




Genetic Galaxy Defender

Gameplayer's Guide

Genetic Galaxy Defender is a game that helps demonstrate how Evolutionary Algorithms (EAs) can provide adaptation and exploration of a problem space.

This document will help guide players, for a more enjoyable experience.

| What it looks like | What it is | What to do | Notes |
|---|-------------|--|---|
|  | Your Ship | Move up and down and shoot Aliens. Prevent the aliens from getting to the left side of the screen. | <ul style="list-style-type: none">- You only live once!- Your ammo is limited- A higher score gives a speed bonus- Your speed and ammo increase each Level |
|  | Alien | Shoot it! | <ul style="list-style-type: none">- Kill Alien: 3 points- Aliens have health and speed that depends on their equipment/sensor loadout- Each Alien has a "brain" that tells them what to do upon different sensor data- Alien loadouts and brains are adapted after each Level- Alien base health is 2 points, armor gives bonus to this |
|  | Ship Bullet | Make these hit the Aliens | <ul style="list-style-type: none">- worth 1 point of damage- after Level 1 there are secondary weapons that look different. Same principle applies. |

Key Mapping

| Key | Function |
|------------------|---|
| ↑ (up arrow) | Moves your Ship up |
| ↓ (down arrow) | Moves your Ship down |
| ↵ (enter/return) | Start a new game (when you have died) |
| [spacebar] | Fire your Ship's cannon |
| "T" | Toggle the equipment details text for each alien |
| "R" | Resets the current Level (preserving your old score, etc) in case you get hung up or in an impossible situation |
| "P" | Pauses the game (useful for observing!) |
| "F" | Toggles between primary and secondary weapons (available after Level 1) |

Things to try:

- Really and truly try to kill all Aliens and keep them from crossing to the left side
- Kill only the weak Aliens. You should find that the enemy gets stronger.
- Allow a weak but successful Alien pass through. Then the enemy gets easier.
- Do nothing for a few levels (hide and don't die).
- Keep a record from the Evolution screen to see which equipment is successful.
- Make it to levels 5 and 9, where the weapons get much better.
- Play to level 10 at least twice.

Tips and Advice for playing the game:

- Play multiple times

Genetic Space Defender Program Design

- Read the equipment loadout at the Evolution screen each time and try to see where crossover and mutation has occurred.
- There are a large number of tips in the game itself. A random tip is displayed after every successful Level.
- Killing weak enemies makes the enemy stronger...
- Annihilating the enemy makes them start over from random bugs!
- If you are overwhelmed, just hide (try the very bottom of the screen).
- Conserve ammo for the weak Aliens if you must.
- If you get hung up on an Alien that has a lot of battery left and you have no ammo, restart the Level.