



# Froggo FPGA

Team 8  
User / Game Manual





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# What Is Froggo?

## Introduction

This game is an educational project inspired by the original **Frogger Arcade Game**, published by Konami© in June 1981. It was created to help demonstrate FPGA programming and game development concepts for learning purposes.

This manual will help you to set up the right environment to play your FPGA version of Frogger named Froggo.

## What Is The Game About?

You are a frog stranded on the other side of the road. To get back to the safety of your home, you need to go through a dangerous path. You'll need to jump through a road full of hazards and a dangerous river with a current that will kill you. The objective is to try to make your way to safety, while collecting the highest score possible.



## What You Will Need

Before playing our game, you'll need to make sure you have all the required software and hardware available to you.

### Hardware Requirements

Here is a list of the required hardware you will need to play FPGA Froggo:

- A computer with access to the internet
- A Go Board
- A micro-USB for data transferring
- A VGA cable (you can use a VGA to HDMI cable)
- A VGA monitor (or an HDMI one, if you have a VGA to HDMI cable)

### Software Requirements

The game runs natively on the Go Board but requires additional software to operate.

To set up the environment, some tools are essential for programming the Go Board and managing the game files. Head over to [Setting Up Your Environment](#), to set up your computer.



# The Go Board

## What Is The Go Board?

The Go Board is an FPGA development platform perfect for beginners. It's designed to make hardware design learning straightforward with Verilog or VHDL. Here's an overview of its main features:

- **FPGA:** Lattice ICE40 HX1K.
- **Clock:** 25 MHz onboard clock.
- **Memory:** 1 Mb Flash memory.
- **Interfaces:**
  - 4 LEDs.
  - 4 push-buttons.
  - Dual 7-segment displays.
  - VGA connector for video output.
- **Connection:** Powered and programmed via a micro-USB cable.



For more info, check out [Nandland Go Board](#).



## Setting Up The Environment

Follow these steps to set up the Go Board for playing the FPGA Froggo game

1. Visit our [GitHub Repository](#).
2. Click on **Releases**.
3. Download the **Source code** and **unzip it**.
4. Open the downloaded file by clicking on it.
5. Navigate to the **setup** folder.
6. **Connect** your Go Board to your computer. (Using a micro-USB cable)
7. Run the **setup prompt** for your Operating System:
  - **On Mac:** mac-installer.sh
  - **On Windows:** windows-installer.cmd
  - **On Linux:** linux-installer.bash

These setup files run the necessary command to set up the right environment to play the game on the FPGA.

They essentially download Python and APIO.

If you encounter any issue visit the [Get Help](#) section



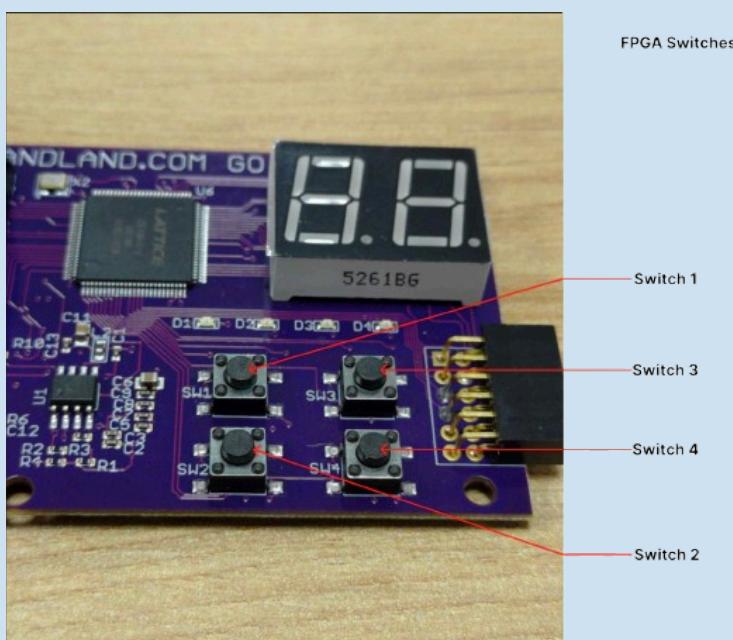
## How to play & Information

This section goes through the different information you need to know to play Froggo FPGA.

