AI ALGORITHMS IN DIFFERENT GAMES

A Course Project – Design and Analysis of Algorithm

Our Team

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AI in Games

Over the course of the last few decades, the gaming industry has seen great strides. Beginning with simple games like "Pong" and "Pac-Man" which offered players a short escape from reality and growing into such involved games like "World of Warcraft" and "Call of Duty 4" which are serious hobbies to those that play them. Today's gamers have grown accustomed to seeing each new game with elevated complexity, engagement and intelligence. For developers, the challenge becomes pushing the limits and create games that are increasingly compelling. Computer-controlled Artificial Intelligence (AI) has evolved in many forms to meet the test.

What Is AI for Games?

At its most basic level, "artificial intelligence" consists of emulating the behaviour of other players or the entities (that is, all the elements of the game that can act or be acted upon, the NPCs) they represent. The key concept is that the behaviour is simulated. In other words, AI for games is more "artificial" and less "intelligence". The system can be as simple as a rules-based system or as complex as a system designed to challenge a player as the commander of an opposing army.

The Purpose of AI in Games

AI can play multiple roles in gaming. It can be a general set of rules used to govern the behaviour of entities in the game world. These set of rules become the foundation for the non-player entities in making decision.

Design and Implementation

AI Algorithms

In these game the non-player entities (NPCs) are a set of specific tasks. The enemies are scripted such that they should attack the enemy and kill it. However, this killing needs few prerequisites:

      i. When the player enters in 5-unit range of the enemy unit then the script is triggered.

      ii. Once in range the enemy finds a shortest path between it and the player. And then chases him.

      iii. After chase if the enemy catches the player, the player dies.

      iv. The player is under a timed environment. If time ends the player dies.

      v. Player needs a key to open the treasure and win the game.

A* algorithm

A* Search algorithm is one of the best and popular technique used in pathfinding and graph traversals. A* is a directed algorithm that us used to find the shortest path to the destination very quickly. It is primarily used for MAP terrains. One of the key points why it boasts of its efficiency is its ability to backtrack to find alternative paths to the destination node.

Important concepts

MAP**:** A map is an area which holds both the origin and the destination to which the path is to be found. It might be made of squares, hexagons, trees etc. This is the boundary within which A* is to operate.

Nodes**:** These are the data structures that hold the position information. For e.g., if we need to go from one point to another on a given MAP, we will have an origin node that will store the position coordinates and other position information of the object and a destination node that will store the position information to the point to be reached.

Distance: Distance between Origin and Destination Nodes
Cost**:** Time taken to reach from Origin node to Destination Node.

Euclidean Distance

This a basic algorithm used in many games used where we want the enemy/ game object to chase any other entity in the environment.

