# ESCAPE THE DUNGEON

Submitted in partial fulfillment of the requirements for the award of the degree of

**Bachelor of Technology**

(Computer Science & Engineering)


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BRILLIKO
INSTITUTE OF MULTIMEDIA

ANIMATION | VFX | FILM MAKING | WEB | GRAPHICS | GAME DESIGN | CODING

This is to certify that **Aman Chauhan** s/o **Rajinder Chauhan** studying in **Department of Computer Science and Engineering at Guru Nanak Dev Engineering College, Ludhiana -141006** has done his 6 months Industrial training/Internship at **Brilliko Institute of Multimedia** From **July, 2021 to December, 2021.**

During this period, he underwent training in **Game Design and Development**. He has worked on various projects and assignments in this field. As part of training he learned **Autodesk Maya, Photoshop, Blender and Unreal Engine** Technologies and worked on building various projects.

As a training project he developed a game named Escape The Dungeon using the above softwares.

We wish him all the best for his future endeavors.

With Regards,

**Brilliko Institute of Multimedia**

28/12/2021

**Proprietor**

## Abstract

Video games have become an integral part of our culture in a relatively short period of time. The industry is also developing into a major pillar of many modern economies, as game development programs are introduced in many developed countries. This coincides with a time when it has never been easier to release a game in the stock market. Over the past two decades, game development teams need financial support and technical level to pass rigorous testing of stadium management to be allowed access to their development computer systems. Today, anyone with a cell phone or tablet and a computer, even a laptop computer, can create a game and sell it in less time with financial support. This is not to say that every game is successful: it is still important to have a good understanding of the technical aspects involved in making games and the concepts involved in designing the games that people will want to play. Sometimes the best way to develop this knowledge is to start from scratch.

The goal of our game project is to design and develop an explicit 3-D computer game using Unreal Engine, Autodesk Maya, Blender and Photoshop. In our project, we decided to design and develop a 3-D prison game where the goal of the game is to find a way out of the dungeon. The user will play as an actor, and must find a way out of the hole. The game is designed in the Windows environment and is written in C ++ and visual script language using Unreal game engine. We made a mysterious, fun and exciting prison 3-D game.

# ACKNOWLEDGEMENT

I am highly grateful to the Dr. Sehijpal Singh, Principal, Guru Nanak Dev Engineering College (GNDEC), Ludhiana, for providing this opportunity to carry out the training project work at Brilliko Institute Of Multimedia.

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I would like to express a deep sense of gratitude and thanks profusely to Sir Kapil Sharma, without his wise counsel and able guidance, it would have been impossible to complete the project in this manner.

I/WE express gratitude to other faculty members of the computer science and engineering department of GNDEC for their intellectual support throughout the course of this work.

Finally, I am indebted to all whosoever have contributed in this report work.

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# Chapter 1 Company Introduction

Billiko is a part of Apprise Consultant Pvt. Ltd. a multidisciplinary organization focused on empowering high quality multimedia education brands in the country.

Brilliko Institute of Multimedia provides animation for characters in games,designing environment for games,developing games, Web design, VFX education and Multimedia, Launched in 2011 by a team of managing professionals and technology publishers with more than a decade of experience in the production and training of Animation & Visual effects, Brilliko offers a variety of training programs aims to produce highly qualified staff to advance the Media & Entertainment industry in india.

There are a variety of IT courses available at brilliko institute of multimedia such as Web development, Angular JS, C/C++, PHP, Python, Java, Android, IOS and Data Analytics.

Brilliko provides students freelancing work besides their classes. Students earn according to their knowledge and power after learning, so in their free time students become able to earn some money.

After completing their study package brilliko provides students jobs in their own IT sector and gives them excellent packages.

# Chapter 2 Introduction Of Project

This report describes the process involved in making a 3-D computer game. Using Unreal Engine with Autodesk Maya, Blender and Photoshop, we created a 3-D game where the user's goal is to escape traps and rivals to find a way out of the pit. This report discusses the overall look of the game, including the definition and play of the game, and focuses on game development and design, describes how the game is used and the editing functions and libraries used in development and design.

## 2.1 Overview

Escape the Dungeon is an interactive maze. This game is a simple 3D Maze template. You will be forced to choose your adventure if you wish to make it to the end. The devil has poisoned you and put you in prison, and the player has only 10 minutes to find out how to escape. If you have not won by counting time, the game is over. That's all. You have to start over. This means that you will need to be wise about your decisions as soon as you make them! It makes the game very difficult but in just 10 minutes, you know that in the end the game will speed up once - once you've got all the clues. Okay, if you can find all the puzzles. Use your mouse to explore, collect objects, and analyze trails to gradually solve various traps that will lead to your escape - if you can do everything in 10 minutes. Then, you will see directly the truth of the devil.

## 2.2 Existing Game

In existing games there are no such graphics provided, only 2-D games are available on the internet. In the existing games players have to solve some familiar puzzles and will pass the levels but in our game players have to find the clues for opening different gates and maps are fully designed in 3-D view so players will enjoy the 3-D environment. After their first level the next level will be much more challenging. In Existing 2-D games, players only solve the small puzzles which are easy to understand so players do not enjoy the entire game.