### Controls

The Go Board features four switches that allow you to move the frog in different directions:

- 👉 SW1: Moves the frog **up**
- 👉 SW2: Moves the frog **left**
- 👉 SW3: Moves the frog **right**
- 👉 SW4: Moves the frog **down**





## Life System

You start the game with three lives, represented by the three lit LEDs on the Go Board. Each LED corresponds to one life.



When you lose a life, one of the LEDs will turn off to indicate the loss.





If you manage to reach 20,000 points, you'll earn an extra life, which will be reflected by one LED lighting up again, provided if you have fewer than three lives.

## Levels

The game has 8 levels, each increasing in difficulty with faster obstacles and more hazards, making the challenge tougher as you progress.

Additionally, the current level is always shown on the seven-segment display, keeping you informed as you progress.

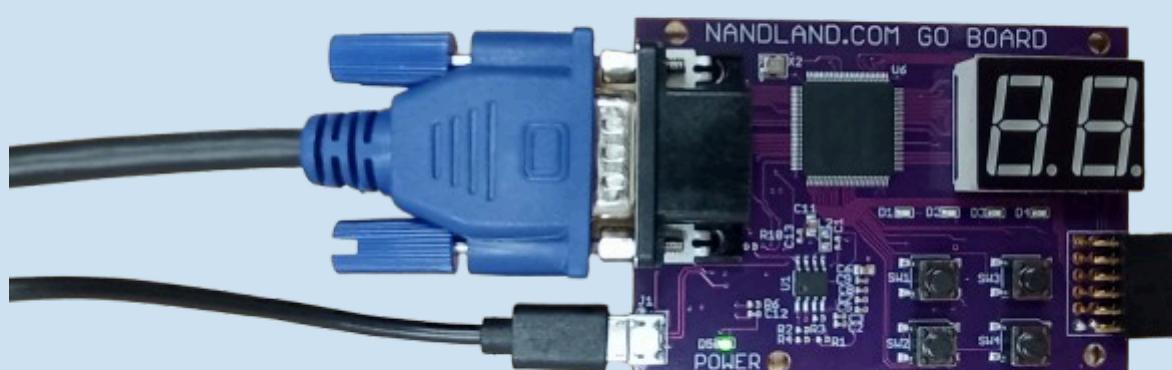


## Display

The game's display is output through a VGA cable. You can either connect the Go Board directly to a VGA monitor or use a VGA to HDMI adapter to connect it to an HDMI monitor.

**Note:** The game is rendered at a resolution of **640x480 pixels** for a classic, arcade-style visual experience.

Here's what your Go Board looks like when it's fully connected and ready for use.





## Start The Game

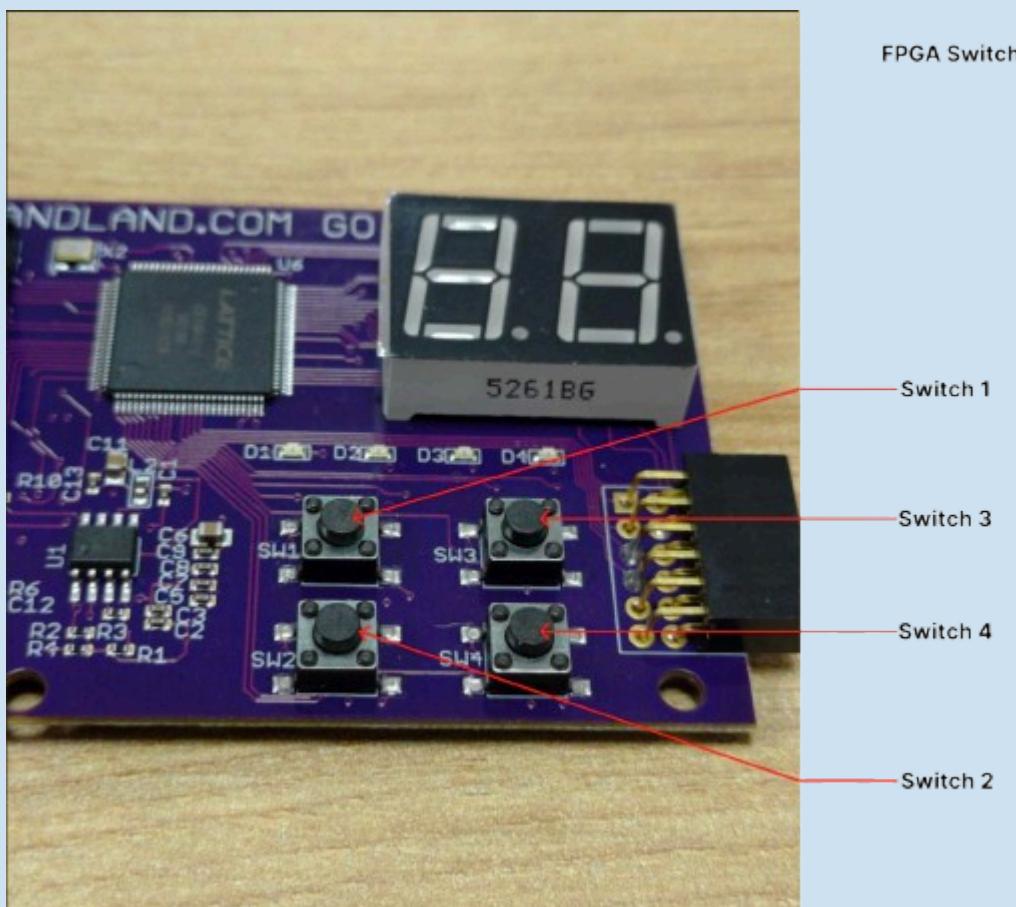
To start the game follow these steps:

### 1. Ensure the Game is On:

- Verify that the Go Board is powered on and the game files are uploaded correctly.

### 2. Press the Buttons Simultaneously:

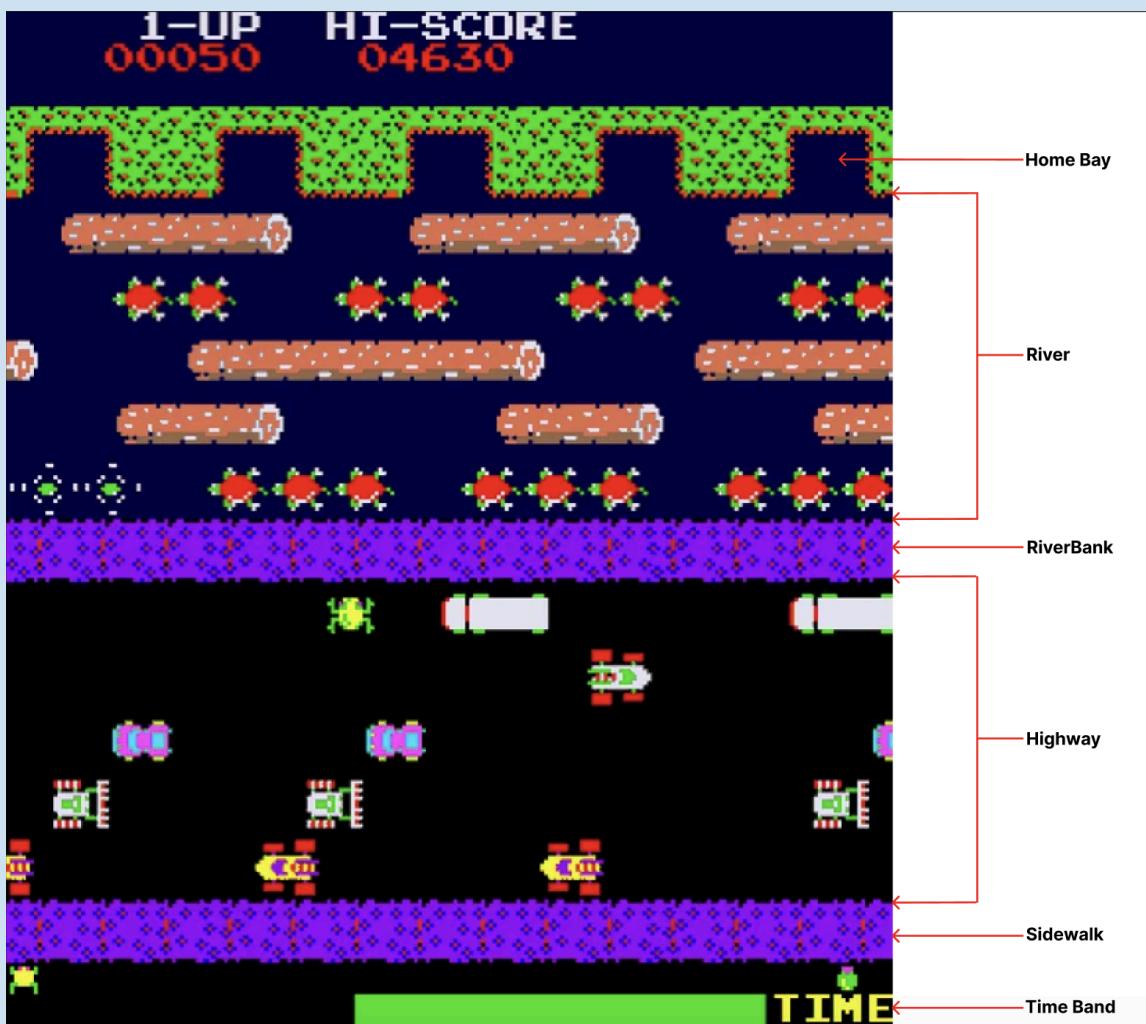
- Press and hold all four switches (SW1, SW2, SW3, SW4) at the same time to initiate the game.





