MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Project Report

on

Blockchain Game development

Submitted By:

Ashish Kumar Mahobia
0901CS191024

Ankit Raj Singh
0901CS191017

Faculty Mentor:
Dr. Ranjeet Kumar Singh
Assistant Professor, Computer Science and Engineering

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR - 474005 (MP) est. 1957

MAY-JUNE 2022

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Project Report

on

Blockchain Game development

A project report submitted in partial fulfilment of the requirement for the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted By:

Ashish Kumar Mahobia
0901CS191024

Ankit Raj Singh
0901CS191017

Faculty Mentor:
Dr. Ranjeet Kumar Singh
Assistant Professor, Computer Science and Engineering

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR - 474005 (MP) est. 1957

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

CERTIFICATE

This is certified that **Ashish Kumar Mahobia** (0901cs191024) has submitted the project report titled **Blockchain Game Development** under the mentorship of **Dr. Ranjeet Kumar Singh** in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in Computer Science and Engineering from Madhav Institute of Technology and Science, Gwalior.

Dr. Ranjeet Kumar Singh
Faculty Mentor
Assistant Professor
Computer Science and Engineering

Dr. Manish Dixit
Professor and Head,
Computer Science and Engineering

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

CERTIFICATE

This is certified that **Ankit Raj Singh** (0901cs191017) has submitted the project report titled **Blockchain Game Development** under the mentorship of **Dr. Ranjeet Kumar Singh** in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in Computer Science and Engineering from Madhav Institute of Technology and Science, Gwalior.

Dr. Ranjeet Kumar Singh
Faculty Mentor
Assistant Professor
Computer Science and Engineering

Dr. Manish Dixit
Professor and Head,
Computer Science and Engineering

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

DECLARATION

I hereby declare that the work being presented in this project report, for the partial fulfilment of requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering at Madhav Institute of Technology & Science, Gwalior is an authenticated and record of my work under the mentorship of **Dr. Ranjeet Kumar Singh, Assistant Professor, Computer Science and Engineering.**

I declare that I have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.

Ashish Kumar Mahobia
0901CS191024
3rd Year,
Computer Science and Engineering

Ankit Raj Singh
0901CS191017
3rd Year,
Computer Science and Engineering

ABSTRACT

Web3.0 is an unstoppable force that continues to completely change the game.

From multiple industries and one major industry that's a victim of this disruption is gaming we've seen a ton of crypto games explode onto this scene in the past year it's one of the fastest growing ecosystem in crypto.

Blockchain technology, such as cryptocurrencies and NFTs, are potential monetization routes for video games. Many live-service games offer in-game customization options, such as character skins or other in-game items, which the players can earn and trade with other players using in-game currency. Some games also allow for trading of virtual items using real-world currency, but this may be illegal in some countries where video games are seen as akin to gambling. This has led to gray market issues such as skin gambling, and so publishers typically have shied away from allowing players to earn real-world funds from games. Blockchain games typically allow players to trade in-game items for cryptocurrency, which can then be exchanged for money, which sidesteps problems associated with gray markets due to blockchain's accountability.

.

सार

Web3.0 एक अजेय बल है जो खेल को पूरी तरह से बदलना जारी रखता है
कई उद्योगों से और एक प्रमुख उद्योग जो इस व्यवधान का शिकार है, वह है गेमिंग हमने पिछले एक साल में इस दृश्य पर एक टन क्रिप्टो गेम का विस्फोट देखा है, यह क्रिप्टो में सबसे तेजी से बढ़ते पारिस्थितिकी तंत्र में से एक है।