## 2.3 User Requirement Analysis(Game Design Document)

### 2.3.1 Game Design Overview

You wake up in a room, which seems strange as it has strange objects and pictures in it. Do these hieroglyphs mean anything? The only thing you know: Get out!

### 2.3.2 Core idea

The player is placed in a visible area where he is trying to escape by solving puzzles. The player can move around freely in the room, pick up objects and interact with objects. The player must run early in order to "win".

### 2.3.3 Key-features

The player can move freely within a virtual room, built approximately equal to the play area in which the game was tested. "Escape The Dungeon" is full of riddles. The player must learn some mechanical devices that have been acquired, leading to other indicators.

### 2.3.4 Genre

This game can easily be included in the "Escape Room Game" section, developed with VR functionality.

### 2.3.5 Target Player Base

Our players we direct are 14 to 40 years old, they like to think creatively so they solve problems. They also do not have to be pure beginners in every category to fully enjoy “Escape The Dungeon”.

### 2.3.6 Detailed Design Document

- Core Mechanic: Grabbing and interacting with objects
- Secondary Mechanic: Placed the objects on buttons
- Progression: Gaining new items and knowledge
- Narrative: Escape from the Dungeon

### 2.3.7 Rules

After starting the game, the player's attention is directed to the timer which drops from 10 minutes. When the timer reaches zero, the player is simply defeated and must restart the game to retry. When the timer is in the middle of the egg, all the lights flash quickly with red lights to give feedback to the players. To win the game, the player must leave the room through different doors by placing items on the buttons, which are locked at the beginning. Things that the player is able to hold, react naturally to physics such as gravity and collision. Some things stand still and do not move. Both hands can hold one thing at a time.

### 2.3.8 Mechanics

The player is able to hold different objects with controls. Each controller (representing a hand in the game) separately can hold one object. Players move forward, backward, left and right by pressing (W) (S) (A) (D). By pressing (G) the player will hold an object and press (G) to release the object.The gates will open when items are placed on certain buttons.

At the beginning of the game, players must be aware of the clues and think of objects and buttons. Passing through different gates the player will reach his destination

### 2.3.9 Technical Design Document

There is a need of computer mouse or keyboard and has the following technical requirements:

- Processor: Intel™ Core™ i5-4590 or AMD FX™ 8350, equivalent or better
- Graphics: NVIDIA GeForce™ GTX 1060 or AMD Radeon™ RX 480, equivalent or better
- Memory: 8 GB RAM or more
- Video output: 1x HDMI 1.4 port, or DisplayPort 1.2 or newer
- Operating system: Windows™ 7 SP1, Windows™ 8.1 or later or Windows™ 10

### 2.3.10 Aesthetics

Game models are low poly and 3D. With the "hardedge" and the colorful style, which is very different, it connects with the science fiction, which is invisible to the player. With some simple illustrations and the importance of everything, "Escape The Dungeon" does not interfere with the player's appearance on the game-playing elements.

## 2.4 Feasibility Study

### 2.4.1 Game Concept

Find a way out or die trying over and over again on this platform challenge!

Trapped in a pit full of challenges. But with enough deception, there may be a chance of survival, no matter how small. Navigate through cold rooms as your search exits. Get the idea to open doors. Dungeon Escape covers many challenges and in their opinion the player will solve all the riddles and get out of the hole. Die and repeat, learn from mistakes and feel your skills improve with each effort. Can you overcome many challenges to come?

### 2.4.2 Technical Analysis

If we look at the feasibility of a project it is possible as all the necessary technologies are available. The main technologies are Unreal Engine and Autodesk Maya which are available online in the form of packages. Can be installed on any computer or laptop in any environment. The proposed system requires users to have a smartphone or computer in order to make a profit.

### 2.4.3 Economic Feasibility

By doing what is happening in the economy it is clear that the system is possible and less expensive to develop and implement. Developing technologies do not incur additional costs without the use of high costs. Maintenance is also simple and easy when done by professional staff. When it comes to use, the system cannot be used even from the ground up as it requires high processing power.

### 2.4.4 Operational Feasibility

The system will not crash while facing a large number of users because every user is playing this game on their systems. The system will provide a solid environment where users can enjoy a visual environment without contact.

## 2.5 Objectives of project

1. To escape from the dungeon in time.
2. To construct GUI design for the game.
3. Connect design to game code.
4. Add conditional statements to allow player movement.

# Chapter 3 Product Design

## 3.1 Product Perspective

The aim of the proposed game is to improve the visual environment and challenge players. No such video game is available online or in any other forum. The game provides the right clues to judge other movements the player will move forward. The proposed game will delight users with the twists, challenges and nature of the game. To reach their final location the players have to open several doors that will only open if the player is able to judge and match the location of the different buttons.

## 3.2 Product Functions

This game will provide a better image feeling for the players. Users can play this game offline anywhere and report game failure with feedback. Players will not move forward without opening doors and doors will only open if players place items on the provided buttons. There will be other challenges in the game as players have to deal with existing bots in the game, which will make this game more fun.