## The Game

This section goes through the different elements you will encounter while playing the game.

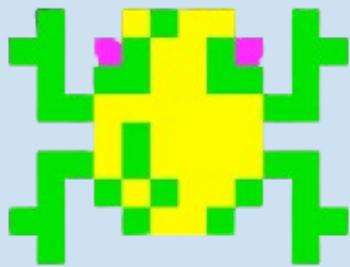


Representation of the Froggo FPGA game

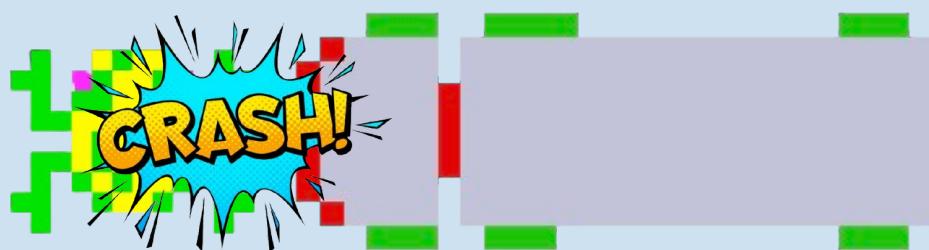


## Main Character

You control a small, delicate frog with vibrant green skin, yellow spots, and striking purple eyes.



It relies on your skill to safely navigate dangerous roads and rivers filled with obstacles. Each move is crucial for its survival.

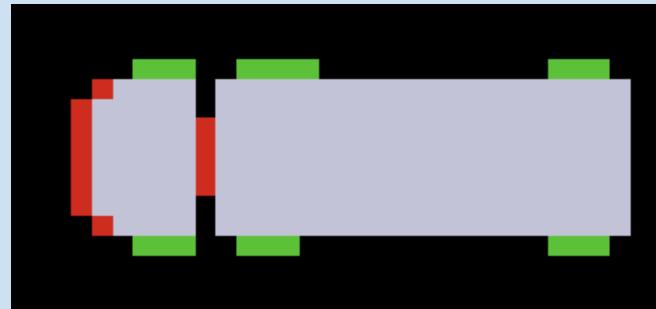
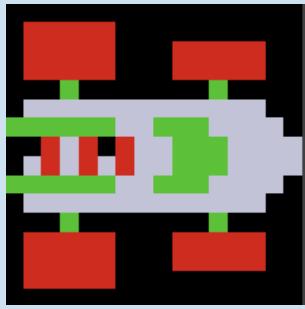
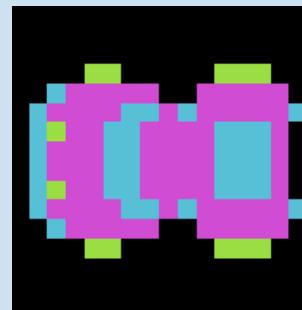
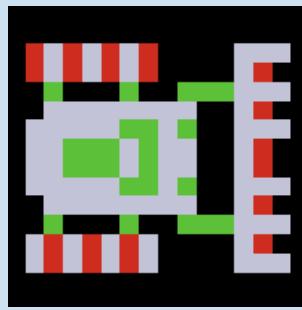
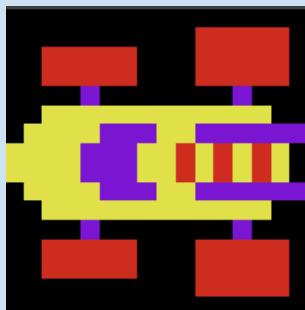