ब्लॉकचेन तकनीक, जैसे कि क्रिप्टोकरेंसी और एनएफटी, वीडियो गेम के लिए संभावित मुद्रीकरण मार्ग हैं। कई लाइव-सर्विस गेम इन-गेम अनुकूलन विकल्प प्रदान करते हैं, जैसे कि चरित्र की खाल या अन्य इन-गेम आइटम, जो खिलाड़ी इन-गेम मुद्रा का उपयोग करके अन्य खिलाड़ियों के साथ कमा सकते हैं और व्यापार कर सकते हैं। कुछ गेम वास्तविक दुनिया की मुद्रा का उपयोग करके आभासी वस्तुओं के व्यापार की अनुमति देते हैं, लेकिन कुछ देशों में यह अवैध हो सकता है जहां वीडियो गेम को जुए के समान देखा जाता है।

इसने धूसर बाजार के मुद्दों को जन्म दिया है जैसे कि त्वचा जुआ, और इसलिए प्रकाशक आमतौर पर खिलाड़ियों को खेलों से वास्तविक दुनिया के धन अर्जित करने की अनुमति देने से कतराते हैं। ब्लॉकचेन गेम आम तौर पर खिलाड़ियों को क्रिप्टोकरेंसी के लिए इन-गेम आइटम का व्यापार करने की अनुमति देता है, जिसे बाद में पैसे के लिए एक्सचेंज किया जा सकता है, जो ब्लॉकचेन की जवाबदेही के कारण ग्रे मार्केट से जुड़ी समस्याओं को दूर करता है।

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Project Overview

We create an entire blockchain game this game will be a Runner game where you can collect NFT's and redeem them on the blockchain so you on real NFT's by playing this game on the blockchain.
To start playing this game you just have to press a key and then this person is running where you should avoid the obstacles and while running you can collect these
We'll build this game using HTML, CSS and JavaScript and this is where it
show your total score and later after you finish playing the game you can collect your metamask and claim your token in your NFT's on the blockchain.

A lot of games based on blockchain gaming are called *crypto-something*, *Bitcoin-something*, etc.
This is because the main selling point for these games is the possibility of earning cryptocurrency.
In blockchain games, cryptocurrencies are used for in-platform payments. In them, players own in-game assets that they can exchange for cryptocurrency and real-life money.
NFTs are a bit more difficult to understand.
A non-fungible token is a unique data unit stored on a blockchain. The term "non-fungible" means that it's unique and cannot be replaced.
For example, a Bitcoin and a dollar bill are fungible.

You can trade a dollar for another dollar with someone, and you'll both have an equally valuable thing. However, if you trade NFTs, the situation is different because their values differ.
NFTs can come in different forms. For example, digital images, music, cards, skins, etc. They represent any type of digital asset ownership.
In blockchain games, players can earn or purchase NFTs. Once they do this, this asset is all theirs, and it has its own in-game value. From the moment they receive an NFT reward, players gain **full** ownership of these assets.
NFT assets are not only valuable in-game but also in external marketplaces where they can be traded or sold.

1.2 History

In 2017, this online game revolutionized the gaming world. CryptoKitties was the first widely recognized blockchain game. In it, players could own, breed, and exchange kitties, the only asset in the game. This game falls into the pay-to-earn category. In order to even join the game, players first needed to purchase the Ethereum cryptocurrency.

Once they had this currency, players could buy themselves a virtual pet that is actually an NFT. The pets were available for sale in virtual auctions filled with offers from other players.

Every pet carried its own number and different DNA attributes. Each of them was 100% unique and 100% owned by the player who has it. To increase their value, players could breed their pets with others. This would create new offspring with mixed DNAs and a brand new NFT to auction. The rarer their attributes were, the more value they would hold.

Basically, these virtual cats were static images that could be purchased, bred, and sold. The game itself had no other goal. During the time the game was popular, some of these NFTs reached crazy values. In fact, one of the kitties was sold for $172,000 (Cnet). Thanks to this transaction, this game made headlines.

1.3 Web3

Web3 (also known as Web 3.0 and sometimes stylized as web3) is an idea for a new iteration of the World Wide Web based on blockchain technology, which incorporates concepts such as decentralization and token-based economics. Some technologists and journalists have contrasted it with Web 2.0, wherein they say data and content are centralized in a small group of companies sometimes referred to as "Big Tech".The term "Web3" was coined in 2014 by Ethereum co-founder Gavin Wood, and the idea gained interest in 2021 from cryptocurrency enthusiasts, large technology companies, and venture capital firms.

