ACCADEMIA
ITALIANA
VIDEOGIOCHI

C Programming

Raylib

CORSO DI PROGRAMMAZIONE
3° ANNO

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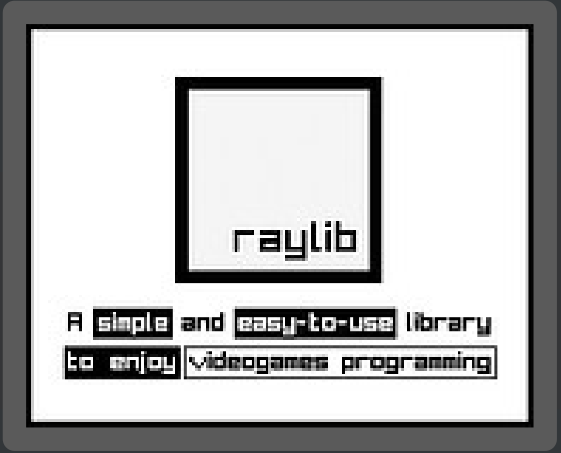
Summary

- Raylib Intro
- Project Assignment

Raylib
Intro

What is Raylib?

- “raylib is a simple and easy-to-use library to enjoy videogames programming.” (cit. https://www.raylib.com)
- Cross-Platform library
  - Windows, Linux, MacOS, RPI, Android, HTML5
  - No iOS (because of OpenGL)
- Main Features:
  - Window (hardware accelerated)
  - Input (mouse, keyboard, joydap, touch)
  - Audio (wav, ogg, mp3, flac, xm, mod)
  - Image/Texture
  - 2D/3D Support
- Written in C99 (with PascalCase/camelCase notation)
  - Natively usable from C and C++
  - Bindings for other 60+ languages (C#, Python, …)

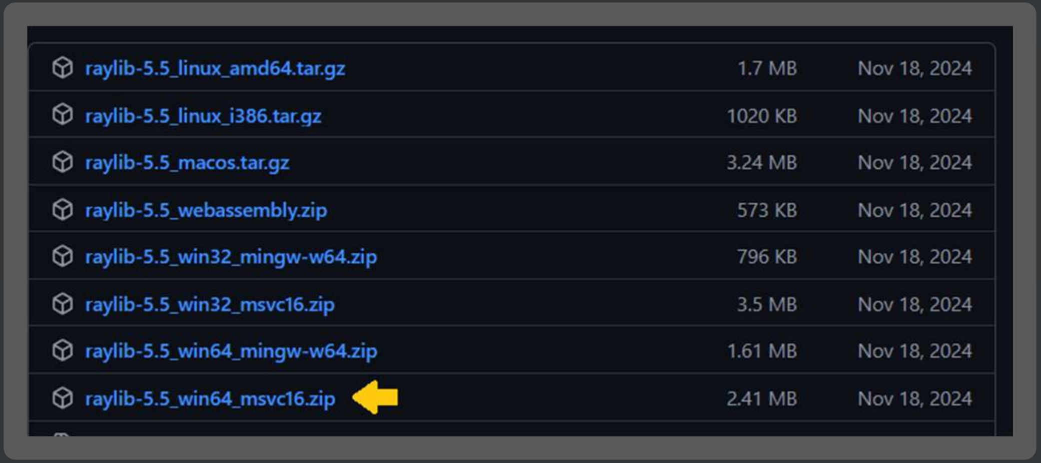

raylib
A simple and easy-to-use library
to enjoy videogames programming

Main References

- Examples
  - https://www.raylib.com/examples.html
- Cheatsheet
  - https://www.raylib.com/cheatsheet/cheatsheet.html
- Architecture & Internals
  - https://github.com/raysan5/raylib/wiki

Dev Kit

- Development Libraries
  - https://github.com/raysan5/raylib/releases (v5.5)
  - Headers and Libraries for Compilation and Runtime