$$d(p, q) = \sqrt{(p_1 - q_1)^2 + (p_2 - q_2)^2}$$

Game Objects

The Game Object is the most important concept in the Unity Editor. Every object in your game is a Game Object, from characters and collectible items to lights, cameras and special effects. However, a Game Object cannot do anything on its own; you need to give it properties before it can become a character, an environment, or a special effect.
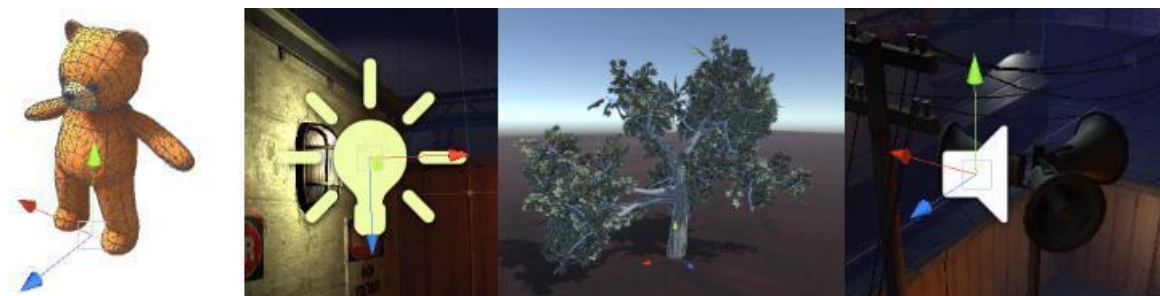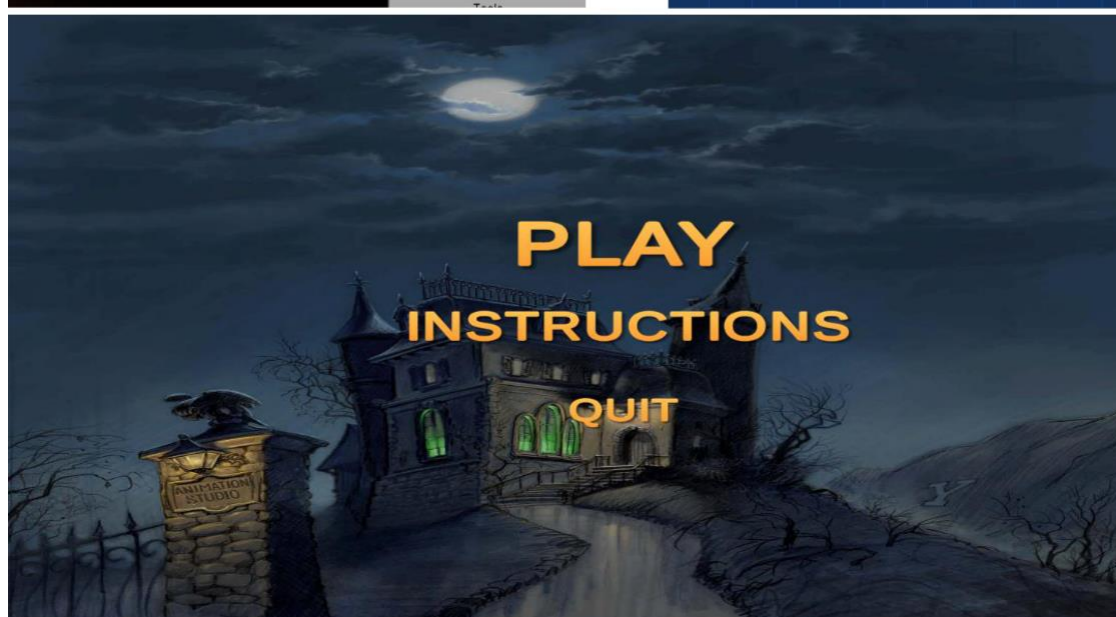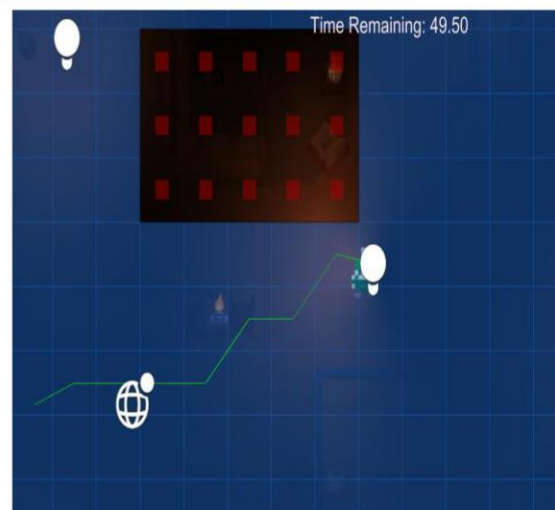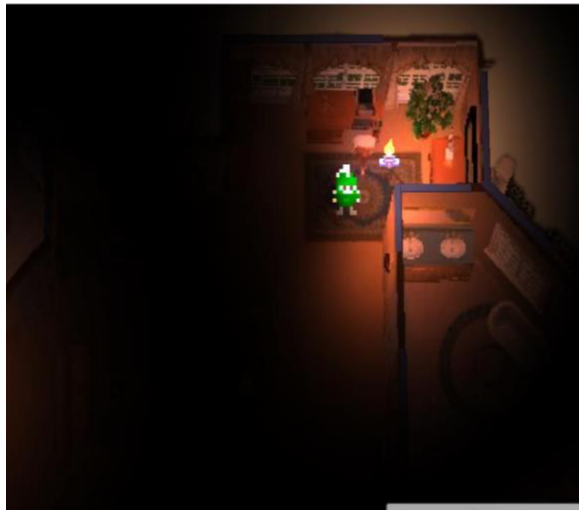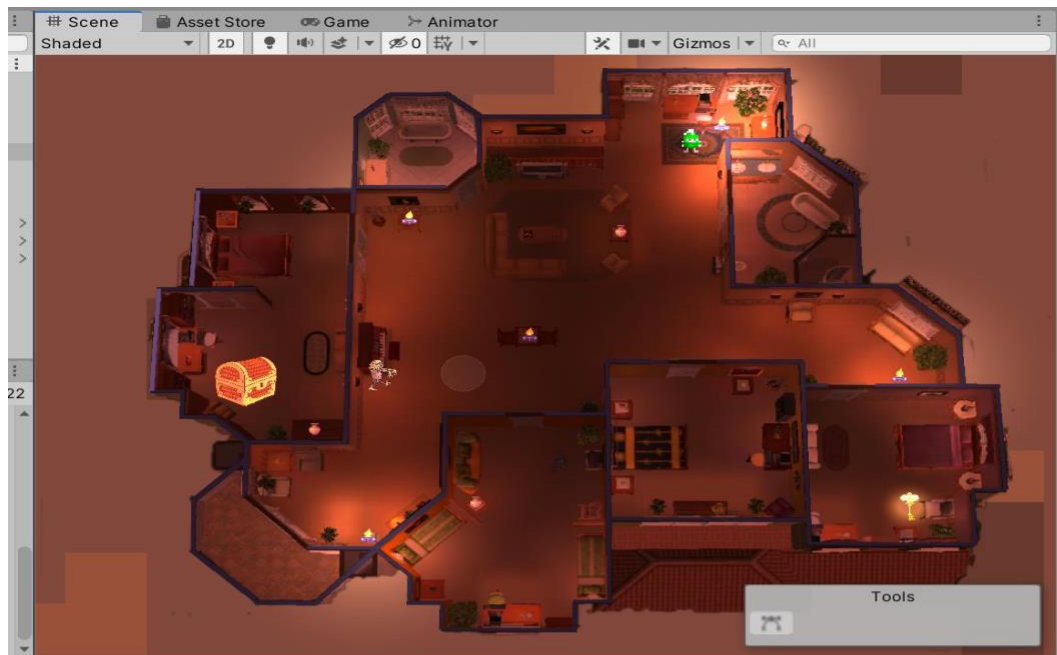

Game Objects are the fundamental objects in Unity that represent characters, props and scenery. They do not accomplish much in themselves, but they act as containers for **Components**, which implement the functionality.

To give a Game Object the properties it needs to become a light, or a tree, or a camera, you need to add components to it. Depending on what kind of object you want to create, you add different combinations of components to a Game Object.

Scenes

Scenes contain the environments and menus of your game. Scene file can be taught as a unique level. In each Scene, we place our environments, obstacles, and decorations, essentially designing and building the game in pieces.

Time Remaining: 49.50

PLAY

INSTRUCTIONS

QUIT

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THANK YOU