Some experts argue that Web3 will provide increased data security, scalability, and privacy for users and combat the influence of large technology companies. Others have raised concerns about a decentralized web, citing the potential for low moderation and the proliferation of harmful content, the centralization of wealth to a small group of investors and individuals,[10] or a loss of privacy due to more expansive data collection. Others, such as Elon Musk and Jack Dorsey, have argued that Web3 only currently serves as a buzzword.

CHAPTER 2. DEFINTIONS

2.1 Blockchain

is a decentralised network of computer all over the world and these computer are called Nodes and you can even your own node and help to secure the network so the blockchain is decentralised and there is a copy of blockchain data store on the blockchain on all of these nodes.
Which mean that you can not delete data because the block and the blockchain is immutable and will develop game as website but will store other rewards such as token and NFT's

One key difference between a typical database and a blockchain is how the data is structured. A blockchain collects information together in groups, known as blocks that hold sets of information. Blocks have certain storage capacities and, when filled, are closed and linked to the previously filled block, forming a chain of data known as the blockchain. All new information that follows that freshly added block is compiled into a newly formed block that will then also be added to the chain once filled.
A database usually structures its data into tables, whereas a blockchain, like its name implies, structures its data into chunks (blocks) that are strung together. This data structure inherently makes an irreversible timeline of data when implemented in a decentralized nature. When a block is filled, it is set in stone and becomes a part of this timeline. Each block in the chain is given an exact time stamp when it is added to the chain.

2.2 What are Token?

Token are digital assets on the blockchain that you can create an transits between address and this is different from cryptocurrency,
Cryptocurrency are basically the native token on the blockchain that was created when the blockchain was created itself so,
Example: On the ethereum blockchain the native token is either and we'll create our own token for our game and will deploy it on the blockchain and this is what we will use to reward the player.

2.3 What are NFT's?

NFT's are similar to token because there are also digital assets on the blockchain but instead of digital money like tokens are NFT's are unique.

At a very high level, most NFTs are part of the Ethereum blockchain. Ethereum is a cryptocurrency, like bitcoin or dogecoin, but its blockchain also supports these NFTs, which store extra information that makes them work differently from, say, an ETH coin. It is worth noting that other blockchains can implement their own versions of NFTs.

