

# **PROJECT DETAIL REPORT**

**PROJECT NAME: GAMIFIED TRAVEL TEAM**

**NAME: FINALLOOP**

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## 1. PROJECT INTRODUCTION

### 1.1. PROJECT TEAM

Finalloop team was established by 7 students studying in the Department of Information Technologies in 2 different vocational high schools, who share the ideal of better promotion of our country and our values, who received various trainings in the fields of software and game development. Our team members, who met in C ++ and Game Development trainings carried out by Arnavutköy Municipality Informatics Academy, have focused on promoting our historical and touristic assets more effectively through digital technologies.



- Figure 1 : Team List

### 1.2. PROJECT SUMMARY

With this project; a gamified presentation will be made on interactive giant screens at the entrance of historical and touristic places such as museums and ruins of Turkey. In this presentation, our game character will collect items related to that museum or archaeological site while travelling in the region. Thus, it is aimed that both children and other visitors will learn important information about the place in a fun and lively way and increase the number of visitors under the age of 20.

And our mascot character;

- Its recognition will increase as its use becomes widespread,
- Apart from museums and archaeological sites, it will gain an institutional representation capability that can be used in presentations and promotions to be made in places such as schools, festivals and events,
- Disney will provide various merchandising opportunities such as Angry Birds and similar

characters and

- It is foreseen that it will contribute to the brand value of our cultural assets with the mentioned features.



- Figure 2: Example game scene -

In the researches conducted, it is calculated that 5-10% of the visitors who visit museums are under the age of 20 [1][2]. The demonstration method is a teaching method based on the technique of showing the subject with diagrams, figures and pictures by the presenter. The synectic method is another important teaching method that provides the analogy of students putting themselves in the place of another person. Our project uses these 2 important teaching methods [3] by adding the entertainment factor to them. The assets and elements of the visited museum / archaeological site are presented to the visitors before they start visiting the museum by using these techniques. It is aimed to increase the efficiency and memorability of visits in a fun way.

## 2. ALGORITHM AND DESIGN

### 2.1. ALGORITHM

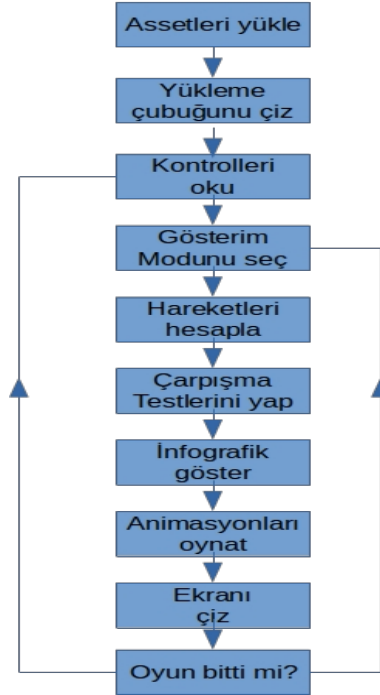
The game, which is the subject of our project, is designed as a kind of platform game. Our character named Arbey, who moves on the platform representing a certain region, overcomes obstacles and finds the predetermined assets/items of the relevant museum or archaeological site.

When each item is found, an infographic screen opens and provides information about that item. After a certain period of time, the infographic screen is closed and the game screen is returned to the game screen and the game continues from where it left off.

The game has two different playing modes: user mode and auto-play (presentation) mode. Firstly, a visitor can play the game. If no one is playing for a certain period of time,

the game will automatically switch to presentation mode and play by itself. Thus, a fun visual activity will be created on the screen for visitors to watch.

The game algorithm is based on the general game mechanics and game modes described above.



- Figure 3 : Algorithm diagram

Various physics animation algorithms will be used to move our character on the platform. There will also be a simple artificial intelligence that provides auto-movement in presentation mode.

## 2.2 DESIGN

Our game, which is the subject of our project, is based on our character named Arbey moving on the platform and collecting predetermined items. Some prioritised goals were considered by our team in the game design.

### 1. Wide Target Audience

Our game is designed to be a game to be played on giant screens placed at the entrance of museums and archaeological sites. For this reason, it should appeal to visitors from all age groups. In particular, it is aimed to increase the interest of secondary education students and younger age groups in museums and to enrich their museum visit experiences. In this context, the target age group of the game was determined as "General". In the visual and mechanical design of the game

We have tried to create a style that will appeal to all visitors, including visitors of all ages.