## 3.3 User Characteristics

This proposed game has different features. The game is easily accessible on desktops, laptops and cell phones; its graphical interface is better than other games. It is accessible to everyone. All the challenges are well organized and difficult to judge but easy to overcome. This game will be downloaded via google play store for android users in the apple user application store and will be available on chrome.

## 3.4 DFDS

Control flow diagram

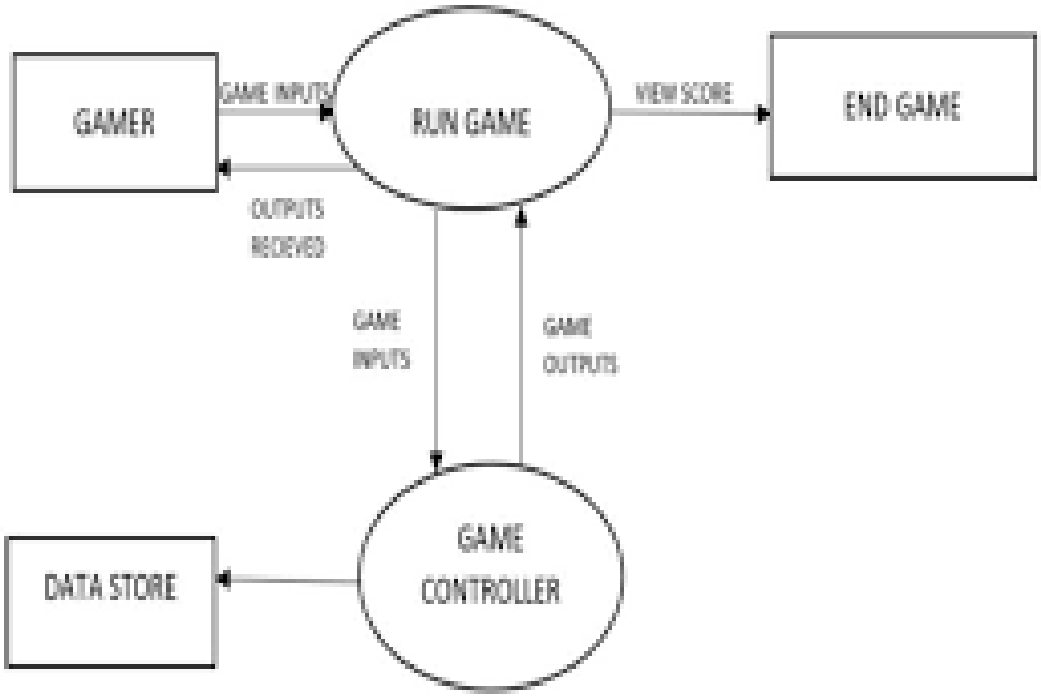


Fig 3.4.1

### Level 1 DFD Administrator

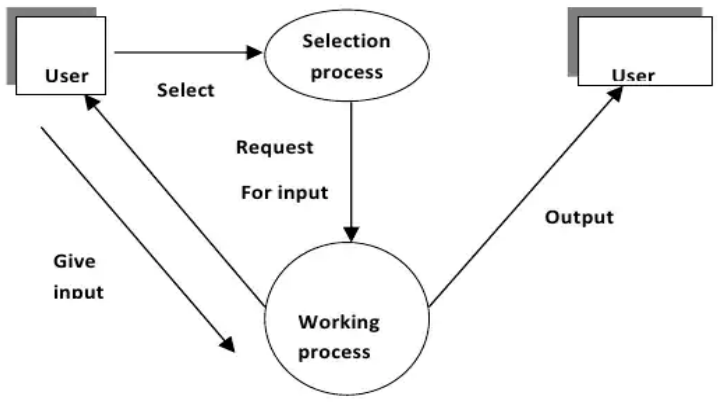


Fig 3.4.2

## 3.5 Assumptions and Dependencies

There is a lot of speculation and dependence on which project is working. The first considerations are: -

- This game does not require any kind of internet service.
- The whole game is well maintained and the graphics are built to a high standard. All issues will be resolved as soon as they are available.
- The game will be upgraded to the latest technology by engineers whenever needed and additional game maps will be added.
- The game will be tested by the end user before you go online.

Now, depending, at the end of the user, this game is completely dependent on the devices users are playing on. On the developer side, the development team needs the latest equipment to develop such a game because low-end devices will not support game engines and software design.