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raylib-5.5_linux_i386.tar.gz	1020 KB	Nov 18, 2024
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raylib-5.5_webassembly.zip	573 KB	Nov 18, 2024
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raylib-5.5_win64_mingw-w64.zip	1.61 MB	Nov 18, 2024
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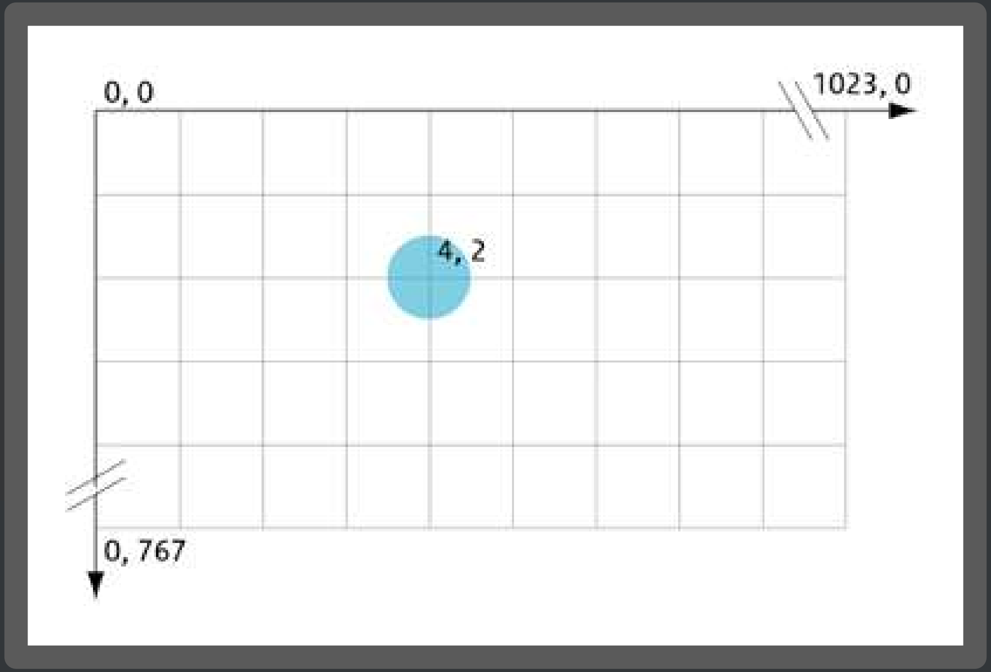
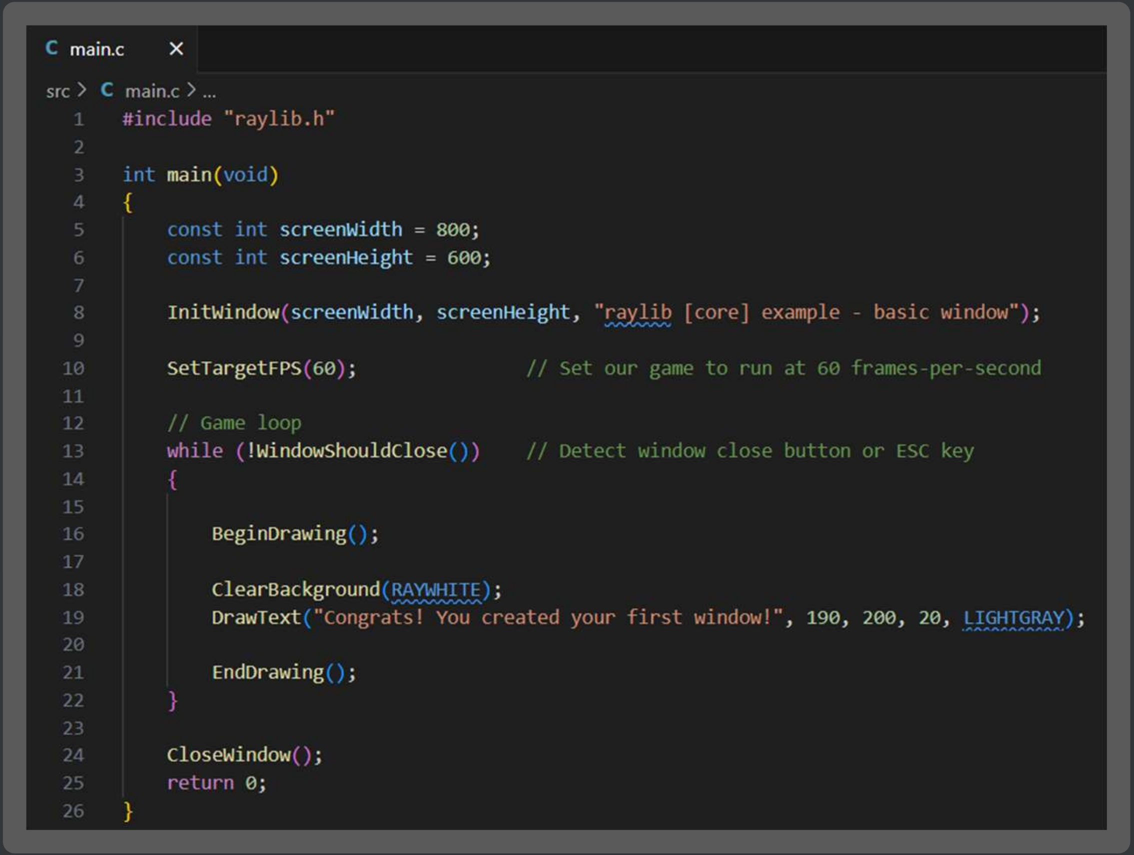
2D Coordinate System



