



"Faculty of Computers and Artificial Intelligence, Cairo University"

CS213: Object-Oriented Programming

*- Dr.Mohammad El-Ramly
Assignment 2-Final Phase*

Prepared by:

-Mohamed Saber Hussein (20240503)

20240503@studi.fci-cu.edu.eg

did Task1, Task11, Task 12, Task 13, Task 14, A pdf report, class diagram

-Mazen Magdy Elsayed Ahmed (20240448)

20240448@stud.fci-cu.edu.eg

did Task1,Task 4,Task7,Task10, Task11

-Abdulraouf Mohamed Abdulraouf Abdallah(20240320)

20240320@stud.fci-cu.edu.eg

did Task1,Task3,Task6,Task9, Task11

-Bishoy Fomil Labib Mikhail(20240124)

20240124@stud.fci-cu.edu.eg

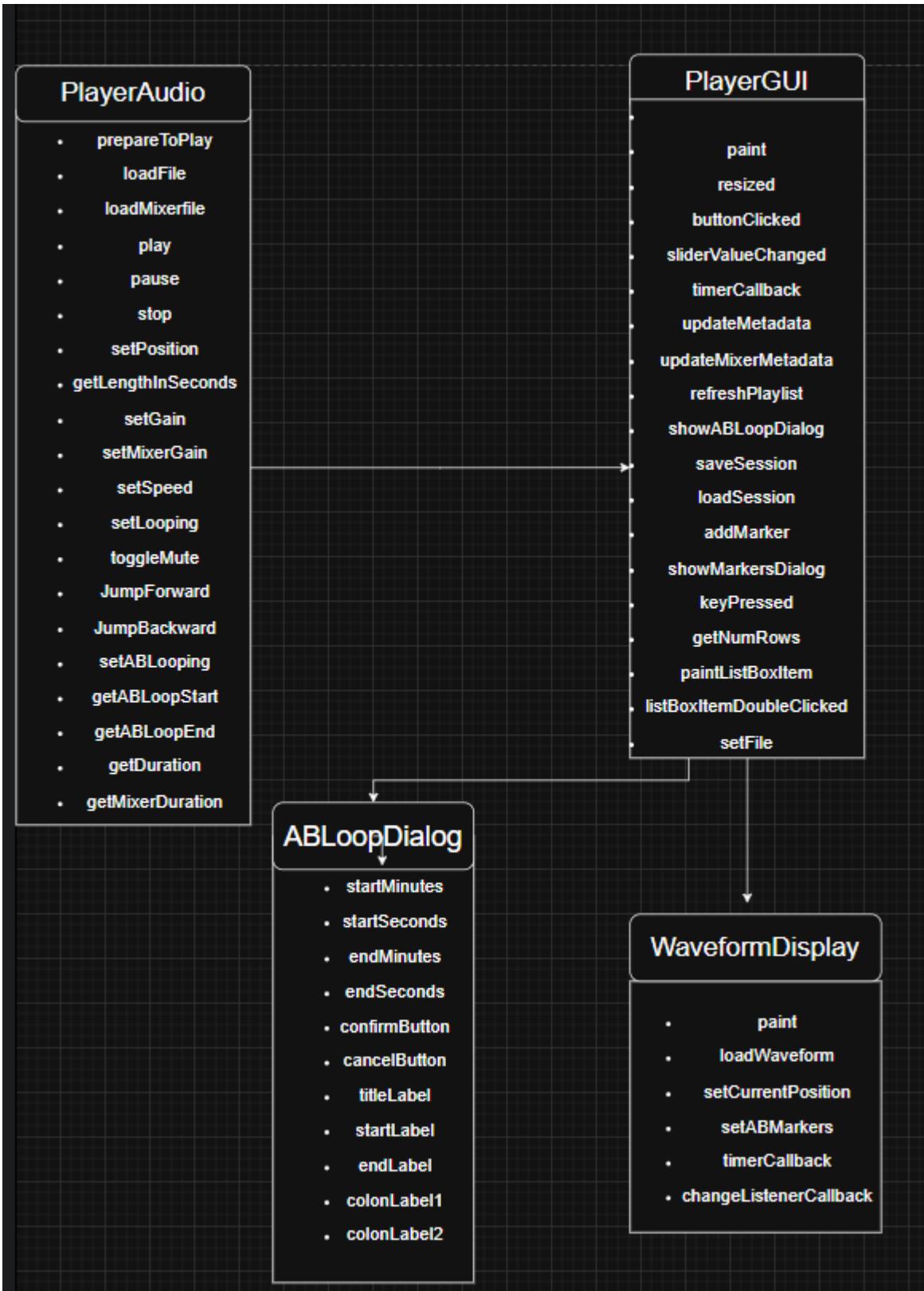
did Task1, Task2, Task5, Task8, Task11, playing two tracks, mixer, hotkeys(innovative feature),Video

