



B2B Brera Museum - Technical Design Document

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Release link

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Section 1 - Introduction

This is the Technical Design Document for the project of an application of gamification of an art museum. Inside this document you can find the features, the diagrams and the logic of this game.

Section 2 - Features

- Player
 - Movement by anchored points
 - Interactions with pictures
 - Camera rotation and zoom
- Puzzles
 - Dragging finger to draw a line for explore the puzzle
 - Multiple start position
 - Object of the puzzle to collect
 - Multiple puzzles to close a level
- Augmented Reality
 - Scan of picture in real life

Section 3 - Choice of Game Engine

The game engine that has been chosen is Unity.

This engine posses different interesting features like:

- A useful system mobile touch input system
- An intuitive editor
- Data Management
- interesting plug-in's

The reason for that choice is the target device of the application, the mobile devices. On these devices other engines would be unsuitable. We had chosen the 2022.3.10f version because this is the standard version adopted by the company.

Section 4 - External Packages

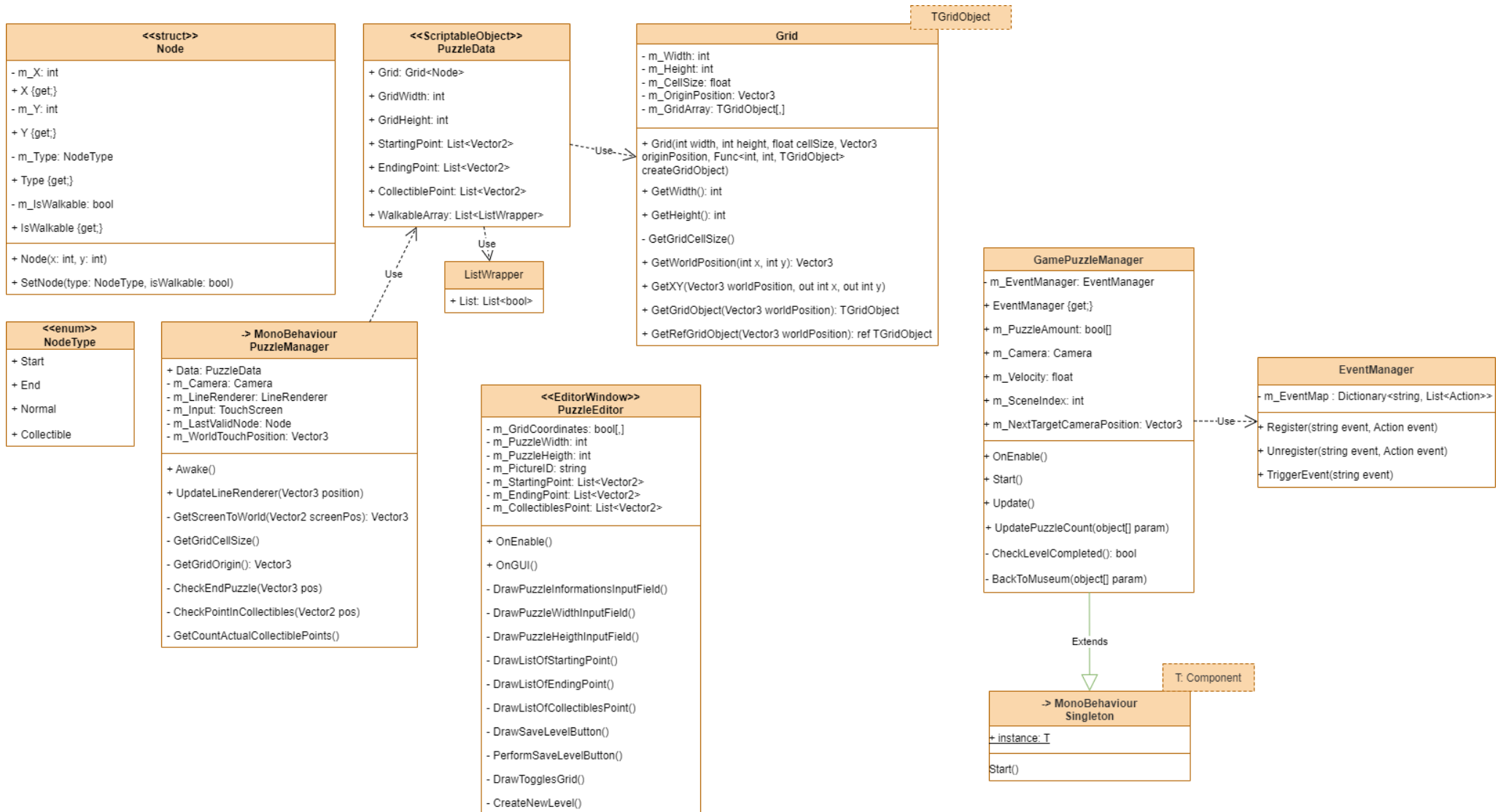
4.1 Vuforia Engine

For this project we have needed of an AR SDK, so we choose for Vuforia Engine, an SDK implemented for provide augmented reality functionality starting from the use of the device's Camera, to the storage of images and 3D models to be scanned into a database so as not to weigh on the project. In addition to this, Vuforia Engine independently generates its part within the application manifest to then request the user to access the camera

