**Full Stack NFT Marketplace**

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Date: [date of final presentation]

**Final Approval**

This is to certify that we have read the report submitted by ***Muhammad Afzaal Hameed (23733), Usman Ayyub (27952), Mussab Saeed (27660)***for the partial fulfillment of the requirements for the degree of the Bachelors of Science in Computer Science (BSCS). It is our judgment that this report is of sufficient standard to warrant its acceptance by Riphah International University, Islamabad for the degree of Bachelors of Science in Computer Science (BSCS).

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**Declaration**

We hereby declare that this document “**Full Stack NFT Marketplace**” neither as a whole nor as a part has been copied out from any source. It is further declared that we have done this project with the accompanied report entirely on the basis of our personal efforts, under the proficient guidance of our teachers especially our supervisor **Mr. Tajamul Shahzad**. If any part of the system is proved to be copied out from any source or found to be reproduction of any project from anywhere else, we shall stand by the consequences.

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**Dedication**

Our final year project is dedicated to our parents, friends and teachers, whose love and support have been our pillars of strength. To our professors and especially supervisor

"**Mr. Tajamul Shahzad**", your guidance has shaped our academic journey.

**Acknowledgement**

First of all we are obliged to Allah Almighty the Merciful, the Beneficent and the source of all Knowledge, for granting us the courage and knowledge to complete this Project.

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Furthermore, we want to say a big thank you to our family and friends. They have been our constant source of support and motivation, always encouraging us to do our best and be honest and hardworking.

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**Abstract**

The project, titled **“The Full Stack NFT (Non-Fungible Token) Marketplace”** aims to create a comprehensive platform for trading digital assets, offering a seamless experience for creators and collectors alike. Built on a foundation of **Next.js, Solidity, Hardhat, Node.js, and MetaMask,** the marketplace provides a robust ecosystem for minting, buying, and selling NFTs. The platform prioritizes security, scalability, and user-friendliness, ensuring that users can confidently engage with the marketplace. Through innovative features and a focus on emerging blockchain technologies, the project seeks to revolutionize the way digital assets are traded, opening up new avenues for creators to monetize their work and for collectors to discover and acquire unique pieces. With a commitment to excellence and a vision for the future of digital asset trading, the Full Stack NFT Marketplace project represents a significant step forward in the evolution of blockchain-based marketplaces.

**Chapter 1:**

**Introduction**

Non-fungible tokens (NFTs), a product of blockchain technology, have totally changed the way that ownership was predicted in the digital realm. NFTs are clear digital assets that substitute for the ownership of a specific device or work of material, along with music, art, collectibles, and more. As they are kept on a blockchain, their ownership history, scarcity, and legitimacy are insured.

We are designing a "Full Stack NFT Marketplace" include in our Final Year Project (FYP) which will further utilize in blockchain technology to make it simple to create, purchase, and sell NFTs. With the help of this marketplace, artists will be able to mint their digital works as NFTs and market and sell their masterpieces to a worldwide audience of collectors and enthusiasts.

Various kinds of technologies, including Next.js for the front end, Solidity for building smart settelments, Hardhat for Ethereum development, Node.js for backend development, and MetaMask for wallet integration, will be used in the building of the marketplace. With the use of these technologies, we will be able to develop an NFT platform that is secured, inflatable, and simple to use for both manufacturer and purchaser.

With the help of this project, we desired to examine how NFTs might convert digital ownership and give a platform that facilitate workers to review their work in advanced and modern ways.

# 1.1 Opportunity & Stakeholders

# 1.1.1 Opportunity

* **Emerging Market:** It is a greater chance for new marketplaces to enter and take market share as the NFT market is boosting rapidly.
* **Income Generation for Creators:** By presenting their works as distinct digital assets, NFTs provide creators a unique method to review their all the digital creations like videos, art, and music.
* **Worldwide Reach:** Together with the global audience of experts and collectors, NFT marketplaces allow them to extend the base of prospective purchaser.
* **Secondary Sales Revenue:** After the initial sale, creators can keep up to generate money by receiving royalties from subsequent sales of their NFTs.
* **Digital Collectibles:** NFTs can be used to produce and exchange digital collectibles, creating new avenues for the entertainment and gaming sectors.
* **Provenance and Authenticity:** By guaranteeing the provenance and authenticity of NFTs, blockchain technology allays ownership and copyright worries.
* **Community Building:** By encouraging a sense of cooperation and belonging among artists and collectors, NFT marketplaces can help to develop a sense of community.
* **Cross-Platform Integration:** By integrating NFTs into different apps and platforms, user engagement and value proposition are improved.
* **Brand Engagement:** By producing limited-edition digital goods, brands can use NFTs to interact with their audience in fresh and creative ways.
* **Educational Opportunities:** To analyze various new models of distribution and digital ownership, NFT give educational academies with abundant of opportunities.

