

# Programmering og Problemløsning

## Datalogisk Institut, Københavns Universitet

### Arbejdsseddel 12 - individuel opgave

Jon Sparring

6. januar - 10. januar.  
Afleveringsfrist: lørdag d. 11. januar kl. 23:59.

Emnerne for denne arbejdsseddel er:

- objektorienteret programmering

Opgaverne er delt i øve- og afleveringsopgaver. I denne periode skal I arbejde individuelt med jeres afleveringsopgaver. Regler for gruppe- og individuelle afleveringsopgaver er beskrevet i ”Noter, links, software m.m.” → ”Generel information om opgaver”.

## Øveopgaver

12ø0 Write a Person class with data properties for a person’s name, address, and telephone number. Next, write a class named Customer that is a subclass of the Person class. The Customer class should have a data property for a unique customer number and a Boolean data property indicating whether the customer wishes to be on a mailing list. Write a small program, which makes an instance of the Customer class.

## Afleveringsopgaver

Sparring, “Learning to program with F#”, 2017, Chapter 21.4 describes a simplified version of Chess with only Kings and Rooks, and which we here will call Simplechess, and which is implemented in 3 files: `chess.fs`, `pieces.fs`, and `chessApp.fsx`. In this assignment you are to work with this implementation.

12i0 Extend the implementation with a class Player and a derived class Human. The intention is to prepare for a future derived class Computer, not to be implemented at the moment. The derived classes must have a method `nextMove`, which returns a legal movement as a codestring or the

string “quit”. A codestring is a string of the name of two squares separated by a space. E.g., if the white king is placed at a4, and a5 is an available move for the king, then a legal codestring for moving the king to a5 is “a4 a5”. The codestring (for humans) is obtained by a text dialogue with the user.

- 12i1 Extend the implementation with a class `Game`, which includes a method `run`, and which allows two players to play a game. The class must be instantiated with two player objects either human or computer, and `run` must loop through each turn and ask each player object for their next move, until one of the players quits by typing “quit”.
- 12i2 Make an extended UML diagram showing the final design including all the extending classes.
- 12i3 The implementation of `availableMoves` for the King is flawed, since the method will list a square as available, even though it can be hit by an opponents piece at next turn. Correct `availableMoves`, such that threatened squares no longer are part of the list of vacant squares.

Afleveringen skal bestå af:

- en zip-fil, der hedder `12i_<(gruppe)navn>.zip` (f.eks. `12i_jon.zip`)
- en pdf-fil, der hedder `12i_<(gruppe)navn>.pdf` (f.eks. `12i_jon.pdf`)

Zip-filen `12i_<(gruppe)navn>.zip` skal indeholde en og kun en mappe `12i_<(gruppe)navn>`. I den mappe skal der ligge en `src` mappe og filen `README.txt`.

I `src` skal der ligge følgende og kun følgende filer:

- `chess.fs`, `pieces.fs`, `chessApp.fsx`,

som beskrevet i opgaveteksten. Programmerne skal kunne oversættes med `fsharpc`, og de oversatte filer skal kunne køres med `mono`. Funktioner skal dokumenteres ifølge dokumentationsstandarden som minimum ved brug af `<summary>`, `<param>` og `<returns>` XML-tagsne. Filen `README.txt` skal ganske kort beskrive, hvordan koden oversættes og køres.

Pdf-filen skal indeholde jeres rapport ifølge:

- Absalon->Files->noter->LaTeX->opgave.pdf

guiden og oversat fra  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ . Husk at pdf-filen skal uploades ved siden af zip-filen på Absalon.

God fornøjelse.