## 2. Fun Gameplay

The primary design goal of the product is to provide an entertaining game enjoyment to the people playing or the visitors watching. A cheerful environment has been created in the game. Our character not only tries to find things, but also tries to overcome obstacles. The element of fun is reinforced by animations, visual effects, music and sound effects as well as the overall graphic design of the game.

## 3. Content Linked to a Museum or Site

The product, which is the subject of our project, will be exhibited at the entrance of various museums or archaeological sites and will include items found in that museum / ceremony. Local items determined by the authorities will be integrated into the game. In this way, people visiting different museums and archaeological sites will experience a locally customised game/presentation experience each time.

## 4. Teaching

Our character progresses through the game and finds predetermined items. These items are selected and prepared in advance by the authorities from the assets of the relevant museum or archaeological site. As our game character finds new items, an infographic window is opened and visitors are given various information about that item. After the infographic screen is displayed for a certain period of time, the game continues from where it left off.

Infographic screens will also increase the efficiency of the information and experience obtained by the visitor from the museum visit by providing information about the products in the visited centre in advance. It will ensure a more conscious visit. Our project has a very high and efficient teaching power thanks to the infographic screens it contains.

## 5. Auto Play(Presentation) Mode

Even if a visitor does not play, the game is intended to play by itself and provide an entertaining introduction to other visitors. For this reason, an auto-play (presentation) mode has been added to the game.

If no one plays the game for a certain period of time, the game automatically switches to presentation mode and plays by itself. Our game character, guided by a simple artificial intelligence developed by our team, collects items.

The presentation mode will change the possible gloomy atmosphere of the museum entrance by providing a fun visual mobility at the museum entrance, as well as providing important preliminary information to visitors with the infographic screens it offers and greatly increases the efficiency of our product.

## 6. Mascot Character

One of the main objectives of our project is to increase the awareness, recognition and memorability of our cultural assets and thus the brand value of our tourism. In order to achieve this, a character is used to move in the game. Our character named Arbey will meet with visitors in various museums and ruins. There is no doubt that the character, which will be presented to visitors in many museums and ruins, will reach a certain recognition. Thanks to this recognition, our character is transformed into a kind of brand representative. Thus, different usage possibilities of the character emerge.

- Since character designs are highly memorable, graphics of the character can be used not only at museum entrances but also in all related materials and documents,
- Graphics of the character can be used in all kinds of promotion of our cultural and historical assets,
- The mascot of the character can be used as a brand representative in media such as schools, festivals, events, promotions, advertising areas
- Character design can be used in many products such as Disney or Angry Birds characters, from home textiles to stationery products. In this way, while entering all areas of life, it will also have a commercial return. It will increase the brand value of our cultural assets.



- Figure 4 : Game main menu -

Once the museum / archaeological site is selected, the gameplay part of the game is played continuously in this museum / archaeological site until you select another museum / archaeological site. Thus, it is ensured that the game is played in the same theme even in presentation mode. This museum / archaeological site selection page also contains short introductory information about that centre.

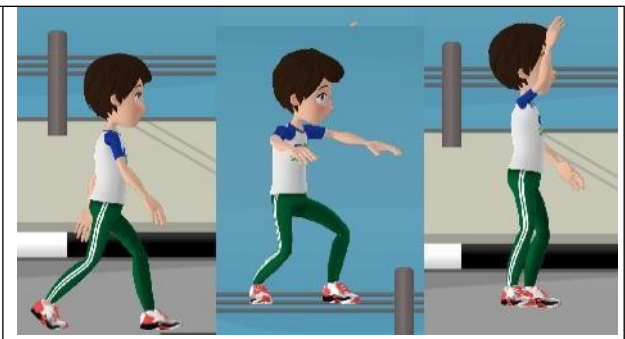


After pressing the play button, the software stream passes to the gameplay section. In this section, our character progresses on the platform. During the progression phase, the character searches for and finds items by changing direction up and down and jumping through the obstacles he encounters. The scenario in the game sections offers us a fun teaching by telling us the historical information of the section we are playing.

