Game-Based Learning

Dr. Nilesh B. Fal Dessai[1], Saish B. Solanki [2], Advait B. Kajarekar [3], Rakshit N. Prabhu[4],
[1]Department of Information
Technology Engineering, Goa
University, Goa, India

Abstract*:-* This research paper focuses on the development of the 3D Desktop game; The project is based on Low Poly games containing 3 different levels for the player to play and learn new topics regarding cyber security in each stage. Player's gain experience in gaming system with increasing levels of difficulty, computer-controlled simple NPCs and other interesting objects like chests, crates. Unlike the traditional games which have no positive impact on the gamer, this provides practical knowledge about cyber security concepts. This project explores a new dimension to the traditional Low Poly games by mixing the features of Survival games and puzzles where the player must learn to survive. With the simplicity of this game, it simply aims to bring fun and enjoyment, which makes you look towards a bright future having strong fundamentals. The Basic tools we are going to use are Unity: A basic game engine used to make games, supports a lot of plugins which helps us to minimize the workload. The engine can be used to create three-dimensional (3D) and two-dimensional (2D) games, as well as interactive simulations and other experiences.

Keywords:- *3D Desktop Game, Cyber Security, Google Dorks, Education, Unity Game Engine.*

I. INTRODUCTION

Game is not just any computer software which is made to benefit users' entertainment purposes nowadays, games can be used for users' educational enhancement. So, while making game we must take its fun as well as educational perspective into consideration. Just making any game will not do, that is why it is more challenging because we always must carefully consider if we are developing it correctly to provide information to users.

Every academic institution needs creative learning process and which is a challenging part. This activity is carried out by almost every academic institute in various forms. It is both a time and man-power-consuming job. Gaming is the approach to using the lush resources most efficiently so that the desired goal can be achieved.

In this project, we present our experience in creating a game based on the Unity game engine for promoting knowledge and creativity. We want to use this more visual, more easily accepted medium to motivate students to study vast topics previously found less interesting. Our game is a quiz game which includes materials provided for learning various basic cyber security key concepts. Such games often test players' problem-solving skills, environment analysis etc.

This starts with Low-poly, a single-player game where the player enters the game and gains different information related to cyber security. To accomplish the game, the player needs to complete all the 3 levels. The player plays the game through his "Avatar" and visuals are seen in third-person view. As soon as you complete the level, you will get knowledge about the topic on which that level is based.

The gaming industry shows that there is a large base of players actively interested in this genre and gives me a good opportunity to tap into that market by following the traditions that have already been set for this genre. But we are mainly targeting casual gamers aged from 16-30 who are in their school and colleges and want to learn basics of Cybersecurity. We are making the game in such way that it will not give core concept understanding but also the practical knowledge about that topic.

He can choose the available levels. The Level status will give him an idea about whether the level is locked or unlocked.

He can unlock the new level only when he has already completed previous levels. There will be a total of 3levels.

In each level, he will get different basic instructions and game controls. He will get problem statements. And these problem statements will be based on Cryptography, Google Dorking, Mixture of both etc. In case players are not able to solve a given problem statement, we will provide hints using the question mark Icon so that the problem statement will get solved. After each completed level you will get advanced to the next level. You can exit the game at any point in time, the player's previous performance will be stored.

II. RELATED STUDIES

➢ *Unity Game Engine*
The Unity game engine was introduced by Unity Technologies in 2005. It has since become one in every of the foremost popular platforms for developing 2D and 3D games. the latest version, Unity 5, can be a completely functional game engine, with all advanced features enabled and freely available to developers. Unity is an integrated environment, which mixes several sophisticated components just like the PhysX physics engine, the Mechanism animation system, a self-contained terrain editor and much more. it is also seamlessly integrated with the Mono develop code editor, so any changes made in Mono develop are transparently compiled by Unity's C# or JavaScript compilers, and inserted into game.