CHAPTER 3: Diagrams

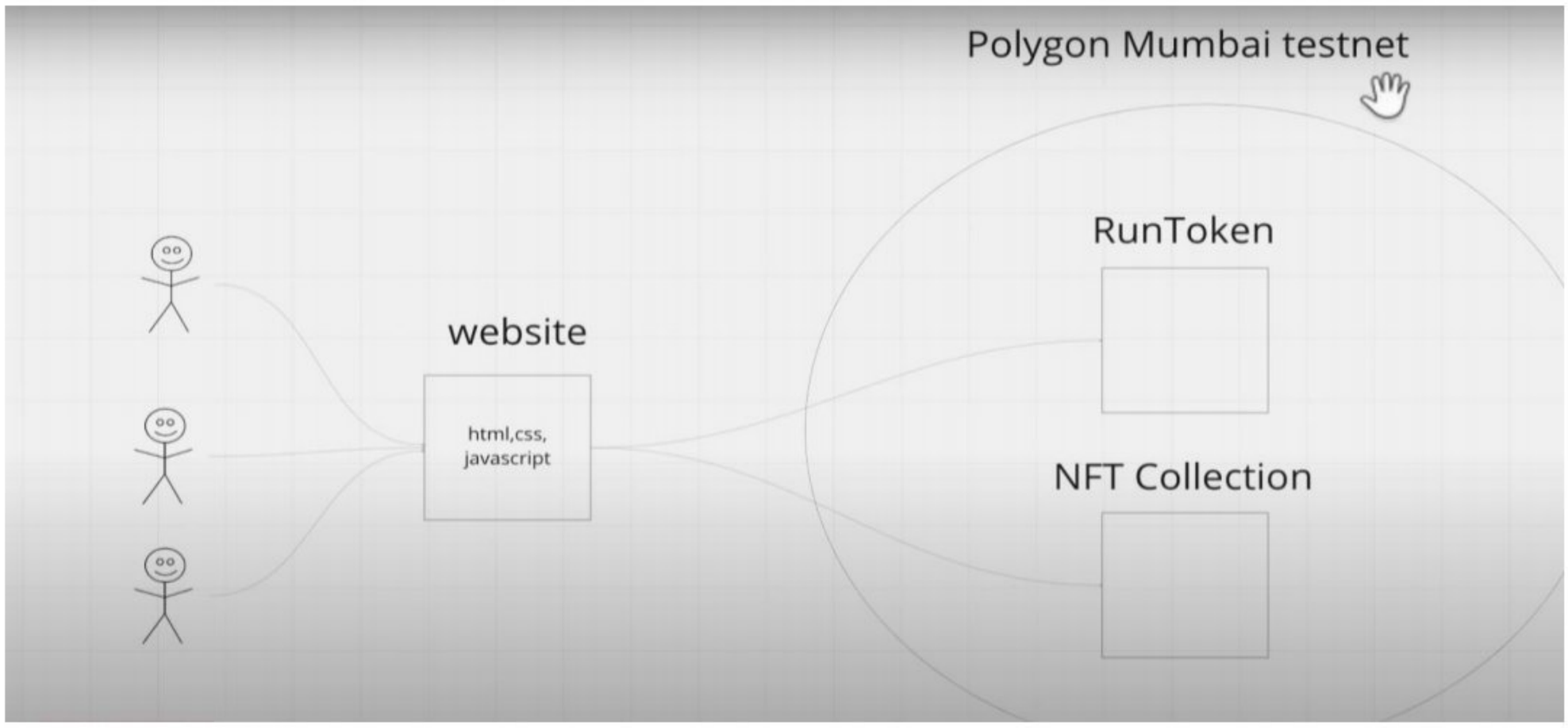

Fig 3.1 Block Overview

2. INTERFACE OF THE GAME:

Fig 3.2 Landing page of the game

FRONT-END HTML CODE:

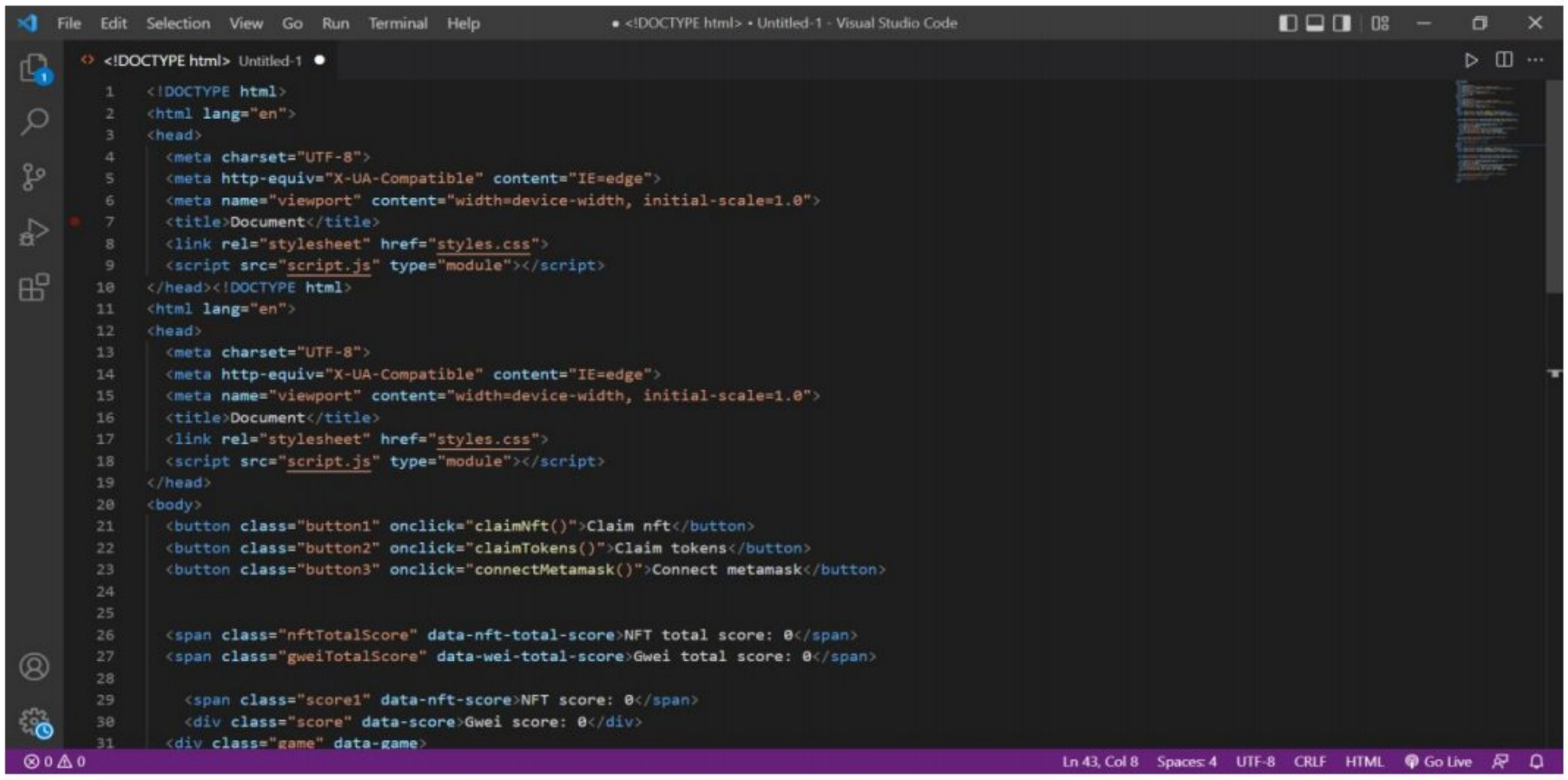

Fig 3.3 Front end html

CSS STYLE SHEET:

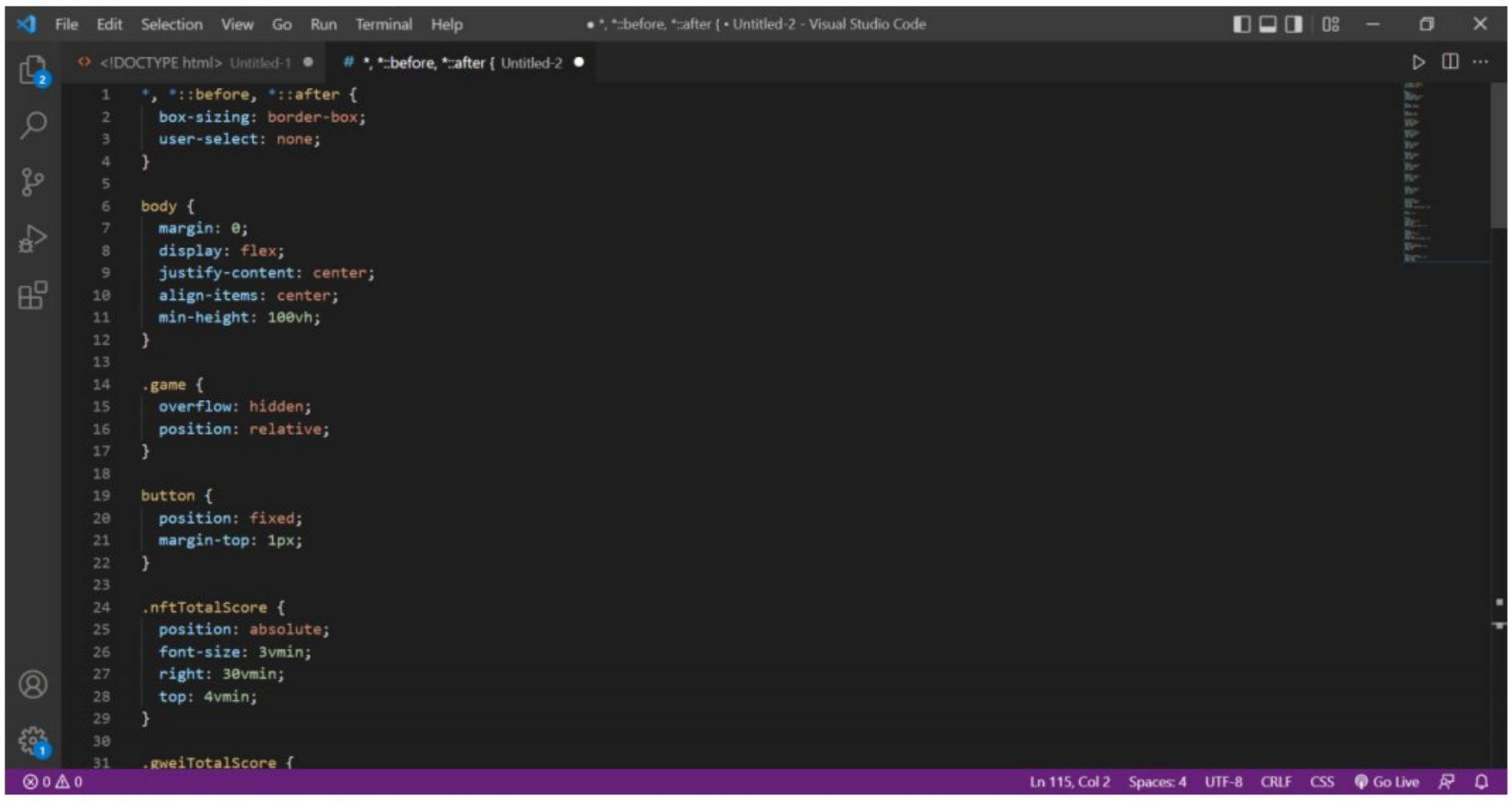

Fig 3.4 Css Style sheet

JAVASCRIPT CODE:

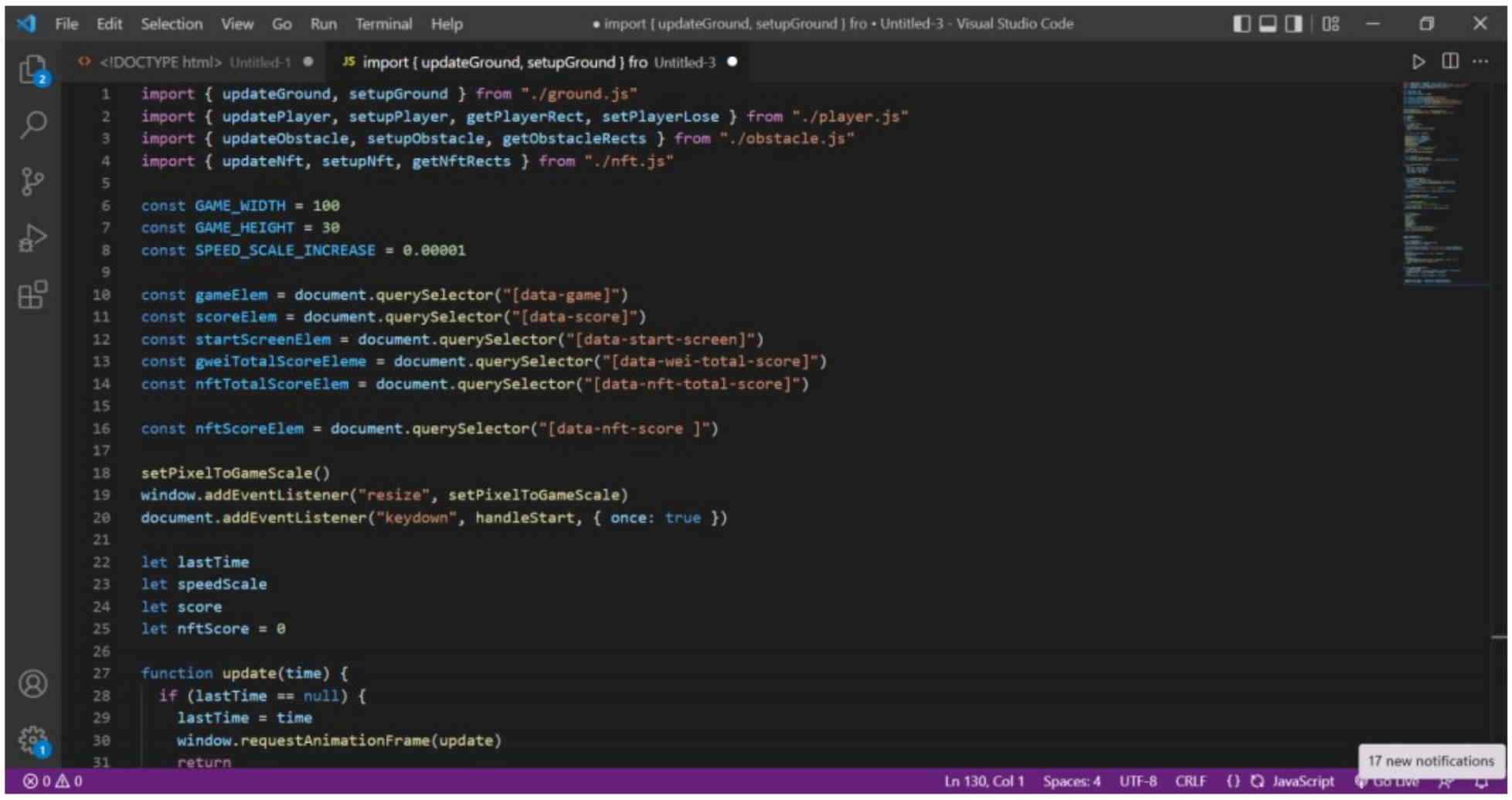

Fig 3.5: JavaScript Code

CHAPTER 4: INTERACTION WITH REAL WORLD APPLICATION

4.1 How are Blockchain Games different from Regular Games?

Blockchain games are different from regular games because on the blockchain game the in-game items you get are stored on a central server instead of decentralized network like the blockchain is and because it's stored on a central server, it means that the company who created the game like PUBG can block your access to in-game access and delete your account.
But in blockchain games you own the in-game item because they are stored on the blockchain and the blockchain is censorship resistant which means no one can block access to your items and also because the items are stored on the blockchain.

4.2 What is the point of blockchain games?

Blockchain gaming **gives players complete control over the digital assets they earn or gain through their participation in the games**. Even if players pay real money for their digital assets in traditional games, they will lose access to them if the server is ever turned down.

Are blockchain games worth it?

They can be, but most are likely to have you losing money get sucked into those micro-transaction powered pay to win models. Luckily the difference here is that you can make money too. So, in some cases, it's more like invest to win and profit, rather than pay to win.

4.3 How do blockchain games make money?

When a player signs up to play on a crypto gaming platform, they are required to pay a transaction fee for purchasing in-game digital currency. That's primarily how game developers earn money. When more players purchase the native token, its value goes up, thus benefiting both players and developers.