# 1.1.2 Stakeholders:

* **Artists/Creators:** They mostly use your platform to promote and exchange their NFTs
* **Collectors/Buyers:** These are the operators who buy NFTs from your marketplace
* **Investors:** These are the persons who supply commercial backing for the project’s growth and development.
* **Developers:** The team of developers are responsible for constructing and supporting the platform
* **Blockchain Network:** The Solana and Ethereum are some basic blockchain technology that works on your marketplace.
* **Security Auditors:** They work on the security of platforms such as identification and addressing potential vulnerabilities
* **Regulators:** The rules and regulations of government must be apply, depends on the place and characteristics of marketplace

# 1.2 Motivations and Challenges

# 1.2.1 Motivations

* **Innovation:** Designing the full stack marketplace of NFT enables you to provide the improvement and transformation of ecosystem of NFT.
* **Opportunity:** NFT offering a special chance to build a prosperous marketplace therefore it gained a outstanding reputation
* **Monetization:** A famous outstanding NFT marketplace can produce revenues with the help of partnerships, premium services, and transaction fees.
* **Community Building:** Different platforms are provided for creators, collectors and artists to link, coordinate, and create a community around collectibles and digital art.
* **Learning Experience:** Operating a cutting edge technologies and vast experience in Web development, and blockchain are required to developed a full stack NFT marketplace

# 1.2.2 Challenges

* **Competition:** The marketplace of NFT is ruthless, which need a high competitive marketing scheme and distinctive aspects
* **Regulatory Uncertainty:** Digital assets and crypto currency are demanding in market which needs an expert person to work. It navigate the regulate view around NFTs
* **Scalability:** For long term success, marketplace must handle a huge number of transactions and customers
* **Security:** For the protection of platforms, digital assets, customer data, from hackers, a strong security measures must be implemented
* **User Adoption:** It is challenging to educate a new customers about advantage of marketplace and digital ownership

# 1.3 Goals and Objectives

# 1.3.1 Goals

* Build a customer friendly platforms for selling and purchasing NFTs
* Confirm the safe transactions by using blockchain technology
* Issue a broad area of NFT group for the customers to explore
* Apply a filter system and strong search for comfortable browsing
* Build coordination with creators and experts to encourage the platform
* Allow customers to design and organize the contributions of NFT
* Must give the access to retailers for checking their NFTs performance
* Provide a smooth incorporation with famous wallets of cryptocurrency
* Apply a receptive draft for greatest customer experience over devices
* Make sure the acceptance with official and regulatory demands linked with NFTs

# 1.3.2 Objectives

* Build a front end interface for buying and browsing NFTs
* Apply unique agreements on the blockchain to control the transactions of NFTs
* Develop a customer verification system for accurate registration and login
* Integrate payment channels for cryptocurrencies to purchase NFTs
* Develop a back end system to control customer account and transactions
* Apply the filter and search utility for NFTs postings
* Provide a dashboard where consumers may oversee their transactions and NFT collections.
* Conduct extensive testing on the platform to guarantee security and functionality.
* Improve the platform for better performance and scalability
* Develop a marketing initiative to publicize the platform and engage the users

# 1.4 Solution Overview

"**The full stack NFT marketplace** project aims to create a decentralized platform for trading non-fungible tokens (NFTs), providing users with a secure and efficient way to buy, sell, and trade digital assets. The project will be built using **Next.js** for the frontend, providing a modern and responsive user interface. The backend will be developed using **Node.js**, which will handle the business logic, database operations, and communication with the **Ethereum** blockchain. **Solidity** will be used for smart contract development on the Ethereum blockchain, ensuring the security and integrity of transactions. **MetaMask** will be integrated for user wallet management and transaction processing, enabling users to securely interact with the marketplace. The project will also implement features such as user authentication, NFT listing and browsing, bidding and auction functionality, as well as transaction history tracking. Overall, the full stack NFT marketplace aims to provide a seamless and intuitive platform for NFT enthusiasts to engage in the growing digital collectibles market."