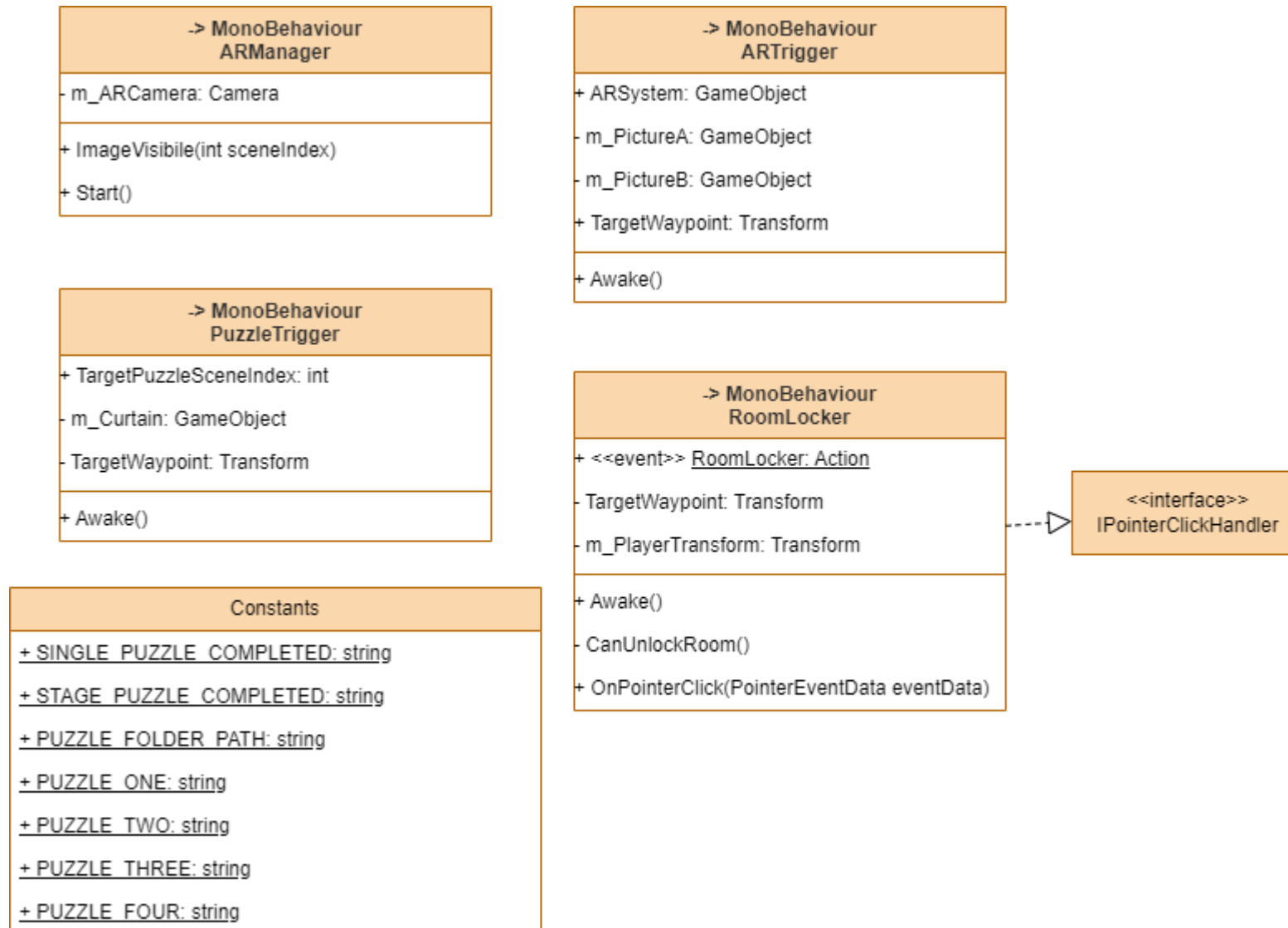
Section 5 - Diagrams

5.1 Player Diagram

5.2 Puzzles Diagram



5.3 Misc Diagram



Section 6 - Input

For this project we pondered different hypotheses of choices for the input system, after several analyzes we decided to opt for a system that included different typologies:

- [input interfaces] to allow clicking on game objects
- [old input system] to handle situations where constant use was necessary
- [new input system] for use in cases where instant use is necessary

Section 7 - Game Logic

7.1 Player

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7.2 Puzzles

- Puzzle Manager:
 - The Manager that manage the correct work of the puzzle, this component permit:
 - the acquisition of data from the PuzzleData
 - The dragging of the user's finger for add to the list of positions of a line renderer, this logic is based on the unity's new input system. The dragging check also if the requested position is walkable or not
 - Check if in the last position of the line renderer's list positions there is a end position of the puzzle
 - For the Collectible Puzzle check if inside the line renderer's list positions there is all collectible position of the puzzle
- Game Puzzle Manager:
 - The Manager that control, when a puzzle manager communicates that it is finished, if all puzzle are completed, and then change scene
- PuzzleData ScriptableObject:
 - This asset contains the information about a single puzzle:
 - An integer of the Grid Width
 - An integer of the Grid Height
 - A list of Vector 2 to storage the starting cells of the puzzle
 - A list of Vector 2 to storage the ending cells of the puzzle
