**CPSC ASSIGNMENT 1 REPORT**

Refactoring 1

This refactoring changed the code of the protected “isPathClearMethod” of the abstract Piece class. This method is used by all its subclasses except for the King and Knight class.

The method was not working properly as detected by: testBishopCanMoveDiagonalMoveUpRightPathNotClear() and testBishopCanMoveDiagonalMoveDownLeftPathNotClear() methods in the BishopTest JUnit test case as well as the equivalent methods in the QueenTest JUnit test case. The method also exhibited “Duplicate Code” and “Long Method” code smells.

I applied the “Substitute Algorithm” refactoring by ensuring that the prepared alternative algorithm compiled successfully, followed by running the already prepared “…PathNotClear()” JUnit test cases for all Piece subclasses that are able to move multiple squares and cannot skip over pieces. The newly improved algorithm passed all tests successfully.

The result of the refactoring is the “isPathClearMethod()” in the abstract Piece class.

Because the “isPathClearMethod()” is protected, it was tested by running JUnit test cases on the canMove() method of the Piece subclasses that can move multiple pieces in a direction, without being able to skip over other pieces. For each direction one of these pieces can move, a Board object would be initialized with a different piece placed in the way of movement. The canMove() method of these pieces will then call isPathClearMethod() and return false if detecting the piece along the path of movement.

Aside from now successfully being able to tell when a path is clear for diagonal movement, the new algorithm is also much shorter, due to less code duplication, and easier to understand, due to previous nested conditionals with while loops being removed.

Refactoring 2

This refactoring changed the code of the canMove() method. This method is a abstract method of the Piece.java class, it is implemented by all its subclasses.

The method previously had the long method code smell. Complex conditionals made the flow of control difficult to read.

I applied the Decompose Conditional refactoring via Extract Method, the newly created methods are then called instead in canMove().

New method isDiagonal, canTakeDestination added to Bishop.java, new method isHorizontal, isVertical, new method isDiagonal, canTakeDestination added to King.java, new method isKnight, canTakeDestination added to Knight.java, new method isVertical, isDiagonal, canTakeDestinationPawn added to Pawn.java, new method isVertical, isHorizontal, isDiagonal, canTakeDestination added to Queen class, new method isVertical, isHorizontal, canTakeDestination added to Rook class.

The newly added methods are all private as they are helper methods and thus they are tested through running JUnit tests on the canMove() method of each respective class.

The refactoring resulted in the canMove() methods being much cleaner and easier to read. However it also lead to a large amount of code duplication enabling further refactorings such as the pull up method.