## Crossing The Road

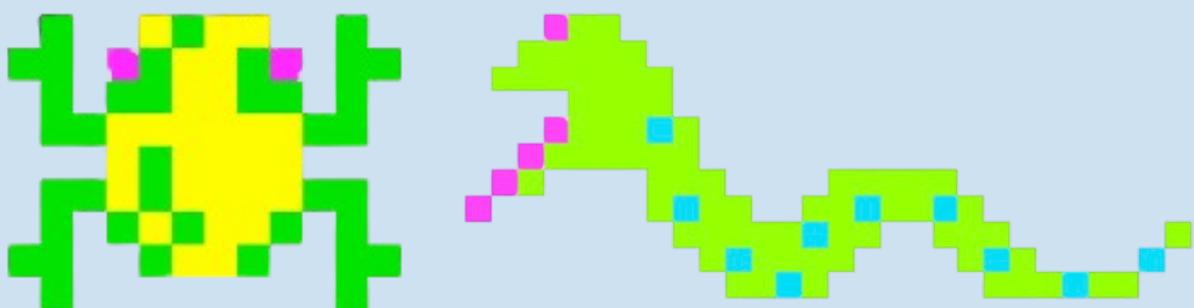
You begin on the sidewalk, facing five dangerous lanes of fast-moving traffic. Your first challenge is to cross the highway, dodging cars driven by reckless drivers. Traffic flows in both directions at varying speeds. Stay alert—touching any vehicle will result in instant death for the frog!

Here are the vehicles you encounter:





⚠ The riverbank appears safe, but as you progress, you may encounter a snake. This dangerous obstacle can be fatal if you cross its path, so proceed with caution—you're not out of danger yet.





## Crossing The River

You can't swim in the river, the current is way too strong for your frog.

You have to jump from logs, to turtles, to alligators, from row to row, to reach the home bay safely.

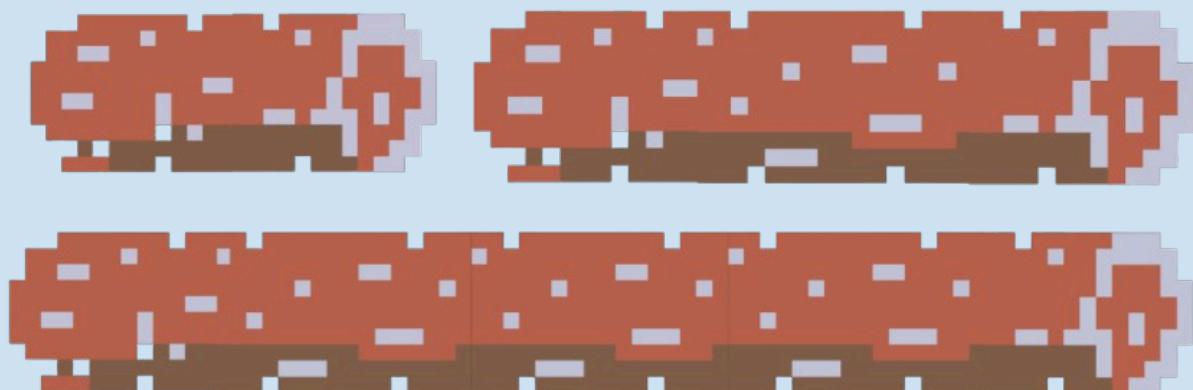
**1. Turtles:** The first objects you can jump on are turtles, which come in sets of two or three. It's safe to jump on their backs, and you can move between turtles within the same set. You can also jump forward or backward to other floating objects, but jumping left or right off the turtles will land you in the water.

⚠️ Watch for diving turtles. It's safe to jump on them when they're above water, but don't stay too long. Move to another floating object before they dive again. They will resurface after a while.