**1.5 Report Outline**

**1.5.1 Introduction**

* + - Outline of NFTs and their role in automated world
    - Significance of NFT marketplaces
    - Basis and objectives of project
    1. **Technologies Used**
  + Hardhat for Ethereum development environment
  + React.js for the front end
  + MetaMask for wallet integration
  + Ethereum blockchain for NFTs
  + Node.js for the back end
  + Solidity for smart contract development
  + OpenZeppelin for smart contract libraries

1. **Marketplace Architecture**
   * Review of the architecture system
   * React.js used for Front end structure
   * Node.js used for Back end structure
   * Ethereum used for block chain incorporation
     1. **Front-End Development**
   * Plan basis and detail features
   * Accomplishment of characteristics like searching, browsing, and buying NFTs.
   * Combination with MetaMask for interaction of wallet.
     1. **Back-End Development**
   * API representation and application
   * Combination with block chain
   * Administrator user attestation and authority.
     1. **Smart Contract Development**
   * Summary of smart agreement functionality
   * Development of smart contract using Solidity
   * Incorporation of agreement with front and back end
     1. **Security**
   * Precautionary measures to stable customer data and transactions
   * Stop fraud and secure the intellectual property of rights
     1. **Testing**
   * Different tools to examine front end, back end, and smart agreements
   * Testing procedure applied
     1. **Deployment**
   * Formation activity for front end, back end, and smart agreements
   * Reflection for adaptivity and improvement of performance
     1. **Challenges and Solutions**
   * Troubles faced during formation and development
   * Results applied to defeat the challenges
     1. **Future Enhancements**
   * Collaboration with other blockchain tools
   * Ability for advancement of the marketplace
     1. **Conclusion**
   * Overview of the plan and its procurement
   * Knowledge and understanding gained from the formation of NFT marketplace
     1. **References**
   * List of various tools, resources and libraries used in the project

**Chapter 2**

**Literature / Market Survey**

**2.1 Introduction**

The advent of blockchain technology has sparked the development of Non-Fungible Tokens (NFTs) in recent years, revolutionizing the field of digital asset ownership and management. NFT markets are online venues that make it easier to trade and exchange these exclusive digital goods. A survey of the literature and an overview of the technology in this field include an investigation of blockchain protocols like Ethereum, which support the development and transactions of NFTs, as well as smart contract frameworks like Solidity for business logic implementation. Furthermore, web development frameworks like Vue.js or React.js, when combined with Node.js for backend functionality, are essential for building strong server-side infrastructure and user-friendly interfaces. Further improving the stability and functioning of these marketplaces within the dynamic NFT ecosystem are the incorporation of decentralized finance (DeFi) protocols for safe transactions and storage, as well as IPFS or other comparable decentralized storage solutions for content hosting.

**2.1 Literature Review/Technologies Overview**

Non-fungible tokens (NFTs) are a revolutionary development in the quickly developing field of blockchain technology. They allow for the digital depiction of distinctive assets and completely alter ideas about provenance and ownership. A examination of the literature indicates that NFTs are becoming more and more popular in a variety of industries, such as art, gaming, and collectibles. Talks about how these technologies may affect copyright, authenticity verification, and applications related to decentralized finance (DeFi) are particularly noteworthy. Developing a full-stack NFT marketplace requires a thorough understanding of critical technologies, which must come first. A dynamic and user-friendly interface is ensured by using frontend frameworks like Next.js and React.js, while the backend is powered by Node.js for scalability and reliable operation. Solidity makes it easier to create smart contracts, while resources like Hardhat offer a more efficient Ethereum development environment. While using libraries like OpenZeppelin guarantees the dependability and security of smart contracts, integration with cryptocurrency wallets like MetaMask improves user accessibility and security. This technological synthesis makes it possible to build a unified and effective platform for the smooth exchange of digital assets within the developing NFT ecosystem.

**2.3 Summary**

Your full-stack NFT marketplace project's literature research and market survey provide a dynamic and quickly changing scene, driven by the growing acceptance of NFTs across a range of industries. Regarded as a groundbreaking technology, NFTs provide digital asset owners with decentralized ownership and authenticity verification. The project has selected Next.js, Solidity, Hardhat, Node.js, MetaMask, OpenZeppelin, and React.js as key technologies. These were selected based on their compatibility and capacity to produce a smooth user experience. Competitor study demonstrates the significance of user-friendly interfaces and strong smart contract architecture by highlighting well-known platforms such as Foundation, Rarible, and OpenSea. Focus on specialty markets or distinctive value propositions to set your marketplace apart, and keep abreast of new trends and legal changes to encourage adoption and preserve your position as a leader in the NFT marketplace ecosystem.