The character design was made with Blender, an open source design programme. After the character was designed, various animations were given and the images of the character were printed out frame by frame.

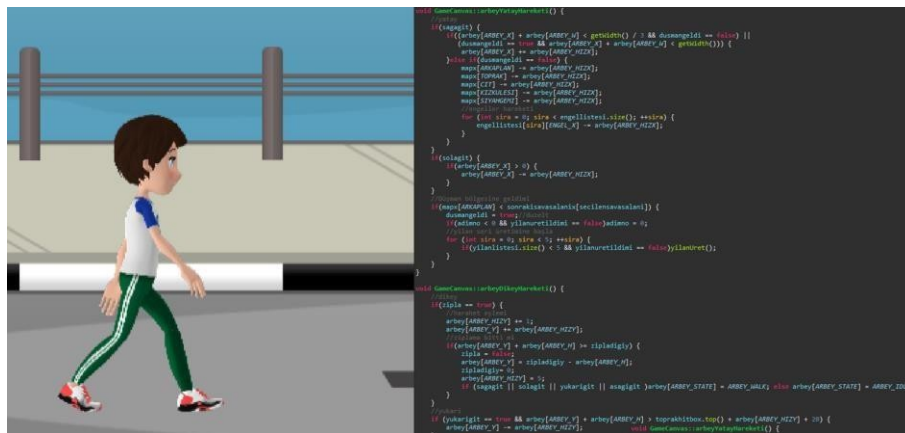


- Figure 5: Character design -



- Figure 6: Various character animations -

In the last stage of the animation study, codes that draw animation frames on the screen according to the movements of the character were developed.



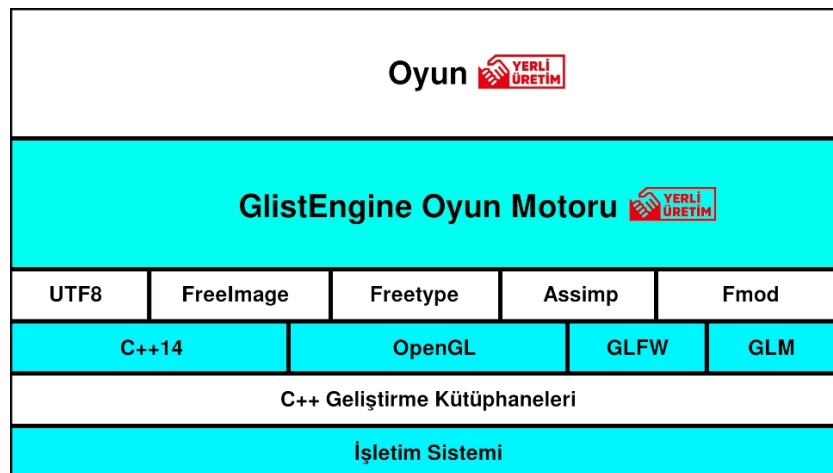
- Figure 7 : Animation playback codes -

### 3. SYSTEM ARCHITECTURE

Our project is a computer game with an impressive presentation mode. It has a catchy character, fun mechanics and informative graphic screens. It is designed to be played on all kinds of computers or screens. If not played, it will automatically switch to presentation mode. Everyone will be able to get information about the artefacts they have visited on the screen.

GlistEngine Game Engine was chosen for the programming of the game. Four important factors played a role in this choice.

1. Our team aims to produce a 100% domestic product by developing its own game codes on a domestic engine. The GlistEngine engine was chosen primarily because it is a domestic and national product and developed by Turkish engineers.
2. Computer games are usually developed in C++ language due to performance and resource usage. GlistEngine Game Engine provides high performance for games. In addition, various tools are offered to game developers to load visuals into the VRAM or RAM of the graphics card according to preference. The performance and resource management tools offered by the engine using the C++ language were another important factor for selection.
3. In order for our product to play on all computers, it is desired that the engine be multiplatform. GlistEngine Game Engine provides a multiplatform development environment.
4. GlistEngine Game Engine is an open source software. Therefore, it can be customised by software developers according to the needs of the game. This feature played an important role in the engine selection. In addition to the engine, all other libraries used are also open source libraries.

