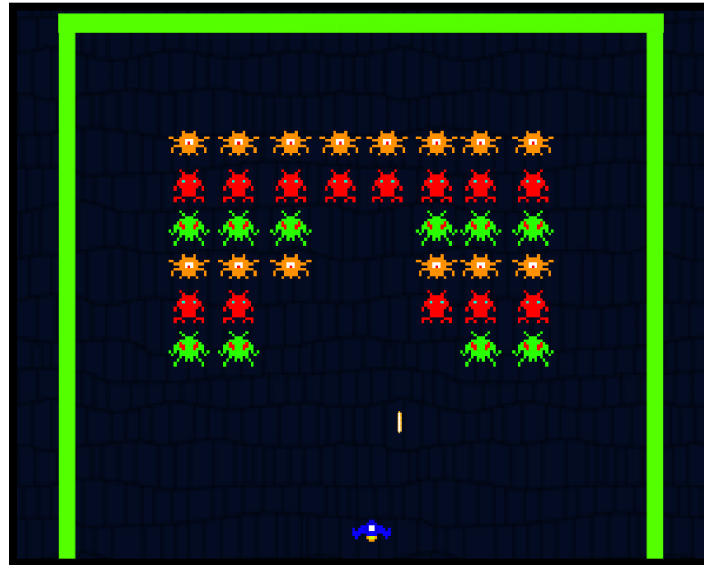# Space Invaders Revamp

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## About

In this project, we would like to recreate the classic "Space Invaders" game from the 1970s. A VGA will display the background and continually add space invaders. The user will control the position of the defending spaceship. If the user is able to successfully eliminate all space invaders, they will proceed to the next level. We plan to incorporate different levels of difficulty to incorporate strategy (i.e. powerups, space invaders that move fast or have more health).

## Implementation

Hardware
- Read user control inputs on a joystick and buttons for directional travel and selectable game options/plays.
- Determine pixel locations and send to software VGA

Software
- Algorithm of movement for invading spacecraft
- Display movements of spaceship and invading spacecraft along with conflicting fire
- Calculation of positions of respective space ships
- Keep rank of score, levels, and differentiate between more difficult enemies based on color

Proposed Difficulties and Rewards
- ● Increasing levels will allow for more rapid fire/multishot while also requiring invading ships to have more health points
- ● Allow for a shield that restricts firing for a certain period of time
- ● If invading spacecraft get too close (low) to the ship, they start to divebomb and the only way to survive is to use shield

# Milestones

M1
- ● Establish interface & configure FPGA to display pixel values
- ● Develop preliminary algorithm for invading ship movement for C conversion

M2
- ● Implement game visuals to display backgrounds and move space invaders & bullets across the screen
- ● Start to fuse ship movement from algorithm into game

M3
- ● Comb through any bugs from algorithm deployment and finalize user displays of levels, score, and lives
- ● Incorporate varying levels of difficulty: add different space invaders, powerups, increasing the difficulty of certain levels

Final
- ● Write report, prepare presentation, and fix any final implementation issues