**Chapter 3**

**Requirement Engineering**

**3.1 Introduction**

For an NFT marketplace, requirement engineering is a thorough process of determining, recording, verifying, and overseeing the requirements that specify the capabilities, limitations, and performance of the system. The first step in this process is to interact with stakeholders—such as artists, collectors, investors, and platform operators—to learn about their requirements and expectations. A wide range of elements, including the development of NFTs, token standards, smart contract functionality, marketplace user interfaces, search and discovery systems, payment gateways, and security measures, may be included in these requirements. Scalability, compatibility with other blockchains, regulatory compliance, and data protection concerns must also be taken into account. Flexibility and adaptability are critical in the continuously evolving NFT arena, necessitating a detailed examination of market trends and user input. To provide as the basis for the development process, needs must be obtained, prioritized, verified, and clearly and concisely documented. An NFT marketplace's requirement engineering is an iterative process that makes sure the finished solution satisfies stakeholders' expectations and fits into the dynamic NFT ecosystem.

**3.2 Problem Scenarios**

**3.2.1 Security Breaches**:

* + Unapproved access to customer accounts results of stealing the NFTs or particular information
  + Smart agreements susceptibility results of manipulation of loopholes.
    1. **Scalability Issues**:

● The incapacity to manage a substantial amount of transactions during peak hours, leading to sluggish system performance or failures.   
● Difficulty in expanding the platform's user base and meeting the rising demand for NFTs.

* + 1. **User Experience Challenges**:
  + Complex transactions and confusing customer interface results of discouragement and perplexing among users
  + Unavailability of mobile upgradation, makes the customer unsuitable to approach the platforms on tablets and smart phones
    1. **Legal and Regulatory Compliance**:
  + Unreliability and uncertainty with regard to NFTs legal status and the essential management for controlling an NFT marketplace
  + Valid legal argument from ownership disputes, copyright infringement, and non compliance with financial rules
    1. **Market Manipulation and Fraud**:
  + Scheme to tackle NFT prices with the help of artificially inflating demand and fake bids
  + Faked or copied NFTs being vending on the marketplace, cheat the customer and weaken the trust in platforms
    1. **Payment and Transaction Problems**:
* Delaying and failures in payments leads to ineffective transactions and funds loss
* Insufficient support for various payment process or currencies, difficulty for users to approach in different regions
  1. **Functional Requirements**

**3.3.1 User**

|  |  |
| --- | --- |
| **ID** | **Requirements** |
| **1.1** |  |
| **1.2** |  |
| **1.3** |  |
| **1.4** |  |
| **1.5** |  |
| **1.6** |  |
| **1.7** |  |

* + 1. **Admin**

|  |  |
| --- | --- |
| **ID** | **Requirements** |
| **2.1** |  |
| **2.2** |  |
| **2.3** |  |
| **2.4** |  |
| **2.5** |  |
| **2.6** |  |
| **2.7** |  |

* + 1. **Fully Dressed Use Cases**
       1. **UC ID: UC001**

|  |  |
| --- | --- |
| **UC Name**: | **Registration of User** |
| **Primary Actor**: | New User |
| **Stakeholders and Interests**: | Users (who wants to connect with marketplace), Admin (involved in controlling new registrations) |
| **Pre-condition**: | User has approach to the registration page. |
| **Post condition**: | Successfully created User account. |
| **Success Guarantee**: | A confirmation mail must send to User for login account. |
| **Main Flow**: | * + 1. User cover the registration Page     2. User enter all the required information or data     3. User consent the registration form     4. System support the information     5. If required, system make a new user account     6. User secure a verification mail |
| **Alternative Flow**: | The system shows an error message, if the given email is already registered. |

* + - 1. **UC ID: UC002**

|  |  |
| --- | --- |
| **UC Name**: | User Login |
| **Primary Actor**: | Registered User |
| **Stakeholders and Interests**: | Users (want to access their account), Admin (Security concerns) |
| **Pre-condition**: | registered account of User. |
| **Post-condition**: | User is logged into the system. |
| **Success Guarantee**: | User is assigned to the dashboard leads to successful login |
| **Main Flow**: | * + 1. User move to the login page.     2. User gives their email and password.     3. User presents the login form.     4. System supports the credentials.     5. If correct, user is logged in and turns over to the dashboard. |
| **Alternative Flow**: | System shows an error message, if credentials are invalid. |