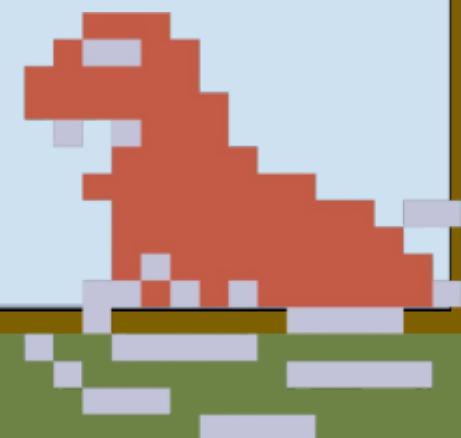




**2. Logs:** You'll encounter logs in three sizes: small, medium, and long. You can jump from side to side on each log, and also forward or backward to other floating objects. Be careful not to jump too far, or you'll fall into the water and drown.

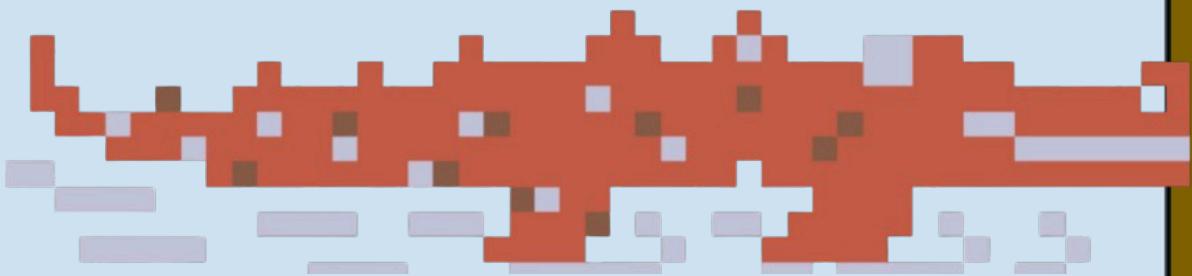


**3. Otters:** As you progress, these fast-swimming animals will try to push you into the water, whether you're on alligators, logs, or turtles. Stay clear of them to avoid being knocked off.



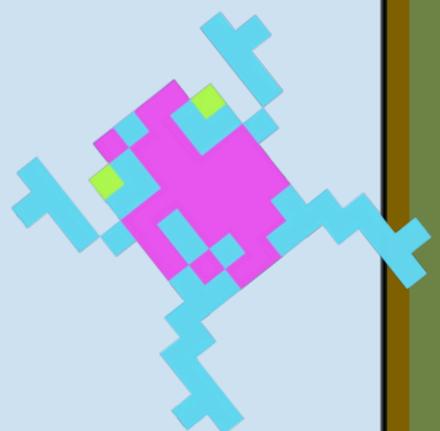


**4. Alligators:** Alligators disguised as logs lurk in the water. You can safely jump on their backs, but avoid their sharp jaws, as they will devour you.



## **5. Bonuses:**

**5.1. Pink “Lady” Frog:** Occasionally, a pink frog will appear on a log. Your goal is to rescue her. Hop on and escort her to safety to earn bonus points.





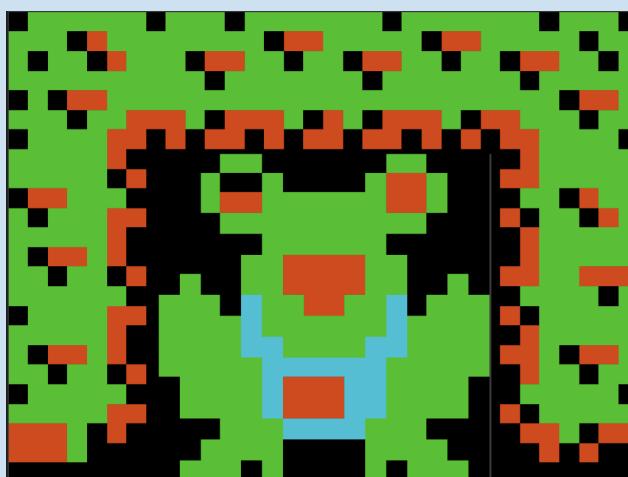
## Getting To safety

Hop the frog into the Home Bay to be safe. You need to put frogs inside each of the five home bays to complete the level. Each time earning points for savings frogs.

**1. Home Bays:** To safely reach a home bay, the frog must jump directly into it. If the frog touches the grass on the side of the home bays, it will die.