 - A list of Vector 2 to storage the collectible cells of the puzzle
 - A list of of list to storage the walkable or not walkable cells of the puzzle
- Puzzle Editor:
 - An editor tool for generation of PuzzleData (see its dedicated document)

7.2 Augmented Reality

- VuforiaConfiguration ScriptableObject:
 - This asset contains all the information about the package, the parts that we have used are:
 - the part about the license key
 - the part about the chosen device for the real camera
- AR Camera:
 - The Camera of Vuforia Engine, it includes a link to the VuforiaConfiguration asset and manage the Camera in real life with the continuous creation of a material based on the user's camera
- AR Image Target:
 - The Vuforia component that manages the acquisition of the linked image. This component permits different uses:
 - Acquisition of the image from folder
 - Acquisition of the image from the online database of the user
 - Acquisition of the image from the Cloud Reco
 - This component contains an event system too, it permit to control what happens when the target is found, and what when the target is lost, in our case we used only the first with the AR Manager
- AR Manager:
 - The Manager that controls the scene change when the AR image target recognizes the image in real life

Section 8 - Art Tools

8.1 2D Art

8.1.1 Adobe Photoshop

- Versions: CC 2023
- Field of using:
 - Texture
 - Walls
 - Interface
- About: Graphics Editing Program
- Reason of using:
 - Standard in the industry because its versatility in using by other tools
 - Supporting by the producter
 - Interesting plug-in's

