# Zombie Simulation
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**Scenario:** The secluded 100 square mile town of CaseyDale has been infected with zombies! A handful of humans have become zombies and are trying to eat the other residents! Will humans be able to survive and take out all the Zombies by obtaining guns, repopulating, and getting some help from the sun to survive? Or will the zombies kill, transform humans and leave radiation to wipe out the entire town? Play this simulation to find out!

There is a 10x10 array full of humans, a 10x10 array full of zombies, and a 10x10 char array to print the grid to standard output. Certain objects in the human and zombie arrays have a 'killed' flag set to false to indicate that object is active in the grid and is free to move. Since there are two or three arrays being changed each turn, there are multiple checks to make sure an action is allowed to occur in the code.

In a set of 25 simulations, humans outlasted zombies 60% of the time (15 of 25). Humans were more likely to win longer simulations of 150 days or more, while zombies were more likely to win simulations of less than 150 days. The shortest simulation was 35 days and the longest simulation was 490 days.

**Starting Condition:** The simulation will start by spawning 15 humans and 3 zombies randomly throughout the board.

**Rules:**
- Every day each Human has a 66.67% (⅔) chance to move (Soldiers are Humans). If the human can move, they'll randomly choose a direction either vertically or horizontally.
- Every day each Zombie has a 90% chance to move. If the zombie can move, they'll randomly move in a direction either vertically, horizontally, or diagonally.
- Every day, all humans will move including soldiers, and then all Zombies will move.
- Humans cannot move into an out of bounds area or a space that is currently occupied by another human, zombie, or soldier.
- Zombies cannot move into a radiated area, an out of bounds area, or an area occupied by another zombie or a soldier
- Each turn, there is a 10% chance radiation will appear on the board This radiation kills humans and soldiers if they move to it.
- If a Zombie is allowed to move AND they choose to move to a square occupied by a Human they have a 50% chance to kill them and a 50% chance to infect them. If infected, the human will turn into a Zombie and the original Zombie will not move, however if killed the Zombie will move to the humans location, eradicating that human from the board.
- Every 30 days a human on the board is chosen at random to become a soldier, if there are still humans that aren't soldiers still on the board. Soldiers ONLY DIE when moving into a radiated location on the board.
- If a Soldier chooses to move to a location occupied by a Zombie on the board, the Zombie will die.
- Every 75 days the sun gets so hot, that all radiated tiles on the board are cured.
- Every 20 days a human is randomly spawned onto the board in a location that doesn't have radiation, and isn't currently occupied by a character.

**Stopping Condition:** There are no humans left,  there are no Zombies left, OR 1000 days have passed.