Project Example



```c
#include "raylib.h"

int main(void)
{
    const int screenWidth = 800;
    const int screenHeight = 600;

    InitWindow(screenWidth, screenHeight, "raylib [core] example - basic window");

    SetTargetFPS(60);               // Set our game to run at 60 frames-per-second

    // Game loop
    while (!WindowShouldClose())    // Detect window close button or ESC key
    {

        BeginDrawing();

        ClearBackground(RAYWHITE);
        DrawText("Congrats! You created your first window!", 190, 200, 20, LIGHTGRAY);

        EndDrawing();
    }

    CloseWindow();
    return 0;
}
```

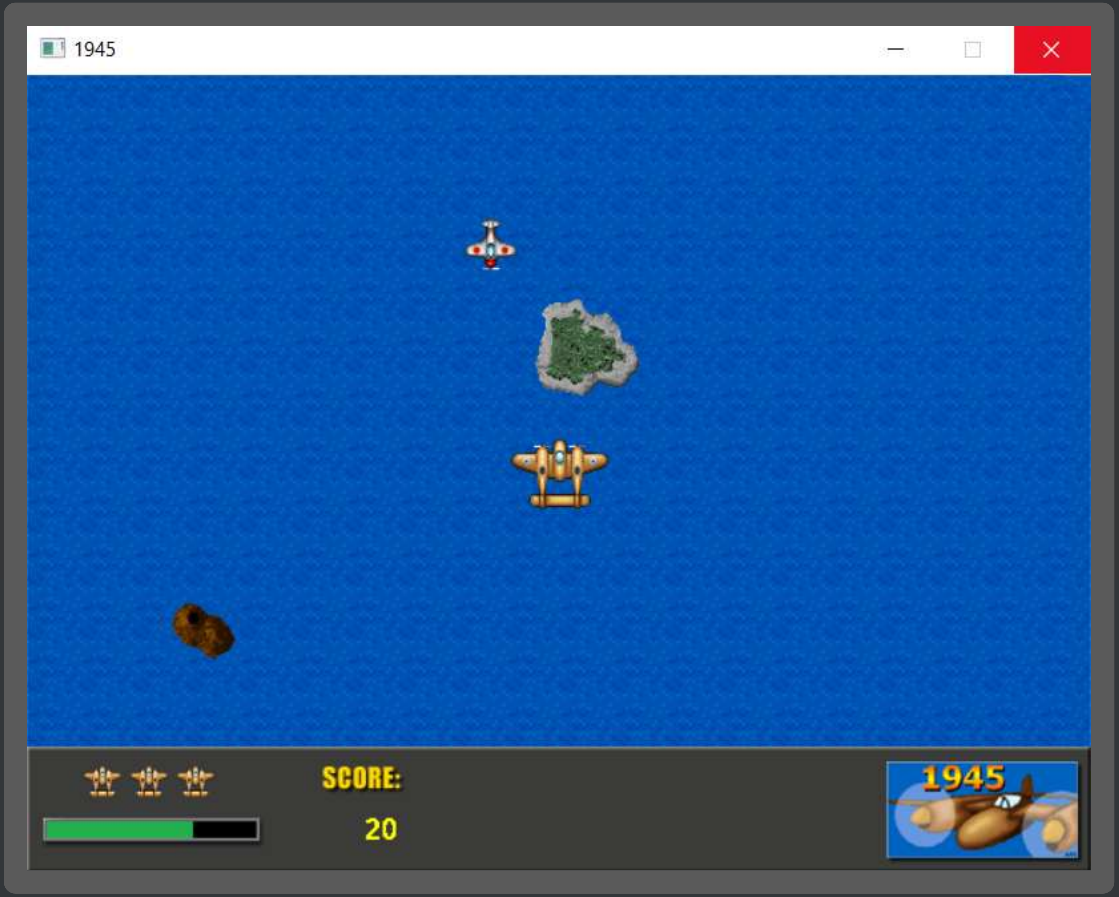
Exploring Features

- Game Loop
- Rendering
- Input (mouse, keyboard)
- Images and Textures
- Writing Text
- Playing Audio
- Camera 2D
- UI ??

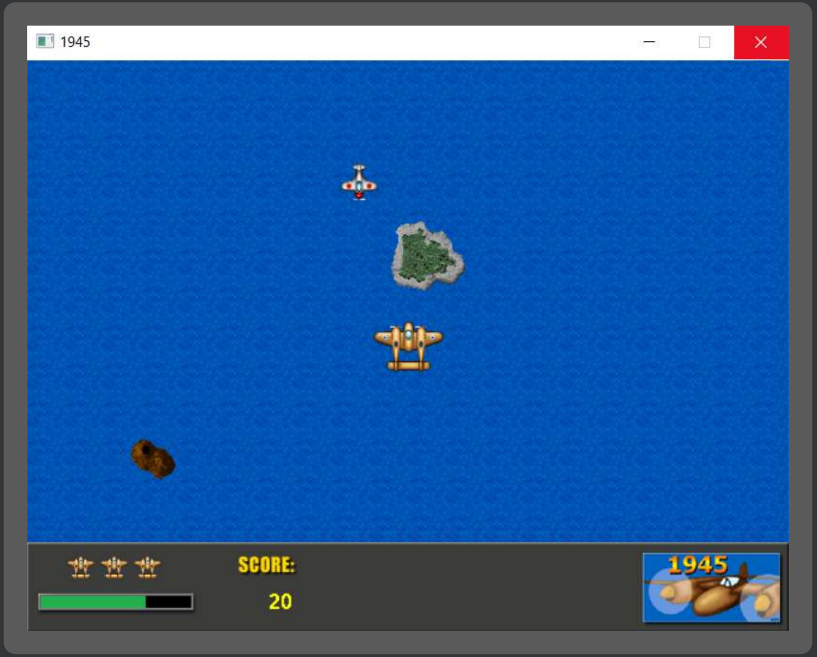
Just a subset or Raylib features useful for the project