8.1.2 Procreate

- Versions: 5.3.3
- Field of using:
 - Texturing
 - Coloring
- About: Graphics Editing Program
- Reason of using:
 - Always at hand
 - Easy to use

8.1.3 Adobe Illustrator

- Versions: CC 2023
- Field of using:
 - UI Design
 - Graphic Layout
- About: Graphics Editing Program
- Reason of using:
 - Vectorial drawing
 - Easy integration between images and writing

8.2 3D Art

8.2.1 Maya

- Versions: 2023
- Field of using:
 - Hard surface modeling
- About: Graphics Editing Program
- Reason of using:
 - It's an extremely powerful 3D modeling software with a lot of professional tools, especially for animating. It's often used in conjunction with other softwares such as Substance Painter or Zbrush

8.2.2 Adobe Substance 3d Painter

- Versions: 2023
- Field of using:
 - Texturing
 - Baking
- About: Graphics Editing Program
- Reason of using:
 - While still being very user friendly, it allows you to rapidly create high quality textures for a 3D asset.
 - There is a large number of premade materials that speed up the workflow

Section 9 - Conventions

9.1 Coding Naming Convention

Element Type	Convention Choice
Public Class Variable	PascalCase
Private Class Variable	m_PascalCase
Protected Class Variable	m_PascalCase
Local Variable	camelCase
Property	PascalCase
Constant	SNAKE_CASE
Method	PascalCase

9.2 Assets Naming Convention

[Prefix]_[NameAssets]_[Number]_[variant].[File type]		
Prefix	Type	AssetName
Doc	Document	GDD(docx)
Doc	Document	LDD
Doc	Document	ADD
Doc	Document	TDD
Doc	Pitch	Pitch
Doc	Document	FC (FlowChart)
Uml	Document	UML (Universal Modelling Language)
Sk	2D Art	Sketch for Concept
C2D	2D Art	Concept for 2D Art
C3D	2D Art	Concept for 3D Model
Sp	2D Art	Sprite
SpSh	2D Art	SpriteSheet
UI	2D Art	UI Sprite
T	2D Art	Texture
An	Anim	Animation
AnC	Anim	Animation Controller
3D	3D Art	3D Model
M	3D Art	Material
Mesh	3D Art	Mesh
Sd	3D Art	Shader
SdG	3D Art	Shader Graph
VFX	3D Art	Visual Effect
Vol	3D Art	Volume
BG	Audio	Background music
SFX	Audio	Sound Effect
PM	3D Art	Physic Material

9.3 Directories Convention

Name	Usage
Scenes	This folder contains the scenes. An “Example” folder is used for containing the example scenes.
Animators	This folder contains the animator controllers.
Art	This folder contains the 2D and 3D arts.
Art/2D	This folder contains the 2D art.
Art/2D/Sprites	This folder contains the 2D generic sprites.
Art/2D/Sprites/Puzzles	This folder contains the 2D Puzzles sprites.
Art/2D/Sprites/Curtains	This folder contains the 2D Curtains sprites.
Art/2D/Textures	This folder contains the 2D textures.
Art/2D/Textures/AR Texture	This folder contains the AR recognized textures.
Art/2D/Textures/Original Museum Artworks	This folder contains the 2D pictures images.
Art/2D/UI	This folder contains the UI sprites.
Art/3D	This folder contains the 3D models.
Audio	This folder contains clip audios and mixers.
Audio/Clips	This folder contains clip audios.
Materials	This folder contains materials.
Prefabs	This folder contains prefabs.
Scripts	This folder contains scripts.

Section 10 - Contact on repositories

10.1 Game Design:

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- Lorenzo Porfirione - JustPorfix

10.2 Game Programming:

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- Gabriele Garofalo - gabevlogd

10.3 Game Concept Art:

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- Victoria Bedont - Vioosa
- Zhou Xunhan - Uranian3
- Federico Agosti - ???
- Eva Cividini - evabbe
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- Romi Rossetti - Scarabaeus97

10.4 Game 3D Art:

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