class diagram

The image shows a **Class Diagram** representing the architecture of **Audio Player** project.

- **PlayerAudio:** Handles all audio processing tasks, including playing, pausing, stopping, adjusting gain and speed, and setting AB loop points.
- **PlayerGUI:** The graphical user interface that manages user interactions (buttons, sliders, playlist, etc.). It communicates with PlayerAudio, WaveformDisplay, and ABLoopDialog.
- **WaveformDisplay:** Responsible for visually displaying the audio waveform, updating the playback position, and managing waveform markers.
- **ABLoopDialog:** A dialog window that allows users to set the start and end points for AB looping.

The relationships between the classes show that **PlayerGUI** acts as the central controller — interacting with **PlayerAudio** for playback control, **WaveformDisplay** for visual feedback, and **ABLoopDialog** for defining loop boundaries.



“A PIE” OOP 4 principles in our program

Abstraction:

The complex operations are abstracted from the user, so they only interact with simple interfaces like **play()** and **stop()**. The user does not need to know how the audio is processed or how **transportSource** or **mixerTransportSource** are controlled. This is achieved by encapsulating the complex functions within these interfaces to simplify usage.

Polymorphism:

Although **transportSource** and **mixerTransportSource** may be of different types, they both provide the same interfaces like **setPosition()** and **start()**, allowing them to be treated in the same way. This enhances expansion and future modifications, making it easy to add other audio sources in the same manner.

Inheritance:

The structure shows strong potential for using inheritance in the future. For example, powerful functions like loading audio, playing it, and controlling speed and gain can be extended through inheritance to provide additional features without rewriting existing code. Classes like **PlayerGUI** or **PlayerEffects** can inherit from **PlayerAudio** to add advanced user interfaces or apply additional audio effects. This allows for easy code reuse and system expansion in an organized and secure manner.

Encapsulation:

Data such as **currentFile**, **title**, and **artist** are stored privately within the **PlayerAudio** object. They can only be accessed through specific interfaces like **loadFile()** and **setPosition()**. This prevents direct manipulation of the data, improves security, and makes the code more flexible.

In Summary:

The program uses these principles to facilitate flexible, secure, and easily expandable audio handling, ensuring a well-structured and extendable system in the future.

Screen shots of program user interface



Screen shots of GitHub

Commits

History for [Audio-Player](#) / [Source](#) on [main](#)

All users All time

- o Commits on Nov 5, 2025
 - added: speed slider, progress bar, waveform, segment looping, saving session modification, track markers, and as an innovative feature i've added Hotkeys
f325f06   
- o Commits on Nov 4, 2025
 - backward & forward modified and position slider added
d6e8a4d   
- o Commits on Nov 1, 2025
 - mixer added
72523b9   
 - playlist feature has been added
9936124   
- o Commits on Oct 31, 2025
 - meta data added
223545c   
- o Commits on Oct 24, 2025
 - adding mute button & some enhancements
f395232   

Commits

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Video Link

https://drive.google.com/file/d/1waxAWQvwDZxLTaD8H_kfE1slvjZJGp47/view?usp=sharing