## 3.6 Specific Requirements

We can say that it is a combination of software and hardware requirements. For this project we need hardware configuration like:

- Processor - intel i5 or greater (or similar to this)
- Ram - 8gb or greater
- Graphic Card - Nvidia GTX with Vram 4gb or greater (or similar)
- Storage - 1TB or greater

Software configuration includes:

- Epic Game Launcher
- Unreal Engine 4 or greater
- Autodesk Maya
- Blender,Photoshop

# Chapter 4 Development and Implementation

## 4.1 Introduction to Languages

### 4.1.1 C++

C ++ is a different forum language that can be used to create more efficient applications. C ++ was developed by Bjarne Stroustrup, as a cpp language extension. C ++ gives programmers a high level of control over system resources and memory. C ++ can be found in modern applications, Graphical User Interfaces, and embedded systems. Object-based programming language that provides a clear structure to programs and allows code to be reused, which reduces development costs. C ++ is portable and can be used to improve custom applications across multiple platforms. Since C ++ is closer to C # and Java, it makes it easier for programmers to switch to C ++ or vice versa. To start using C ++, you need two things:

- Text editor, such as Notepad, for coding C ++
- A compiler, like GCC, that will translate C ++ code into computer-readable language

Throughout the life of C ++, its development and evolution have been guided by a set of principles:

- It has to be driven by real problems and its features should be immediately useful in real world programs.
- All features must work (in the obvious way to do so).
- Program planners should feel free to choose their editing style, and that style should be fully supported by C ++.
- Enabling a useful feature is more important than preventing any possible misuse of C ++.

- It should provide structured editing tools into separate, well-defined components, and provide different integration resources.
- There are no obvious violations of the genre system (but allow for obvious violations; that is, what is explicitly requested by the editor).
- User-created models require the same support and function as built-in models.
- Unused features should not adversely affect created performance (e.g. low performance).
- There should be no language under C ++ (other than the assembly language).
- C ++ should work in conjunction with other existing programming languages, rather than promoting its separate and incompatible editing environment.
- If the purpose of the editor is unknown, allow the editor to specify it by providing manual controls.

### 4.1.2 Visual Scripting Language (Blueprint Programming Language)

The Blueprint Visual Scripting system in Unreal Engine is a complete gameplay scripting program based on the concept of using a location-based visual interface to create game play features within Unreal Editor. Like most common writing languages, it is used to describe classes or object-oriented objects (OO) or engines. As you use UE4, you will often find that items described using Blueprint are colloquially called "Blueprints." This program is extremely flexible and powerful as it gives designers the ability to use almost the entire range of concepts and tools commonly available only to program planners. In addition, the Blueprint tag located in the use of Unreal Engine's C ++ allows programmers to create basic systems that can be extended by designers. Game editing and everything that UnrealScript used in the past can now be encrypted using C ++. At the same time, while Blueprints can be understood as unrealScript substitutes, they serve many of the same purposes as those of UnrealScript, such as:

- Expanding classes
- Maintenance and repair of fixed structures

- Manage the topic (e.g. sections) to replace classes

It is expected that the programmers of the game program will establish basic classes that present a useful set of activities and structures that Blueprints created in those basic classes that I can use and expand on.

#### 4.1.2.1 Types Of Blueprint

Blueprints can be one of a few types each with its own unique uses ranging from creating new genres to writing-level events to defining interactive links or macros that will be used by other Blueprints.

**a. Blueprint Class**

Blueprint Class, often abbreviated as Blueprint, is a legacy that allows content creators to easily add functionality to existing game play classes. Blueprints are built into the Unreal Editor visually, instead of typing code, and are stored as assets in the content package. This defines a new category or type of character that can be placed on the map as conditions that behave like any other type of character.

**b. Data-Only Blueprint**

Blueprint Data Only is a Blueprint Class that only contains code (in the form of node graphs), variables, and components inherited from its parent. This allows those inherited properties to be repaired and repaired, but no new features can be added. These actually replace archetypes and can be used to allow designers to fix buildings or set things up differently.

Data-Only Blueprints are organized into integrated architecture, but can also be "converted" into full Blueprints by simply adding code, dynamics, or components using the full Blueprint Editor.

c. **Level Blueprint**

Level Blueprint is a special kind of Blueprint that works as a graph for a global event. Each level in your project has a built-in level Blueprint that can be edited within the Unreal Editor, however the new Level Blueprints cannot be created via the interface editor.

Total level-related events, or specific level-level events, are used to chase the sequence of actions in the form of Active Cells or Flow Control functions. Those who are familiar with Unreal Engine 3 should be familiar with this concept because it is exactly the same as how Kismet works in Unreal Engine 3.

Level Blueprints also offers a level streaming control and Sequencer and binding events for actors placed within the level.

d. **Blueprint Interface**

The Blueprint Interface is a collection of one or more functions - just name, no launch - that can be added to other Blueprints. Any Blueprint with an additional Interface is guaranteed to have those functions. Interface functions can be assigned to work on each additional Blueprint. This is essentially the same as the concept of the interface in standard layout, which allows many different types of Objects to be shared and accessed through a standard interface. Simply put, Blueprint Interfaces allow different Blueprints to share and send data to each other.

Blueprint Interfaces can be created by content creators in the same way as other Blueprints, but it comes with some restrictions because it cannot:

- Add new variables
- Arrange the graphs
- Add Parts

e. **Blueprint Macro Library**

The Blueprint Macro Library is a container that holds a collection of Macros or individual graphs that can be placed as nodes in other Blueprints. These can be time-saving as they can keep track of the most commonly used node sequences and inputs and your results for both data processing and transmission.

Crows are shared between all the graphs they refer to, but are automatically expanded into graphs as if they had no folded node during compilation. This means that Blueprint Macro Libraries do not need to be integrated. However, changes to Macro are only shown in Macro-specific graphs when the Blueprint containing those graphs is reassembled.