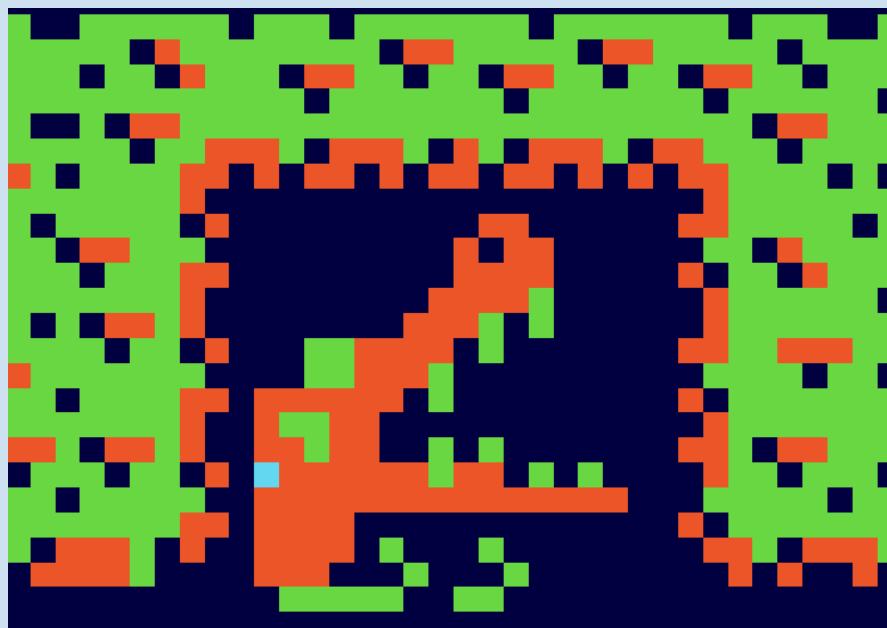
**2. Occupied Home Bay:** If a home bay is occupied, the frog cannot jump into it. You must find another bay.

 Attempting to jump into an occupied bay will result in death.





**3. Alligator's Head:** An alligator head may appear in a home bay, making it unsafe to jump into that bay.



**4. Fly:** A fly may appear in the home bay. Jumping into it will earn you bonus points.





## Difficulty

Difficulty increases each time you fill all five home bays. As you progress, more enemies appear, and they become faster and deadlier. After placing the fifth frog in a home bay, a new level begins with fewer floating objects and changing traffic patterns, but you keep your remaining lives. A more challenging path awaits.

You need to master eight levels to complete the game.

## Scoring

Your score is displayed in the top-left corner of the screen. You can earn points through various actions:

Action	Points Earned
Jumping Forward	+10 points
Reaching Home Bay	+50 points
Beating A Level	+1000 points
Escorting Pink Lady	+200 points
Eating A Fly	+200 points
Bonus Time	+10 points * ticks remaining

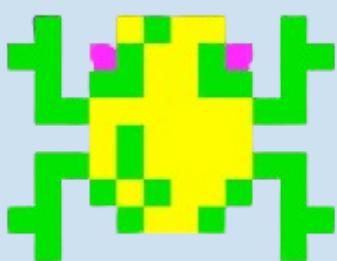
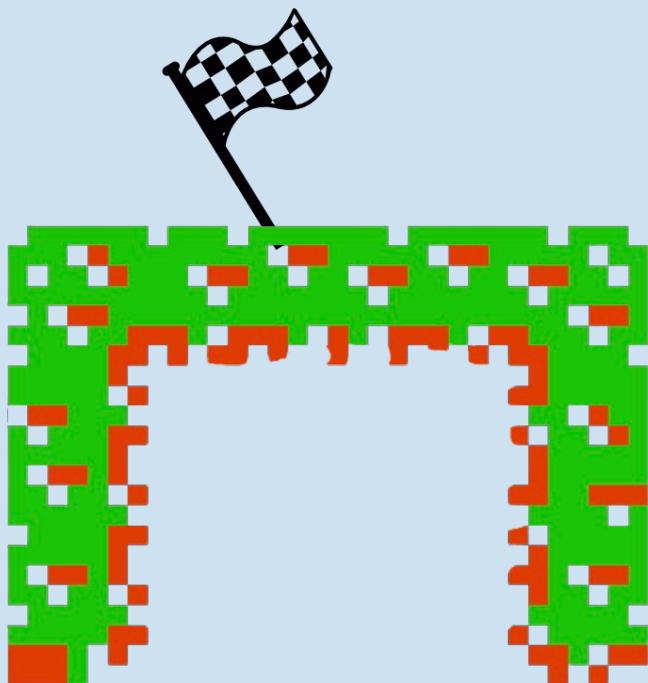


Reach 20,000 points to earn an extra life.