CHAPTER 5: Technology Stack & Dependencies

- **Solidity (Writing smart Contract)**

Solidity is an object-oriented, high-level language for implementing smart contracts. Smart contracts are programs which govern the behaviour of accounts within the Ethereum state. Solidity is a curly-bracket language designed to target the Ethereum Virtual Machine (EVM). It is influenced by C++, Python and JavaScript. You can find more details about which languages Solidity has been inspired by in the language influences section. Solidity is statically typed supports inheritance, libraries and complex user-defined types among other features.

With Solidity you can create contracts for uses such as voting, crowdfunding, blind auctions, and multi-signature wallets. When deploying contracts, you should use the latest released version of Solidity. Apart from exceptional cases, only the latest version receives security fixes. Furthermore, breaking changes as well as new features are introduced regularly. We currently use a 0.y.z version number to indicate this fast pace of change.

- **Infura**

  Infura allows users to connect to the Ethereum network without having to run a full node. This allows Dapp developers to focus wholly on building without worrying about onde maintenance. Infura offers tools, documentation, and API key as well as distributed IPFS storage.

- **NodeJS** To install Dependencies
- **Hardhat** Ethereum development environment
- **Ethers.js** To interact with the blockchain

CHAPTER 6: CONCLUSION

Let's get a high level overview of how our game will work we have our users that want to play the game we will create a website for the users to interact with using html css and javascript and this website is where you can play the game.
But after you've finished playing the game you have collected NFT's and you have some score and you want to get the rewards we'll use the smart contract that will deploy on the blockchain for that we'll create a run token contract this is the token that will reward our users based on their running score.

And will deploy an NFT collection that we' re going to reward our users and these smart contracts are going to be deployed on the Polygon Mumbai Test-net.
And this testnet is very similar to real blockchain but it uses fake ethereum and is created for development purposes.

For this project the technologies we're going to use and dependencies are:
1. Solidity : It is a programming language that we're going to use to create our smart contract on the blockchain our NFT and our Token smart contract and this is a programming language specifically designed to implement Smart Contract.
2. And then we're going to develop our game, In the browser using html this is the language to develop the structure of our website css to style our website and we're going to use javascript to for the website interaction.

We're going to deploy our smart contract on a public testnet and public testnet is the closest thing we have to real blockchain but this testnet is created only for testing purposes.
To connect to these test nets you have to have a node because the blockchain or the testnet is just a network of computers and

Instead of running our own node we're going to use infura as the node provider so infura will create a node for us then we have to have node.js installed in npm to install all the dependencies we're going to use and we'll use hardhat as our ethereum development environment.
c
Hardhat basically has all the tools you need to develop, debug test and deploy smart contract and we'll use ether.js to interact with the blockchain so after creating the website and deploying the smart contract on the blockchain we need a way — for the website to talk to the smart contract and rewards the player NFT's and for this interaction we're going to use
Ether.js : this is a javascript library that allows our front to talk to the blockchain and our smart contract.

REFRENCES:

1. Clark, Mitchell (15 October 2021). "Valve bans blockchain games and NFTs on Steam, Epic will try to make it work". The Verge. Retrieved 8 November 2021.

2. ^ Jump up to: [a b c d] Mozuch, Mo (April 29, 2021). "Blockchain Games Twist The Fundamentals Of Online Gaming". Inverse. Retrieved November 4, 2021.

3. ^ "Internet firms try their luck at blockchain games". Asia Times. 22 February 2018. Retrieved 2018-02-28.

4. ^ Evelyn Cheng (6 December 2017). "Meet CryptoKitties, the $100,000 digital beanie babies epitomizing the cryptocurrency mania". CNBC. Archived from the original on 20 November 2018. Retrieved 2018-02-28.

5. ^ Laignee Barron (13 February 2018). "CryptoKitties is Going Mobile. Can Ethereum Handle the Traffic?". Fortune. Archived from the original on 28 October 2018. Retrieved 2018-09-30.