## 4.2 Other Supporting language or Tools used

### a. Unreal Engine 4

Unreal is an engine which is used to develop games. The latest version of this engine is unreal Engine 5. The unreal engine is used to develop classic graphical games and much more. In unreal two types of languages are used which are C++ and visual scripting (blueprint). Famous games such as Pubg and Call of duty developed in Unreal engine. Graphical design and environment of games are developed in other software which further import in unreal. Speciality of unreal engine is that it supports high graphics games.

### b. Autodesk Maya

Autodesk Maya is used to design 3-D models for video games, animated series, TV series and also it is used to produce visual effects. Autodesk Maya produces dynamic environments for video games. In order to produce games Maya provides different modes. Following are the modes in Autodesk Maya.

- Modeling
- Texturing
- Lighting
- Rigging
- Animation

Autodesk Maya is best known for Modeling and Animation. But Maya is not open source, this is paid software. We used Maya for designing our game environment and gave animation to characters.

### c. Blender

Blender is also like Autodesk Maya, which is used to design 3-D models for games and others. Autodesk Maya is much familiar in industry from years and used for big production whereas Blender is new one in industry and used for start up projects. Blender is much used for sculpting characters. Sculpting makes the character more realistic. Autodesk Maya is not good enough at sculpting. Everything which is used in Autodesk Maya can be done in Blender. Blender is open source and can be downloaded from the internet and there is no need to buy a license for Blender and it provides all the tools free of cost. We used Blender in our game to make characters more realistic.

### d. Photoshop

Photshop is used to edit photos and also to design 2-D models and provide animation to 2-D models. Photoshop is also paid software and requires a license to use this software. We used Photoshop to provide texturing to models and which makes the gaming environment more realistic. For texturing first we require its UV set of models, designed in Maya, then texture will be set in photoshop, which will further set on UV sets.

## 4.3 Implementation

### 4.3.1 Used Blueprints

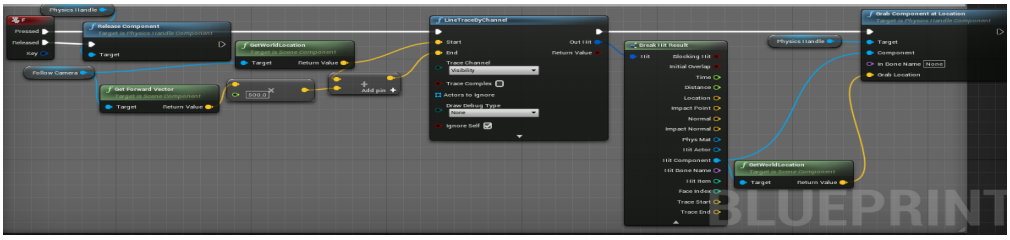

Fig 4.3.1.1 (Grab)

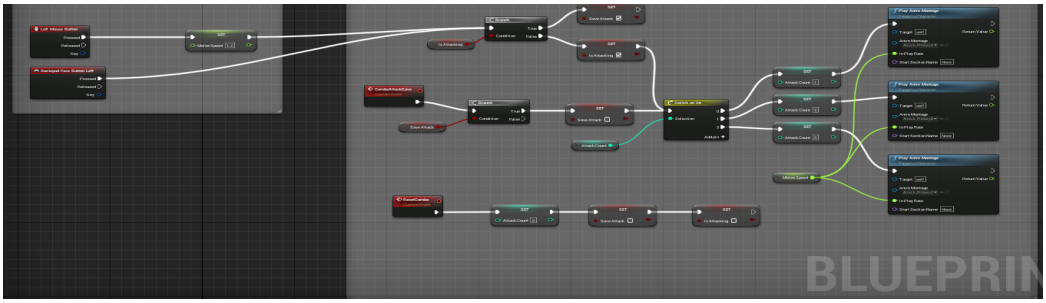

Fig 4.3.1.2 (Character)

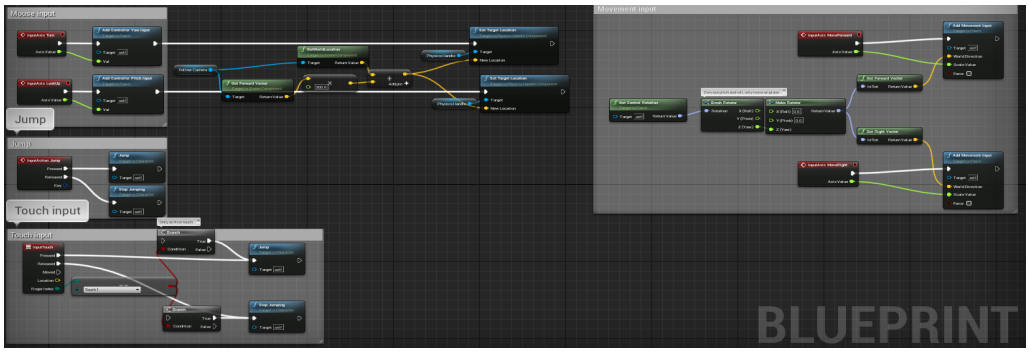


Fig 4.3.1.3 (Link Grab)