Rendering: Unity Game Engine resources 3ds Max, Maya, Softimage, Blender, Modo, and ZB rush is incorporated into the game project and controlled by the graphical interface of Unity. Additionally, Unity includes support for the PhysX physics engine from Nvidia (previously Ageia) with the addition of capability for real-time cloth simulation on arbitrary and skinned meshes (as of Unity 3.0)

Platforms: Unity supports deployment to multiple platforms. Within a project, developers control over delivery to mobile devices, web browsers, desktops, and consoles. Unity also allows specification of texture compression and backbone settings for each platform the game supports. Currently supported platforms include for Windows, Mac, Linux/Steam OS, Unity Web player, Android, IOS, Blakberry10, Windows Phone 8, Tizen, Windows Store apps, WebGL, PlayStation 3, PlayStation 4, PlayStation Vita, Wii U. Xbox One, Xbox 360, Android TV, Samsung Smart TV, Oculus Rift, and kit VR.

Scripting: Mono, an open-source version of the.NET Framework, is that the inspiration for Unity's scripting. An open-source IDE for Linux, MacOS X, and Windows is termed Mono Develop. Boo, C, C++, C#, CIL, D, F#, Java, Oxygene, Python, Vala, and VB.NET are all supported. The use of scripts allows games to react to user input and plan for gameplay events to occur at the suitable times. They will even be accustomed construct a unique AI system for game characters, govern the physical behaviour of objects, and provide graphic effects.

III. MATERIAL AND METHODS

Materials used are desktop with minimum 2GB RAM and minimum of 200MB free space having good graphic card.

Software used are Unity Game Engine and Blender.

The software methodology we have used to develop this game is Agile methodology which is an approach for developing products (in this case: games) using short iterations. The main idea is not making the whole project from start to finish, but making small features for the current project in small periods of time

When it comes to Game development there are not any Algorithms as such but something called

A Game loop where every individual entity has its workflow which is independent of other entities present. In this project, we would make use of animations to improve our methods rather than using codes or algorithms for the same.

This is how our Game works:
1. When we open the game, it shows option When we open the game it shows opening graphics.
2. Then the user must click on the start button to start a game.
3. As soon as we click on the start button we will land up on the page where we must choose the level which we are going to play. Initially, all the levels are locked except

starting level. As soon as we complete the level next levels will get unlocked.
4. After selecting the level, you will enter the room where you must solve the puzzle to complete that level. The puzzle will be based on basic cyber security concepts.
5. After completion of the level, you will get the new game scene.
6. You will get advanced to the next level. Also, you can quit the game the if you want.

IV. RESULTS AND DISCUSSION

A. *Level 1: Caesar Cipher*

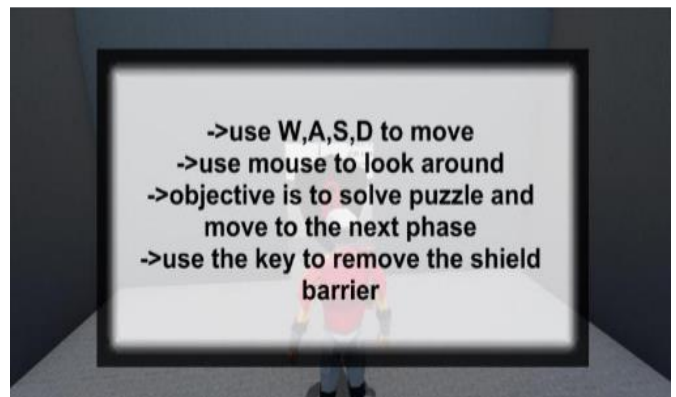Fig 1:- At the start of first level, that tablet shows hints/information regarding the level.
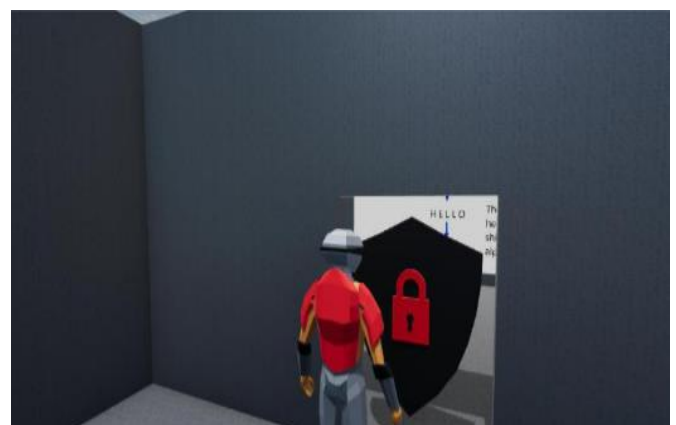