* + - 1. **UC ID: UC003**

|  |  |
| --- | --- |
| **UC Name:** | Generate NFT listing |
| **Primary Actor:** | Seller |
| **Stakeholders and Interests:** | Sellers, Buyers, Platform Administrators |
| **Pre-condition:** | Seller is validated and has digital resources for listing. |
| **Post-condition:** | Create NFT listing which is in view on the marketplace. |
| **Success Guarantee:** | NFT is successfully listed with correct metadata. |
| **Main Flow:** | * + 1. Retailer logs into the platform.     2. Seller starts the process to make a new NFT listing.     3. Seller uploads digital resources and Seller uploads digital asset and fill up in metadata details.     4. Seller fixes prices and other listing guidelines.     5. Seller finds out and submits the listing. |
| **Alternative Flow:** | None. |

* + - 1. **UC ID: UC004**

|  |  |
| --- | --- |
| **UC Name** | : Search NFTs |
| **Primary Actor**: | User |
| **Stakeholders and Interests**: | Users (need to search the particular NFT), Artists (Want their NFTs to be discoverable) |
| **Pre-condition**: | User is on the NFT marketplace page. |
| **Post-condition** | Specific search results are presented to User. |
| **Success Guarantee** | User observed the specific NFTs |
| **Main Flow**: | * + 1. User enters a search query.     2. System filters NFTs based on the query.     3. System shows the filtered results to the User. |
| **Alternative Flow**: | None. |

* + - 1. **UC ID: UC005**

|  |  |
| --- | --- |
| **UC Name**: | Add to Favorites |
| **Primary Actor**: | User |
| **Stakeholders and Interests**: | Users (need a bookmark NFTs), Artists (Want their NFTs to be favorite) |
| **Pre-condition**: | User is logged in and looking an NFT. |
| **Success Guarantee**: | User gets a verification of successful addition. |
| **Post-condition**: | NFT is added to the favorite list of User. |
| **Main Flow**: | * 1. User clicks on the "Add to Favorites" button.   2. System adds the NFT to the user's favorites list. |
| **Alternative Flow**: | * 1. If the NFT is already added in user’s favorite list, the system shows a message specifying the same. |

* + - 1. **UC ID: UC006**

|  |  |
| --- | --- |
| **UC Name** | Remove from Favorites |
| **Primary Actor**: | User |
| **Stakeholders and Interests** | Users (need to hide the NFT from favorites), Artists (convert their NFT into un-favorite). |
| **Pre-condition**: | User is logged in and looking their favorites list. |
| **Post-condition**: | NFT is hiding from the favorite list of User. |
| **Success Guarantee**: | User receives a confirmation of successful removal. |
| **Main Flow**: | User taps on the "Remove from Favorites" button next to an NFT.  System removes the NFT from the user's favorites list. |
| **Alternative Flow**: | * 1. If the NFT is not in the user's favorites, the system displays a message indicating the same. |

* + - 1. **UC ID: UC007**

|  |  |
| --- | --- |
| **UC Name:** | Purchase NFT |
| **Primary Actor:** | Buyer |
| **Stakeholders and Interests:** | Buyers, Sellers, Platform Administrators, Payment Processor. |
| **Pre-condition:** | Buyer is validated and has enough balance. |
| **Post-condition:** | Buyer keeps the purchased NFT. |
| **Success Guarantee:** | Buyer successfully completes the purchase transaction. |
| **Main Flow:** | * + 1. Buyer searching the marketplace and select NFT for purchase.     2. Buyer analyzes the listing details and settled the purchase.     3. Buyer chooses the payment method and finished the transactions.     4. The ownership of NFT is shifted to the buyer. |
| **Alternative Flow:** | Failure in payment, NFT already sold out. |

* + - 1. **UC ID: UC008**

|  |  |
| --- | --- |
| **UC Name:** | Browse NFT Listings |
| **Primary Actor:** | User (Buyer/Seller) |
| **Stakeholders and Interests:** | Buyers, Sellers, Platform Administrators |
| **Pre-condition:** | User is validated and on the marketplace homepage. |
| **Post-condition:** | User has looked all the available NFT listings. |
| **Success Guarantee** | User successfully cut across through listings. |
| **Main Flow:** | * + 1. User accesses the NFT marketplace.     2. User exploring through present NFT listing.     3. User look details of specific selected listings. |
| **Alternative Flow:** | None |