### 4.3.2 Snapshots Of Game


Fig 4.3.2.1(Main Screen)

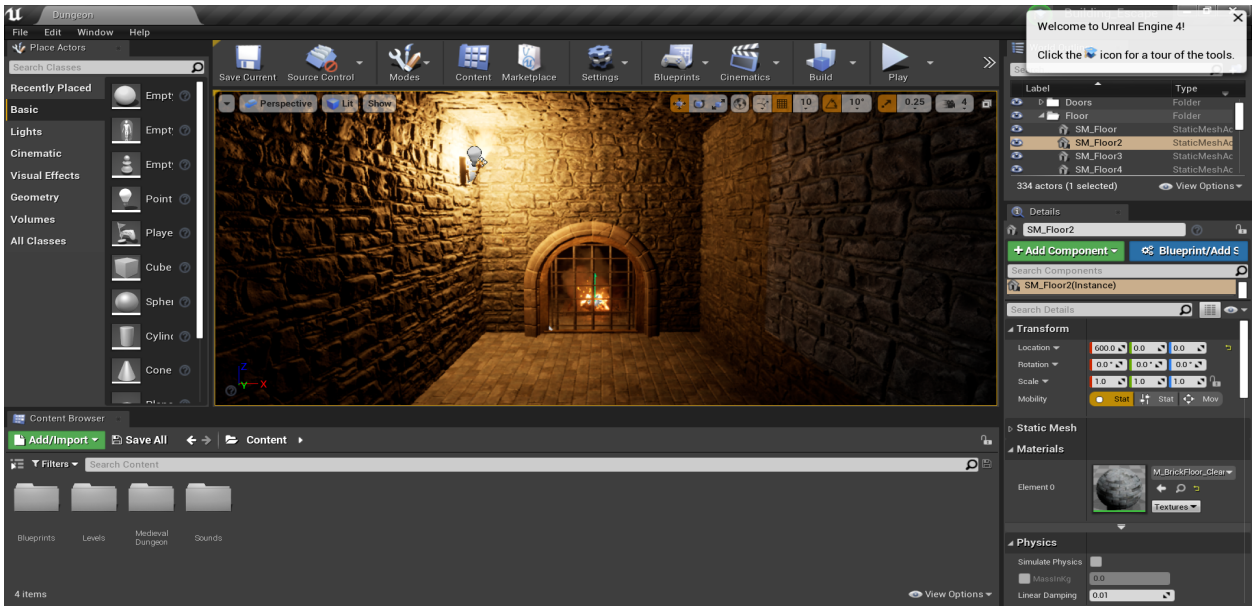


Fig 4.3.2.2 (Level)

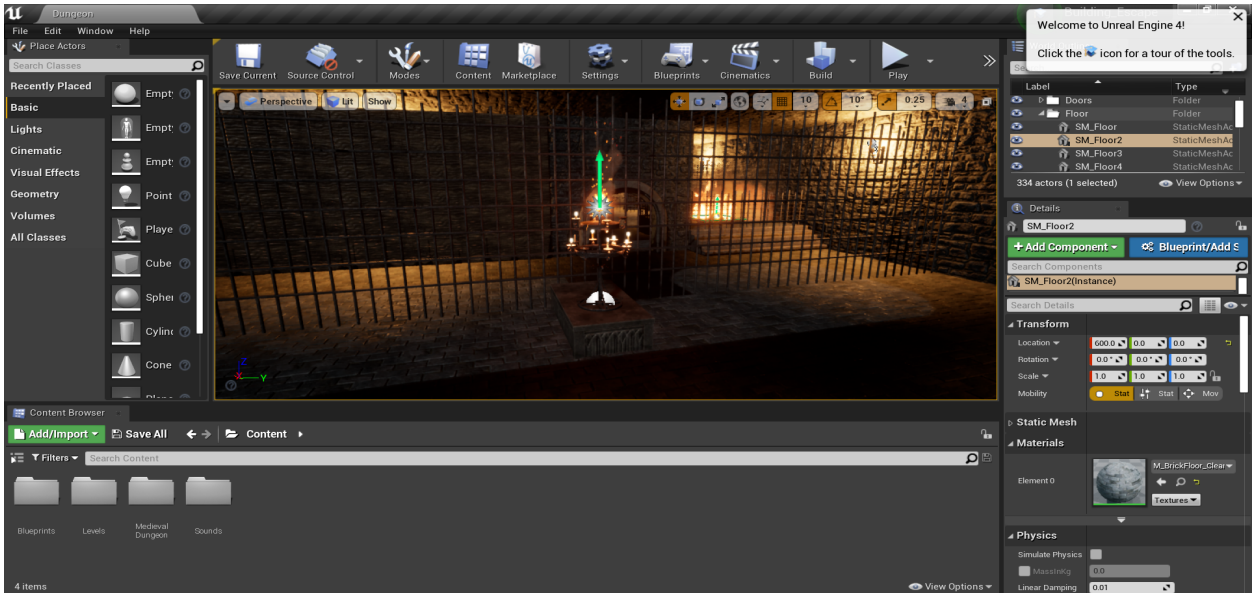


Fig 4.3.2.3 (Level)

