# Programmering og Problemløsning: Ugeopgaver

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18. august 2015

1. Gruppeopgave: 8. september 2015;

   (a) What can you make with 10 blocks? a) Use pen and paper, and write a program. b) Simulate the computer and describe, what is shown/computed. c) Implement it in Scratch and compare.

   (b) Design a game with 2-5 moveable sprites, clickable content, hide-show, approximately 1 minutes game-time.

   (c) Write report on game in LaTeX: max 3 pages, must include the following sections: Introduction (Introduktion), Design and program description (Design- og programbeskrivelse), Test (afprøvning), Conclusion (Konklusion). Hand-in: game in class' group and report as latex and pdf.

   (Goal: Get started, introduction to Scratch and imperative programming (statements, variables, loops, boolean expressions, and conditions. minor emphasism on: threads, events, and messages), make a program of moderate complexity, introduction to the design process, introduction to peer review/feedback, make a report in latex. Monday: Get startet, upload a program to class project, start on 10 block program. Tuesday: Design a game (no computer), Friday-Monday: Implement game-test-improve. Tuesday: Write report)

2. Individuel opgave: 15. september 2015;

   (a) HR: 1.1, 2, 4, 5, 8,

   (b) HR: 2.1, 8, 9, 10, 13.

   (c) Write a report in LaTeX where each exercise is an individual subsection, including the program, the result when run, and a max 3 line description of the solution. Hand-in: One zip file including a single source file for each exercise, that is compilable with fsharpc. Naming convention must be,

   $$<\text{instructor's}-\text{initial}>\_<\text{your}-\text{name}>\_<\text{exericse}-\text{number}>.\text{fsk}$$

   (Goal: Get started with fsharp/mono and particularly fsharpc. Introduction to functional programming, Use the automatic code correction system. Programming concepts: values/bindings, types, functions, recursions, 2-tuples, environment, numbers, booleans, `unit`, precedence and associations, characters and strings, operators. )

3. Individuel opgave: 22. september 2015;
   HR: 3.1, 2, 4, 5, 6, 7. Extra: Skriv en funktion

   $$\text{solve2} : \text{float} * \text{float} * \text{float} -> \text{float} * \text{float},$$

   sådan at solve2 a b c giver de to løsninger for $x$ i ligningen $ax^2 + bx + c = 0$, såfremt $b^2 - 4ac \geq 0$. Du behøver ikke at tage stilling til tilfældet $b^2 - 4ac < 0$.. Vink: Kvadratrodsfunktionen hedder sqrt . (Goal: lean group work, programming concepts: tuples, records, local bindings, invariants, enumeration types, exceptions)

4. Gruppeopgave: 29. september 2015;
   HR: 4.1, 4, 9, 13, 17, 22, 23 (Lists, recursion over lists, polymorphisms, value restriction)

5. Individuel opgave: 6. oktober 2015;
   HR: 5.1, 3, 7, 11 (Programming concepts: Lists, sets, and maps.)

6. Gruppeopgave: 20. oktober 2015;
   HR: 6.1, 2, 6 (Finite trees, tree traversal)

7. Gruppeopgave: 27. oktober 2015;
   På vej (Unit test)

8. Individuel opgave: 24. november 2015;
   HR: 7.1, 4, 5, 7, 9 (Modules, signature and implementation files, brief introduction to classes and objects in fsharp)

9. Gruppeopgave: 1. december 2015;
   HR: 8.1, 2, 3, 5 (Imperative programming in Fsharp, mutable variables, arrays.)

10. Gruppeopgave: 15. december 2015;
    På vej (Klasser, objekter, design)

11. Gruppeopgave: 12. januar 2016;
    På vej (Nedarvning og brugergrænseflader)

12. Individuel opgave: 19. januar 2016;
    På vej (Opsamlingsprojekt)