## End Game

There are many ways for the frog to die, and it's only safe once it reaches a home bay. The game ends when you lose all four lives or complete all eight levels. If you succeed, congratulations on beating the FPGA Froggo game! You can restart and try to beat your previous score.





# Get Help

## Troubleshooting

### Go Board is not connecting to my computer:

1. Verify your computer is on.
2. Ensure the micro-USB cable is securely connected and the Go Board is recognized.  *The three first LEDs should be on.*
3. Ensure the Go Board is set up correctly on your computer with the proper drivers installed.

### LEDs are not litting up:

1. Verify the Go Board is correctly connected.
2. Ensure the game is powered on.
3. Try re-uploading the game to the Go Board.

### Buttons are not working / You can't move

1. Verify the Go Board is correctly connected.
2. Verify the game is on.
3. Try re-uploading the game to the Go Board.

### Nothing is being displayed on the screen

1. Verify the Go Board is correctly connected.
2. Verify your monitor is powered on.



3. Check the VGA (or VGA-to-HDMI) connector is securely attached to your monitor.
4. Verify the game is on.
5. Try re-uploading the game to the Go Board, if necessary.

### **Game freezes or doesn't load properly**

1. Verify the Go Board is correctly connected.
2. Try re-uploading the game to the Go Board.
3. Restart your computer if none of the previous steps resolve the issue.

### **Game crashes**

1. Verify the Go Board is correctly connected.
2. Reupload the game.

### **Characters disappears**

1. Verify the Go Board is correctly connected.
2. Close the game.
3. Launch the game.

### **Nandland website**

If you wish to have more information about the Go Board or set it up for more projects, please visit the [nandland](#) website.



## Contact Us

If you're still experiencing issues or have discovered other problems, our team is here to help with further troubleshooting. You can reach us through the following channels:

### On GitHub:

- **Visit Our Wiki:** Head over to our GitHub wiki for more information, detailed troubleshooting steps, and additional resources.



<https://github.com/algosup/2024-2025-project-1-fpga-team-8/wiki>

- **Scan the QR Code:** Alternatively, you can scan the QR code below using your smartphone to be directed to our GitHub wiki.





Head over to the wiki for more troubleshooting information and instructions to get in touch with our team.

## Report an issue

You have encountered an issue our team couldn't help you troubleshoot ?

Head over to our [GitHub issue](#) section to report any problems you couldn't resolve.

We have detailed instructions directly on this section, or you can head to the wiki for more information on how to make a GitHub issue.

## Via Email:

For direct support, feel free to contact us by email at:

 max.bernardoCTO@algosup.com

Our team will respond as soon as possible to help resolve any issues or answer your questions.



# Safety Recommendations

## Hardware Safety Recommendations

### ⚠ Electrical Safety:

- Ensure all cables (micro-USB, VGA/HDMI) are properly connected to avoid short circuits or damage to the Go Board or computer.
- Avoid placing liquids near the Go Board, computer, or monitor to prevent electrical shock or hardware failure.

### ⚠ Heat Management:

- Ensure the Go Board and your computer have proper ventilation to avoid overheating. Do not cover any vents on the devices.

## Health Recommendations

### ⚠ Posture and Ergonomics:

- Maintain good posture while playing to avoid strain on your back, neck, and shoulders.
- Take regular breaks every 30-60 minutes to avoid eye strain and repetitive stress injuries, especially if you play for extended periods.



## ⚠️ Health Warnings:

- **Seizure Warning:** A small number of people may experience seizures or blackouts from flashing lights or certain patterns. If you have a history of seizures or epilepsy, consult a doctor before playing. If you feel dizzy, uncomfortable, or disoriented, stop playing and take a break.
- **Fatigue:** Avoid playing when overtired or in low-light conditions to reduce the risk of eye strain and headaches.

## ⚠️ Monitor Placement:

- Ensure your monitor is placed at eye level and at a comfortable distance to avoid neck strain and to optimize visibility.
- Avoid prolonged exposure to bright screens in dark environments to prevent eye strain.

## ⚠️ Supervision for Children:

- If children are playing the game, ensure they are supervised to prevent accidental damage to equipment or injury.

 Our team is not responsible for any damage or injuries that may result from the use of the hardware/software.