Fig 2:- Game Controls:

Fig 3:- Using that key, we can unlock that entrance:
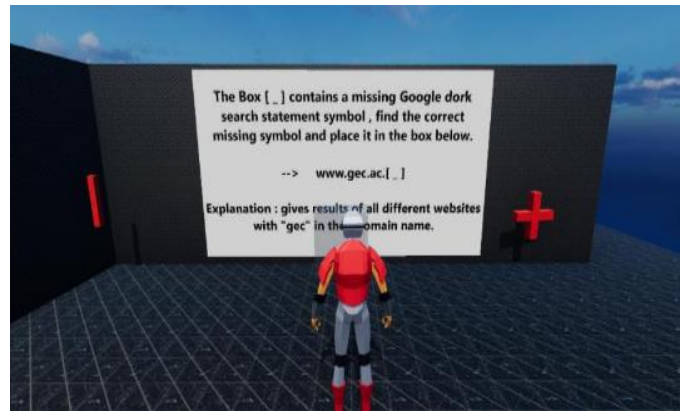
Fig 4:- Understanding Caeser Cipher:
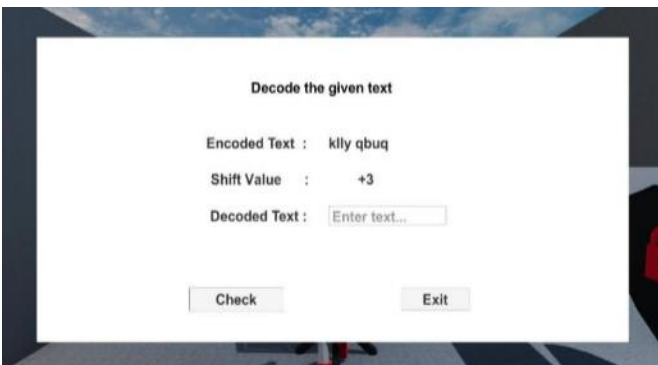

Fig 5:- This is where we give custom input to get the key to go to the next phase:
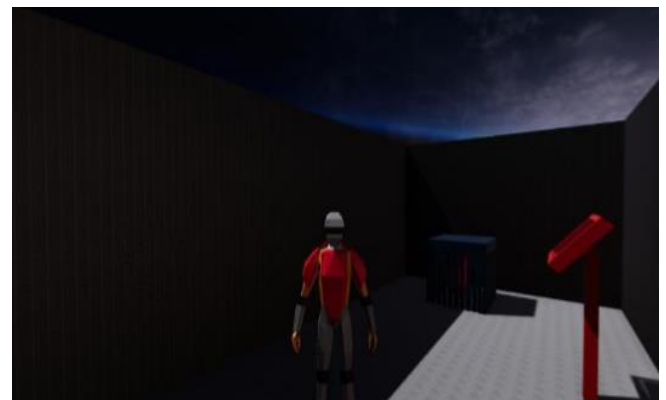
B. Level 2: Google Dorks

Fig 6:- Character Spawn:

Fig 7:- Input:

Fig 8:- Query:

