# MATH 222

Project

In the following two games state who can always win: the first player or the second player. If the first player can always win, state the first move that he or she needs to make. If the second player can always win, state the first move he or she must make in response to every way the game may be begin.

You may work in groups of up to 3; when your group has found the answer, fill in the template on the course web page. Only hand in one template per group with your answers, nothing more is needed.

Game 1

Turnablock
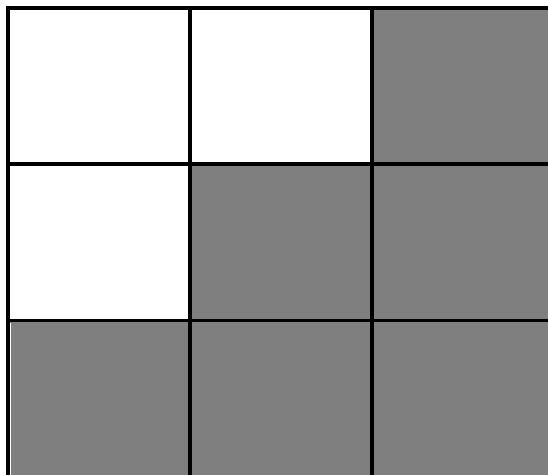
Turnablock is played on a 3 by 3 square board with 9 counters that are black on one side and white on the other. The games starts with some counters flipped to the white side and some flipped to the black side as shown above. Players take turns reversing all the pieces in a block from black to white or white to black. A block can be any size (1×1, 1×2, 1×3, 2×1, 2×2, 2×3, 3×1, 3×2, 3×3) but the lower right corner of the block must be black in order to flip it. Both players play on the same side of the board and therefore have the same view point of the lower right corner. Whoever first turns the whole board white is the winner.

Double Take Nim
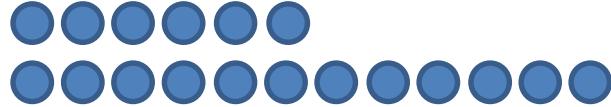
How to play: Place counters as shown. Players take turns removing counters from one or both (horizontal) rows; in the latter case, the numbers of counters removed from each row must be equal. The player that picks up the last counter wins the game.

Grading

Game 1	Stating the player that can always win this game		25%
	Correctly stating the winning player's first move		25%
Game 2	Stating the player that can always win this game		25%
	Correctly stating the winning player's first move		25%