Project Assignment

1945



Systems



UI

Rendering

Input

Collision

Audio

AI

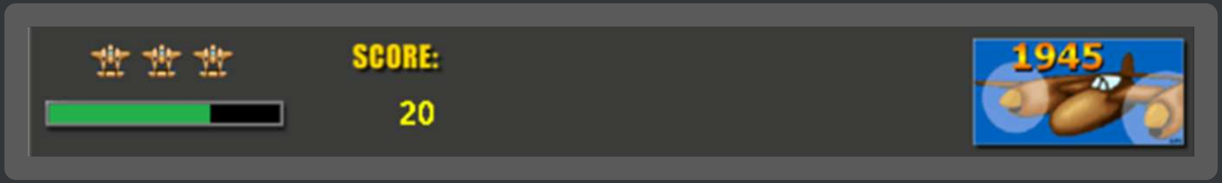
Player

Perks

Memory

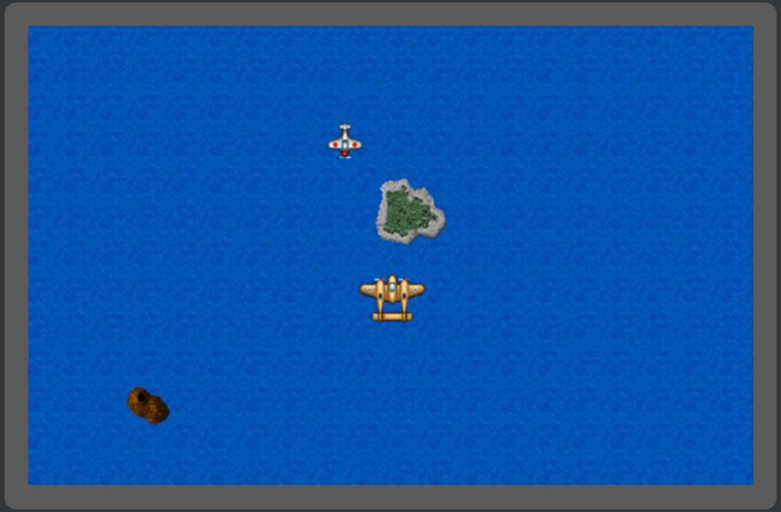
UI

- Window target: 640x480
  - to stick with provided assets,
  - but eventually you can try otherwise
- Life count
- Energy
- Score
- Window Icon (bonus)
- Splash Screen with Menu (bonus)
- Game over Screen (bonus)



Rendering

- Sprite Management
  - Enemy, Player, Bullets
  - Simulate movements, explosions
- Level
  - Vertical Scrolling
  - randomized islands



BONUS: Use atlas instead of single images

Input

- Keyboard
- Player movement
- Player shoot
- Menu selection (bonus)

Collision

- Enemy <=> Player
- Enemy Bullet => Player
- Player Bullet => Enemy
- Enemy Bullet <=> Player Bullet

Simple collision detection among rects!

Audio

- Music
- Effects (FX)
  - Player / Enemy Explosion
  - Shooting

AI

- Enemy Spawning
- Enemy / Bullet Pooling
- Enemy Movements (straight, diagonal, …)
- Boss Fight (Bonus)

Player

- Keyboard for movement and shooting
- Animation
- When loose a life:
  - player control is disabled for 3 seconds
  - player sprite “blink”

Perks
(Bonus)

- Pooling / Spawning
- Life + 1
- Special Bullets (that could affect shoot animation)

Memory

- Memory Management

Remember:
at each allocation must correspond a deallocation!!!

Dev Specs

- Source Configuration: Github
  - Project managed wit git protocol
  - Readme with a brief game description, user guide and developer guidelines
  - Make a release with the binaries ready to play
- Video for showing the final result
- Project Automation: CMake
- Unit Testing: use aiv-cunit or clove-unit
- Collections: use aiv-collections