



## ECE243 Final-Project

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**“Asteroids** is a space-themed multidirectional shooter arcade game designed by Lyle Rains and Ed Logg released in November 1979 by Atari, Inc. The player controls a single spaceship in an asteroid field which is periodically traversed by flying saucers. The object of the game is to shoot and destroy the asteroids and saucers, while not colliding with either, or being hit by the saucers' counter-fire. The game becomes harder as the number of asteroids increases” [1].

This rendition of asteroids serves as a homage to the classic retro arcade game, closely mimicking both functionality and appearance. For instructions on how to load this game, please continue reading below.

- 1) Simulate on CPULATOR
  - a) Use the following De1-SoC simulator to run the game:  
<https://cpulator.01xz.net/?sys=arm-de1soc>.
  - b) Change the file type to C instead of ARMv7
  - c) Press File, Open, and then select your local copy of asteroids.c
  - d) Press Compile and Load, press continue, then press switch 1 on the right side of the panel - this should load up the loading screen
  - e) Scroll down on the right side until you see the VGA pixel buffer and the PS/2 keyboard or mouse panel (IRQ 79) - keyboard commands will go in the 'type here' box
  - f) Welcome to Asteroids!
  - g) Note: if CPULATOR starts acting up or you die everytime you try to shoot in the beginning, either reload the screen or just restart the game and immediately move your ship out of the center danger zone before you start shooting (chances are the alien might have set some trap there making your ship implode!)
- 2) Run on the DE1-Soc Board:
  - a) Make a new project in the Quartus Monitor Program, and add your local copy of asteroids.c to the project files.
  - b) Add “-std=gnu99” to the project compile flags, and “-lm” to the linker flags.
  - c) Compile and load the program onto the board, and run the program
  - d) Toggle the VGA adapter and press switch 1 on the board - this should load up the loading screen.
  - e) Connect a PS/2 keyboard to the PS/2 port on the DE1-Soc Board.
  - f) Welcome to Asteroids!

Continue onto the next page for more details about how to play Asteroids...

# ASTEROIDS

## Objective:

- 1) Shoot and evade the incoming asteroids and alien saucers to protect your spaceship

## Commands:

- 1) Press tab to start the game, and then again at the end to reload the game
- 2) Use the arrow keys to navigate your ship through space. Up to thrust and Left and Right to rotate your ship about its center
- 3) The Down arrow key lets you teleport to a random spot on the screen if your current position gets too heated (Hyper-Space)
- 4) Use the spacebar to shoot the opposition
- 5) If you're feeling adventurous, have a friend come and take control of the alien saucer by pressing Q repeatedly when its near you to shoot even more bullets at you

Hint: Everytime you kill an alien saucer, another will randomly respawn after some time - remain cautious! Also, if the alien crashes into you, it might just abduct you and end the game...

## In-game Examples:

ASTEROIDS

PRESS TAB

Figure 1. Home screen

# ASTEROIDS



Figure 2. Gameplay on the DE1-Soc VGA

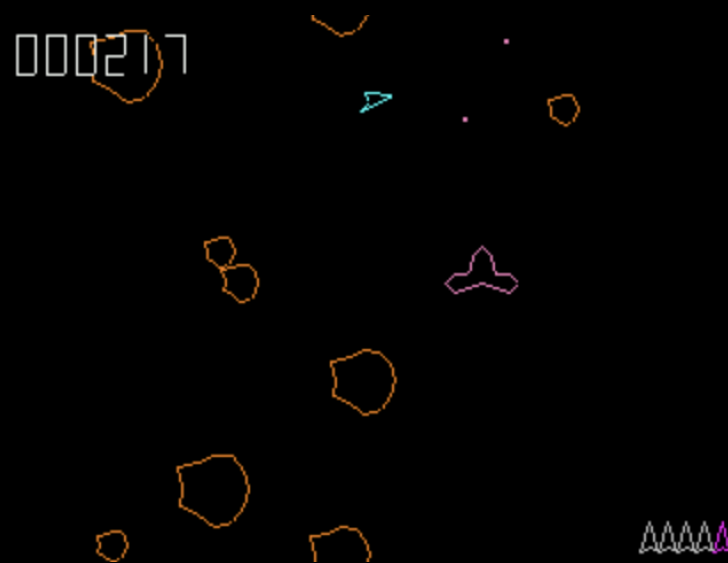


Figure 3. Gameplay with Alien

# ASTEROIDS

Attribution Table:

| Tasks                          | Name             |
|--------------------------------|------------------|
| Vector Functions               | Muhammed         |
| Game Structure                 | Muhammed & Ankur |
| Game Logic                     | Muhammed & Ankur |
| Asteroids Structure            | Muhammed         |
| Asteroids Logic & rendering    | Muhammed         |
| Bullets Structure              | Ankur            |
| Bullets Logic                  | Ankur            |
| Ship Structure                 | Muhammed         |
| Ship Logic & rendering         | Muhammed         |
| Keys Structure                 | Muhammed         |
| Keys Logic                     | Muhammed         |
| Alien Structure                | Ankur            |
| Alien Logic & Rendering        | Ankur            |
| Main and Exit Screen Rendering | Ankur            |
| Score Logic and Rendering      | Ankur            |

[1] [en.wikipedia.org/wiki/Asteroids\\_\(video\\_game\)](https://en.wikipedia.org/wiki/Asteroids_(video_game))