Laboration 4
The Game "Fia"

Introduction
The purpose of this programming exercise is to give experience of the analysis, design, and implementation
phases of a programming project. You first have to model a problem, and thereafter, using the model, im-
plement a solution. Since problem analysis is part of the exercise, the problem statement is brief.

Preparations
Put your files in a separate directory and make sure that this directory can only be read by the members of
your lab group. If you want the teaching assistants to be able to look at your files, give the AFS group
oopk_e00:assistenter read access for the directory.

Always load the course module before starting work:

    module load oopk_e00

Copy the make file from the course directory

    cp $OOPKHOME/Makefile .

(you need to edit this file before compiling).

In this exercise you will use the graphics package Grain. It is documented in a manual page that is printed
in the course material. You can also view the manual page on-line by typing "man grain". If you use the
Makefile from the course directory, your code will be linked with the Grain library.

You should draw UML diagrams that describe your program. Therefore, review the lecture notes about
UML and the UML Quick reference that can be found in the course material.

The Assignment
Implement the game "Fia med knuff" as an object oriented program (see the next page for rules). The game
board should be drawn in a window on the display, and it should be possible to use the mouse to move pie-
ces. Clicking on a piece should move the piece to its new position (the new position depends on the outco-
me of the die and the piece’s current position). The program should check that the piece that is being moved
is allowed to make the specified move. The graphics package Grain should be used for user interaction.

Document your program using the UML. You should have a paper copy of the diagrams to hand over to
the teaching assistant at the time of examination. The diagrams should either be prepared by computer, or
be well hand drawn. It is necessary to present a class diagram, some relevant sequence diagrams, state dia-
grams, use cases, and a data dictionary.
Rules for "Fia med knuff"

"Fia med knuff" is a game for 2, 3, or 4 persons. Each player has four pieces of one color and puts them in the corresponding colored areas of the board (these areas are called homes and are in the corners of the board).

All players throw a die, and the player with the highest outcome makes the first move.

A player’s turn starts with a die throw. The player then moves one of his pieces (that is not in the home) the number of circles forward as indicated by the die. The pieces start on the circle nearest counter-clockwise of the home and goes once round the periphery of the board in the clockwise direction, and then goes into the center of the board.

If the die shows 1 or 6, the player may, if he wishes, instead of moving one of the pieces forwards, move pieces out of the home. If the die shows 1, one piece may be moved out of the home and placed on the circle nearest to the home, counting counter-clockwise. If the die shows 6, the player may choose between moving 2 pieces to the same circle, or to move 1 piece to the sixth circle.

When a piece is moved to the board’s center position (after moving once around the board, and then to the center), it is removed from the game. The object of the game is to get rid of all four pieces. The one who first removes his fourth piece from the board is the winner. To stop on the center position, the piece has to stop exactly on that circle. If it is moving too far, it “bounces” and back up from where it came.

If the die shows 6, the player gains another round for free; that is, the player may throw the die again after the move is completed.

It is not allowed to pass ones own pieces, or to put several pieces on the same circle. The only time two pieces may be on the same circle is after two pieces are moved out of the home at the same time (the die shows 6). If a move stops on a ring where an opponent has a piece, the opponent’s piece is knocked out from this position and is moved back into the opponent’s home.

A player may not refrain from moving if he has a legal move.

When a player has finished his move, the next player, counted clockwise is up for throwing the die.