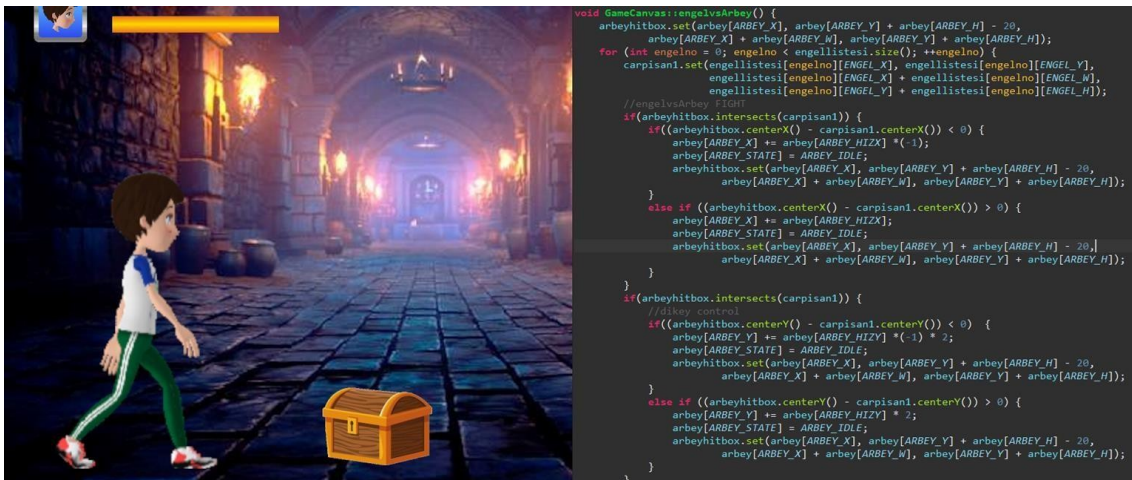


- Figure 8 : General software architecture of our project -

After the engine selection, while the first designs were being prepared, the game programming work was started. Due to the structure of the engine, each screen is created as a Canvas class. Each Canvas has a setup() function that loads the assets, update() and draw() functions that form the main loop, and a number of other asynchronous auxiliary functions. The update() function performs calculation operations, while the draw() function draws on the screen. The functions are initially empty and are programmed inside these functions by the game developer according to the algorithm of the game.

Our game has been developed in a semi-MVC architecture. We started working by creating 4 screens for our game. In addition, a root class is used to transfer global variables between screens. The screens work in an MVC structure within themselves. However, since our game will run for a long time all day long in an open area, it is necessary to keep CPU heating to a minimum. For this reason, separate classes were not created for lower objects and the properties of these objects were followed in the arrays in the relevant screen.

As the character moves through the scene, collision tests are used to check whether the character encounters obstacles and objects. For these collision tests, quadrilaterals that act as hitboxes around the character and other objects are defined. Collision tests are performed according to these quadrilaterals.



- Figure 9 : Our crash test codes -

There are some hardware requirements for the game to be displayed at the entrances of museums and archaeological sites. These hardware requirements are essentially the basic level requirements for a digital game to be played. The hardware needs consist of a computer that will play the game, a giant screen television that will act as a monitor and a game arm that will allow visitors to play the game. Although our game can run on any type of computer, considering that it will run all day long, it is preferred to have an i5 or higher processor, an SSD disc and a new generation video card with HDMI output. The screen that will act as a monitor is expected to be a 140-200 inch TV with FullHD resolution with HDMI input, depending on the physical conditions of the hall.

#### 4. REALISABILITY / APPLICABILITY

Demonstration method is one of the important teaching methods. With the demonstration method, the subject is explained in a rich way. This method provides an attractive and memorable presentation of information in teaching.

With our project, a computer game will be developed to be shown on giant screens at the entrances of museums and archaeological sites, introducing the cultural assets of that museum or archaeological site and having various characteristic features. In this way, our cultural assets will be presented to children and other visitors visiting museums and archaeological sites in a gamified way with the demonstration method, and the interest of this age group in museums and archaeological sites will be increased [4].

In the demonstration method studies applied in schools, the subject is the teacher. Since the majority of museum and archaeological site visitors do not have such a model during the visit, a character was used in the design of the game. Our game character undertakes the role of modelling in the demonstration method applied by collecting the elements.