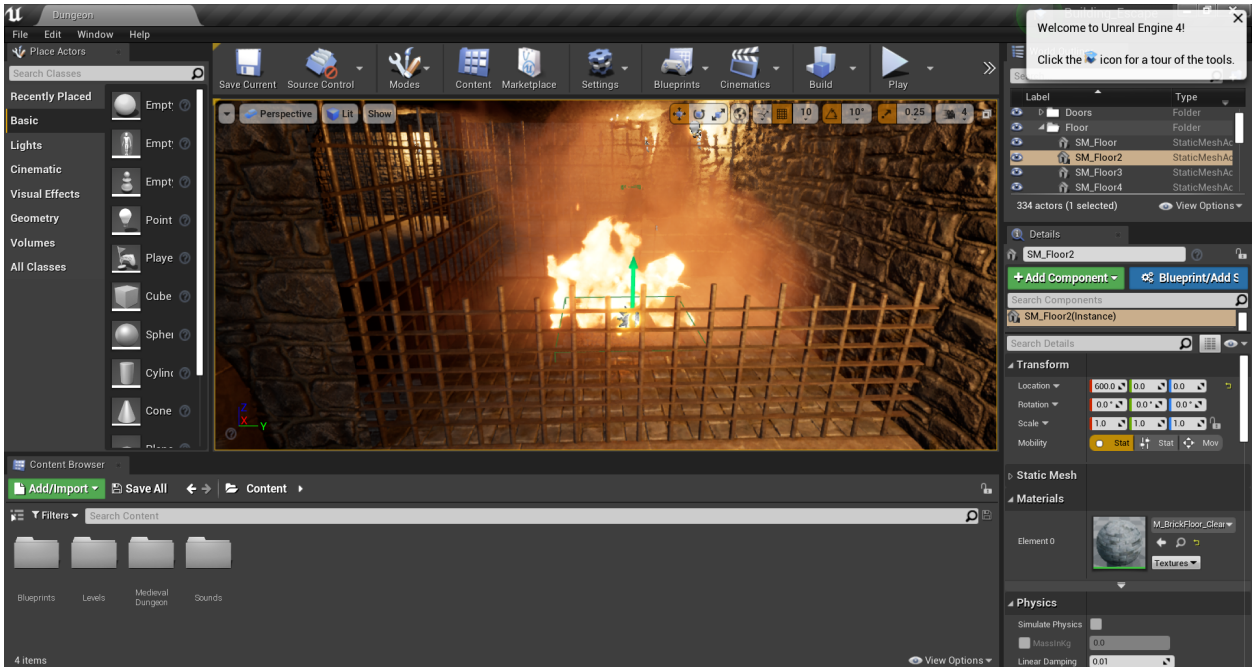


Fig 4.3.2.4 (Fire Fx)

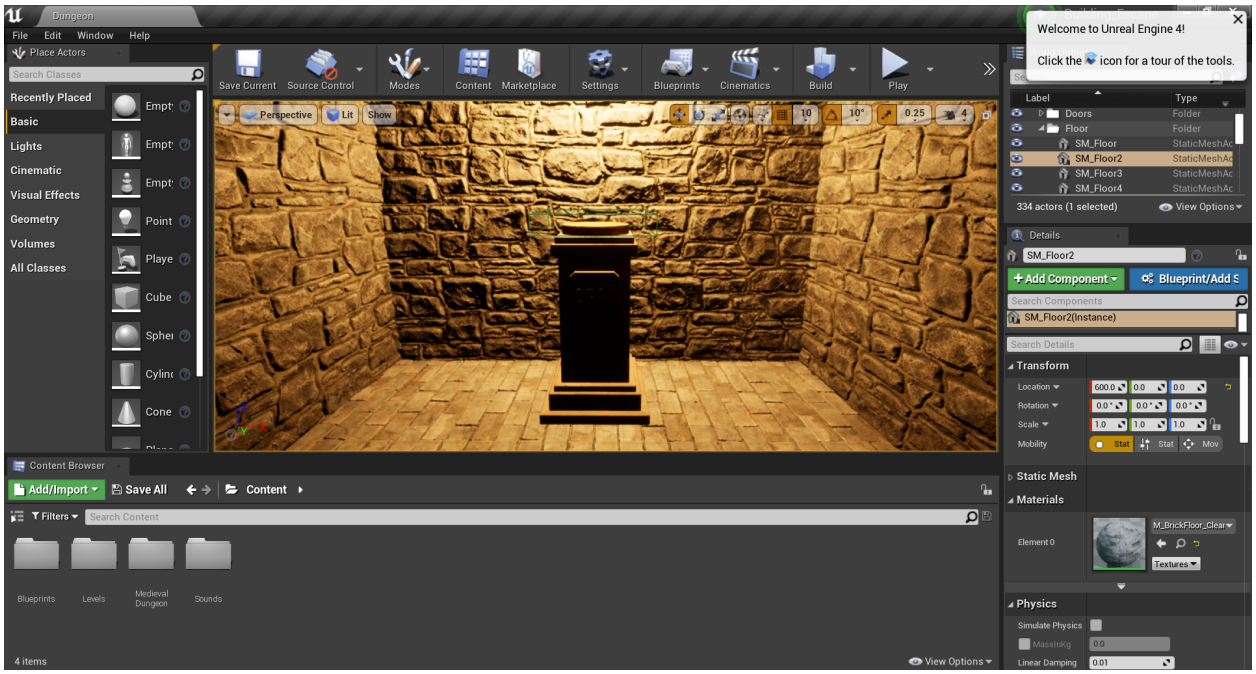


Fig 4.3.2.5 (Clue Button)

