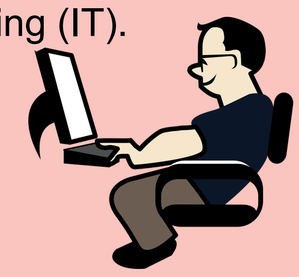


Wrigstad and Castegren introduced (see [1] and TUK 2018 [2]) the achievement system to improve examination, in particular by encouraging students to assume more responsibility for their own learning.
I used their approach in a very different setting.

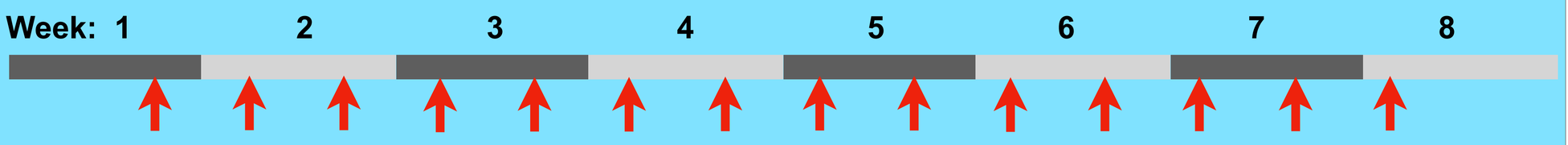


My setting: The course Semantics of Programming Languages (5 hp). A **theoretically** oriented third-year course, part of the bachelor's programme in Computer Science (DVK).

Wrigstad's and Castegren's setting: The course Imperative and Object-Oriented Programming Methodology (20 hp). A **practically** oriented second-year programming course, part of the bachelor's programme in Computer Science (DVK and the master's programme in Computer and Information Engineering (IT).

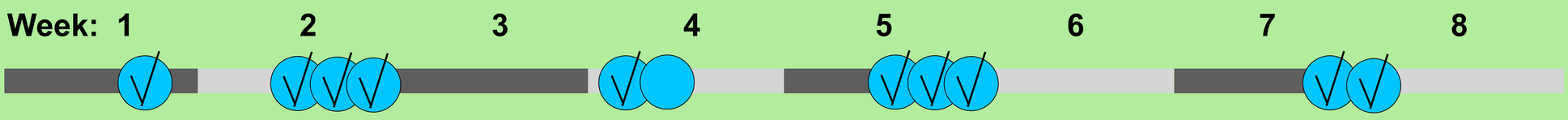


Previous examination setup:
Continuous (no final exam), with two seminars (oral) and two assignments (written) every week.



Problems: Teachers/TAs need to provide feedback to assignments quickly. Hard to avoid slipping.
Seminars works well with few students but became more difficult as number of students grow.
Classes have to be broken up into smaller groups. Heavy demand on teacher time.
Students find it hard to know what they have achieved relative to grade requirements.

Achievement-based examination:
Continuous (no final exam). Instructors publish presentation slots for each week. Students sign up to present evidence of achievements at their own pace and in their own order. Failed achievements can be retried later.



Advantages: Students get immediate feedback. They can determine their own pace and feel more in control of their progress. Less stressful and time-consuming for teachers and TAs.
Disadvantages: A few students find the presentation situation stressful.

This 5 hp course had a total of 8 achievements on the grade 3 level, 5 achievements on the grade 4 level and 4 achievements on the grade 5 level.

Course outcomes:

- Proportion of passed/failed students the same as in previous years.
- Average grade dropped markedly as students can now choose whether they will attempt a higher grade or not. (This was expected.)
- Students and teachers happier and less stressed!

Sample grade 3 achievement:

Understand how to determine the final state of a (terminating) program with repetition (WHILE statement). You may do this either in Natural Semantics or Structured Operational Semantics

Suggested (not compulsory) presentation topic for this achievement:

The program
`x:=8; while 0≤x do x:=x-5`

References:
[1] Wrigstad, Tobias and Castegren, Elias (2017) Mastery Learning-Like Teaching with Achievements, SPLASH Educators Symposium (SPLASH-E), 2017.
[2] Wrigstad, Tobias and Castegren, Elias (2018) Course Design for Increased Student Responsibility for Learning, Poster at TUK 2018