[Date]

CI517 – Game Engine Fundamentals: Animation Playback

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CHANGE NORMAL FONT BACK TO CORBEL(BODY)

# Introduction

Game engines are software development programs often used to assist and manage game creation. They are vital within the games industry and lay down a basic framework for game developers to expand off of and create games easier than if they had begun from scratch.

XCube 2D is a simple game engine that has been developed using SDL 2.0 and C++. Within this project, the XCube engine will be extended to include an animation playback system which uses CSV files to display and play different animations on screen.

# Design

* Frame rate – how many frames displayed per second (24 & 12 are typically most common for 2d animation)
* Playback time – how many frames are within the entire animation (this divided by the frame rate will be how long the animation is in seconds)
* Keyframes would be useful to space out when the image needs to be changed
* CSV file that includes: frame rate, playback time, image locations, playback frames based upon previous images in an array
  + 24, 128, images/buttcheek.png, images/crack.png, 0, 0 ,0, 1, 1, 1 … etc
  + framerate, playBackRate, image location, max sprite in image, width, height, keyframes based on max sprites !
* Create animation class that loads csv upon creation all above information stored easily within class – it would also need sprite it is supposed to be attached to and possibly the location (x, y) of that sprite.
* Easter egg can be name and module animated at the top of the screen
* Research temp thoughts: does sdl have anything to help you animate or thing about keyframes n such?
* CREATE ANIMATION CSV FILES FOR SAVING read and write to them w fstream – a link explaining more <https://java2blog.com/read-csv-file-in-cpp/>
* Use graphics engine draw texture

Design stuff!!

# Implementation

* Start by discussing the class

Each animation that is created by the user will need to have a specific CSV file which states all the necessary details of the animation in question. A CSV file is used within the subsystem to allow the user to manipulate their animations without changing the subsystem itself. It also allows for animation detail data to be easily changed when debugging an issue. The CSV file for each animation must contain the following data:

1. Animation name.
2. Frame rate.
3. Playback time.
4. Image location.
5. Number of sprites within each row & column.
6. Json file location, if needed.
7. Sprite width & height.
8. Scale width & height.
9. Which way to flip the animation, if needed.
10. All keyframes.

Text

Description automatically generatedWithin the Animation class two functions are used to read and assign values from the given CSV file. The function readAnimCSV uses the C++ library fstream to loop through all the file’s contents and return them as an array. The function will report back an error to the console if the file cannot be opened or there is more than one row within the file.

The next function, assignCSVContent, uses the content array from the last function to initialise all variables within this instance of the Animation class. The main role of this function is to check the file content for any errors which may make the animation unable to function properly. These error checks include:

Figure \_: readAnimCSV function.

* Ensuring all integers can be converted from strings and that they are bigger than 0.
  + This is completed for the frame rate, playback time, keyframes, sprite amount, sprite width and height.

Text

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Figure \_: Convertion error checks for assignCSVContent.

* Ensuring locations are valid by checking if the file extension is supported.
  + This is completed for the animation sprite sheet location and when checking for a JSON file.

A screenshot of a computer

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Figure \_: File extension error checks for assignCSVContent.

* Ensuring enough keyframes have been added to the file by comparing the amount of them to the playback time.

Text

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Figure \_: Amount error checks for assignCSVContent.

If any of these errors occur, the animations ‘run’ variable is set as false and the animation cannot be used until these issues have been fixed. Each error also outputs to the console so, debugging can be efficient and easy for the developer.

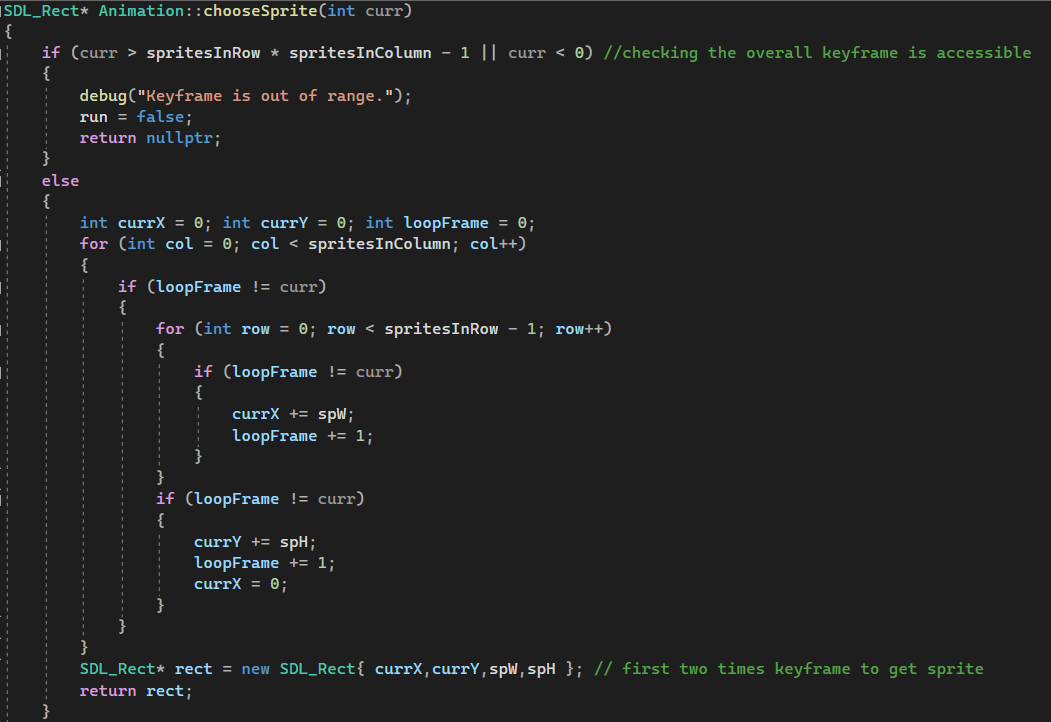


Figure \_: ChooseSprite function.

* Grace period of no animation needed for start up

# Critical Review

* Discuss how plain csvs are not the best security
* Discuss how json helped spritesheets could be used within the system so they can be used as well as square chunked sprite sheets – if you have enough time put this into the engine !!

# Estimated Grade

# Conclusion

* Learned about memory management and the difference between pointers references and copies – think about the bug with Almas

# Links

## Github Repository

## Youtube Video

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