In our game, besides the game mode, there will also be a presentation mode designed specifically for our project. When the game is not played for a certain period of time, it will automatically switch to presentation mode. In the presentation mode, our character will automatically navigate the platform and collect assets. Each time an asset is collected, a graphic presentation screen will appear. After the presentation screen appears for a few seconds, the game will continue to play automatically. Thanks to this special mode, our game will allow a gamified presentation on giant screens to be placed at the entrance of museums and ruins.

In addition to the demonstration method, using a character in the game design and showing in presentation mode, the synectic learning method is also used. With the synectic personal analogy method, the visitor will collect the items by putting himself in the place of the character, and thus subjectivise the content. With the demonstration and synectic teaching methods used in game design, the visit to the museum / archaeological site will be more conscious, rich and memorable, and the efficiency of the visit will increase. [3]

Since our project has a very low level of hardware requirement, it can be easily implemented at the entrance of every museum and archaeological site. In addition, by using a portable big screen television, presentations can be made not only in these centres but also in all events.

## **5. INNOVATION / ORIGINALITY**

Our project is a computer game with an impressive presentation mode. It has a catchy character, fun mechanics and informative graphic screens. It is designed to be played on all kinds of computers or screens. If it is not played, it will automatically switch to presentation mode. Everyone can easily get information about the artefact they want to visit from the screen.

Nowadays, various game/simulation applications are used very successfully in some of our museums and enrich the visitor experience. We have observed during our own museum visits that these applications are of great interest to young visitors. With our project, these studies are carried to an institutional level. By presenting the interactive demonstration method on giant screens at the entrance of the museum / archaeological site, the entire visit process is enriched and made more efficient. In addition, by making our museums more entertaining from the entrance stage, it is aimed to achieve a significant increase in the number of young visitors.

As of the date of our project, there is no similar interactive presentation application either in our country or in centres abroad. In this respect, our project will be the first and only application in its field and will be an example for centres abroad.

In the sales centres at the entrances of our museums and archaeological sites and in the special touristic goods sales shops in the vicinity, various souvenirs prepared by using cultural and historical elements as photographs, patterns and forms are sold. Our character to be produced with our project will bring a new dimension to these commercialisation activities. Just as Disney and Angry Bird characters are used in all products, our game characters can be merchandised and marketed in many different areas from home textiles to stationery products.

## 6. PRODUCING A SOLUTION TO A PROBLEM / NEED

Our country; It is a country that is home to the oldest settlements in the world, living intertwined with history, rich in historical places and places. Our Ministry of Tourism exhibits historical and cultural assets in museums and ruins. In terms of Population Science, 5-10% of the people who visit museums and archaeological sites are students and children under the age of 20 [1][2]. Visitors are informed about the historical heritage exhibited in these areas through books, brochures and guides. All information is conveyed in the seriousness of history, archaeology and chronology. There is no presentation method for children and young people.

With our project, a computer game will be developed to be shown on giant screens at the entrances of museums and archaeological sites, introducing the cultural assets of that museum or archaeological site and having various characteristic features. Thus, our cultural assets will be presented to children and other visitors visiting museums and archaeological sites in a gamified way, and the interest of this age group in museums and archaeological sites will be increased [4].

In addition, a fun mascot character will be created and gamified promotional activities will be carried out in schools, festivals, events and other promotional activities.

The menu pages and gameplay sections of the game are being prepared with all design objectives in mind. As of the date of writing the report, the programming of the main mechanics has been completed. Design works are ongoing and it is aimed to complete the game completely by preparing different game scenes until the Teknofest final.

## 7. SWOT ANALYSIS

### **Our Strengths:**

- The fact that we are a team that loves this job and our communication within the team is strong
- The design and coding of our project is completely done by our team
- The fact that our project will serve our country

- Having a space where our team can work together on the project
- Our project is unique

**Weaknesses:**

- Poor knowledge about museums,

**Opportunities:**

- The wide range of areas to be served by the project thanks to the richness of our country's museums,
- Gaining experience in our field while doing our project,
- To present the historical objects in the museum to the users in a fun way,
- To introduce historical objects in museums to children in a fun way

**Risks**

- Lack of demand when we present our project to the user