C. Level 3: Mixed Level
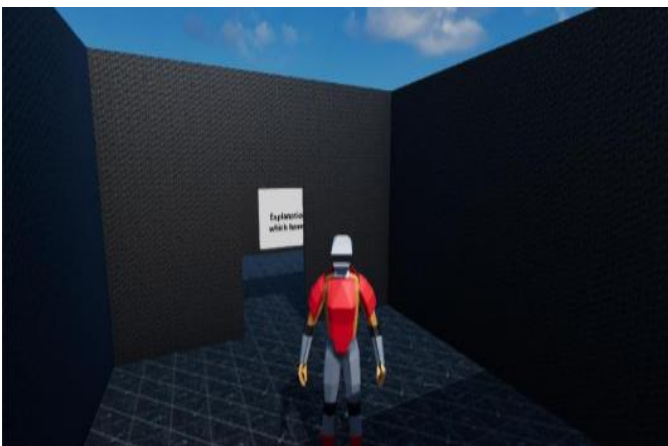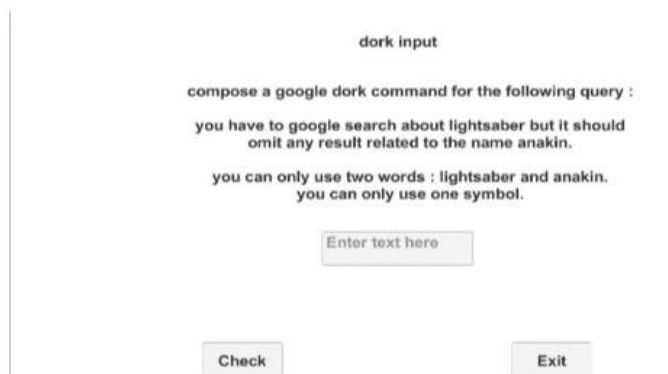

Fig 9:- Character Spawn:

Fig 10:- Caesar Cipher:
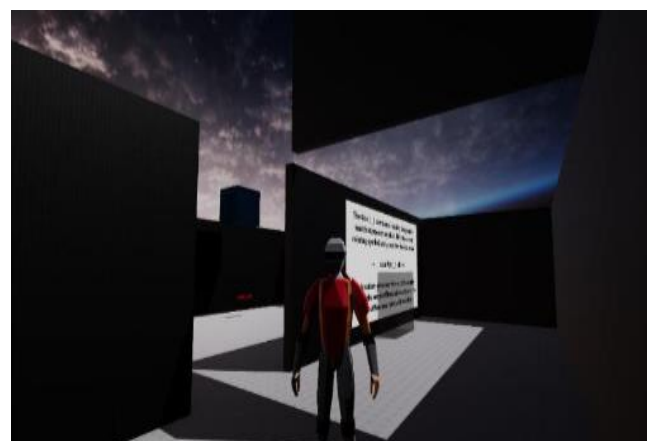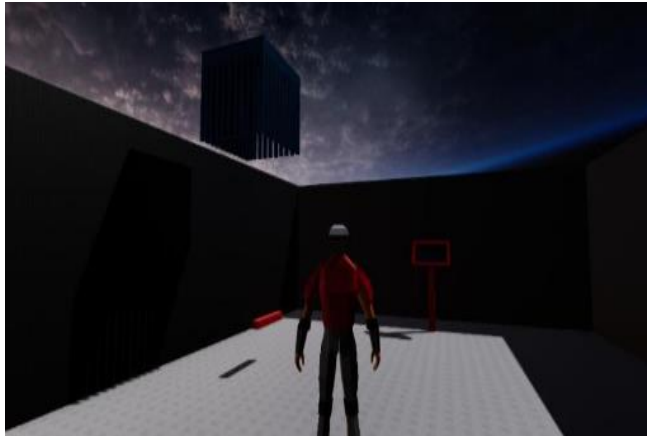

Fig 11:- Screen Sliding Google Dorks

Fig 12:- Opens the cage

D. Testing

The game is compatible across different devices, and on different configurations of hardware and software. Overall performance is checked by Battery Consumption and Graphic Performance. Checked Memory and processor constraints.

V. CONCLUSION

In this Project, we discussed how the 3D game can be used in college departments to improve learning. We have also depicted how the game will begin, the option is available in-game to the player, how the game controls work, and how different features in the game make it easier for us to learn the cybersecurity concepts. We have learned about how different features of Blender and Unity 3D can be used to develop a simple low-poly 3D game. It helped us in enhancing our creative thinking and imaging capabilities. It is sensible to work and it demands much time because Game Engine wants to connect game environment with the real world.

In This 3D game covered Caesar Cipher and Google Dorking in very fun and easy way. Also, we have tried to make it as realistic as possible so that student can relate to the problem situation and will work according to that.

FUTURE SCOPE

Right now, this project is the game with only 3 Levels. We can increase number of levels to make it more challenging and interesting for a learner. We can introduce New Game Features like changing Avatar, changing outfit options, adding sounds throughout gameplay, adding map for each level. We can improve Graphics of the game. Adding Post Processing like motion blur, anti-aliasing and Field of view can improve game graphics. Adding more levels related to Cyber-security.

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