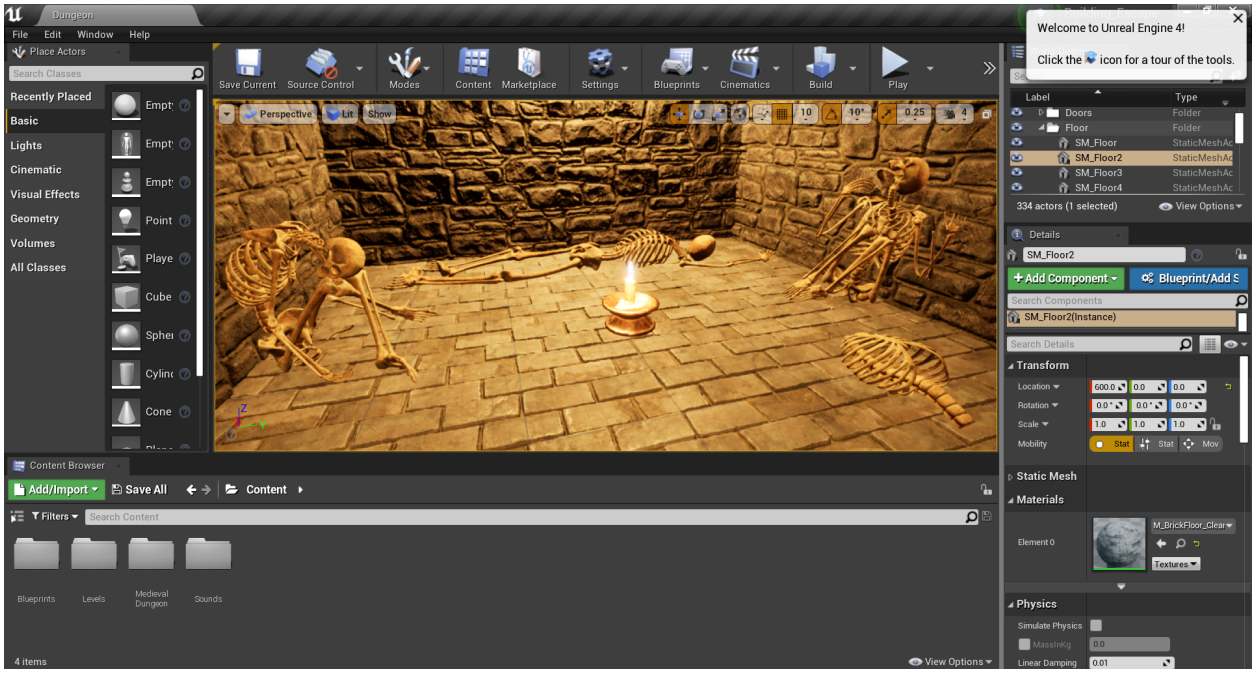


Fig 4.3.2.6 (Hidden Chamber)

# Chapter 5 Conclusion And Future Scope

## 5.1 Conclusion

In this game, in a short time, we used a game environment that included 3D view and moving objects with camera, brightness and versatility, and a texture map. Improving the game environment and knowledge makes it very challenging. Players must judge and understand the indications where the gates will open and players will play the next and most difficult levels.

## 5.2 Future Scope

This game will be monitored regularly and depending on the needs of the users, changes will be made with feedback, the game will be upgraded from time to time. So far there is only one map that will get the attention of the players in this game. In the future additional challenging maps will be added to the game. After completing one map, the next will be even more difficult and challenging. A map is designed to get the player acquainted with the game. Upcoming maps will be the real beginning of the game where there will be various creatures and bots, those that will face players and make their way difficult. Following maps will be added:-

Next Level: In this map, the player will start his journey in a forest. Player has to find an orb with the help of a given map in order to complete this level. Player will have only three life lines, if the player lost his three life lines then the game will restart to the initial point of the map. During the gameplay the player has to fight with different creatures to reach their final destination.

Level 2: After completing the above level, the player will enter a dark hell. Player need to pass through a gate to reach their next level which is locked and gatekeepers have the key but a demon make them slaves. So in this level players have to save the gatekeepers and get the key in order to open the gates. In this level players will fight with the entire army of demons and few loop locations will make players level difficult and more challenging.

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4. Adobe: *Creative, marketing and document management solutions*. [online] Available at: <https://www.adobe.com>
5. C++[online] Available at: <https://en.wikipedia.org >cpp>