* + - 1. **UC ID: UC009**

|  |  |
| --- | --- |
| **UC Name:** | Manage NFT Collection |
| **Primary Actor:** | User (Buyer/Seller) |
| **Stakeholders and Interests:** | Buyers, Sellers |
| **Pre-condition:** | User is validated and has uploaded NFTs. |
| **Post-condition:** | User well ordered and control their NFT collection. |
| **Success Guarantee:** | User successfully fulfills activity on their NFTs. |
| **Main Flow:** | * + 1. User accesses their profile/dashboard.     2. User covers the collection section of NFT.     3. User arranges, improve metadata, or remove the NFT as desired. |
| **Alternative Flow:** | None. |

* + - 1. **UC ID: UC010**

|  |  |
| --- | --- |
| **UC Name**: | Update NFT Details |
| **Primary Actor**: | Artist |
| **Stakeholders and Interests**: | Artists (need to improve their NFT information), Buyers (Want correct information ) |
| **Pre-condition**: | Artist is logged in and owns the NFT. |
| **Post-condition**: | NFT details are modernized |
| **Success Guarantee**: | Updated details are displayed to users |
| **Main Flow**: | * + 1. Artist covers the improved NFT page.     2. Artist selects the NFT to update.     3. Artist improves the details (name, description, and price).     4. Artist submits the update form.     5. System upgrades the NFT details. |
| **Alternative Flow**: | * + 1. The system rejects the updates, if the artists no longer maintain the NFT. |

* + - 1. **UC ID: UC011**

|  |  |
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| **UC Name**: | Contact Us |
| **Primary Actor**: | User |
| **Stakeholders and Interests** | Users (Want to contact the supporter), Admin (Want to direct the support requests) |
| **Pre-condition**: | User is on the "Contact Us" page. |
| **Post-condition** | User's message is submitted to the support team. |
| **Success Guarantee**: | User get a verification email with a support ticket number. |
| **Main Flow**: | 1. User navigates to the "Contact Us" page. 2. User fills in the contact form with their name, email, and message. 3. User submits the contact form. 4. System validates the form data. 5. If valid, system sends a confirmation email to the user and assigns a support ticket. |
| **Alternative Flow**: | If the form data is invalid, the system displays an error message and prompts the user to correct it. |

* + - 1. **UC ID: UC012**

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| **UC Name**: | Meta Wallet Connect |
| **Primary Actor**: | User |
| **Stakeholders and Interests**: | Users (Need to join their Meta Wallet), Admin (Want to control wallet connections) |
| **Pre-condition** | User is logged in and wants to link their Meta Wallet. |
| **Post-condition**: | User's Meta Wallet is successfully linked. |
| **Success Guarantee**: | User can access Meta Wallet features on the marketplace. |
| **Main Flow**: | * + 1. User negotiates to the Meta Wallet connection page.     2. User taps on the "Connect Meta Wallet" button.     3. System produces the user access to select their Meta Wallet provider.     4. User selects their Meta Wallet provider and accepts the connection.     5. System linked with Meta Wallet of User to their marketplace account. |
| **Alternative Flow**: | * + 1. The system must show a message of cancellation, if the user cancels the link task. |

* + - 1. **UC ID: UC013**

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| **Use Case Name:** | Viewing Popular NFTs |
| **Primary Actor:** | User/Collector |
| **Stakeholders and Interests:** | User/Collector: Interested in viewing and discovering famous NFTs.  NFT Creators: Great concern in their NFTs being featured as famous, attaining more clearness and developing sales. |
| **Pre-condition:** | The user is logged into the NFT marketplace. |
| **Post-condition:** | The user has checked famous NFTs and may select to connect with or buy them. |
| **Success Guarantee:** | The user can access a list of famous NFTs and check their details and media. |
| **Main Flow** | 1. User negotiates to the “Popular NFTs” section of the marketplace. 2. System recovers a list of famous NFTs based on criteria such as views, likes, or sales volume. 3. System shows the list of famous NFTs to the user. 4. User selects a specific NFT to view its details. 5. System shows the details of specific NFT, such as title, description, media, creator, and present price. 6. User can linked with the NFT, such as view it, liking it, add it into favorite list, or buying it. |
| **Alternative Flow** | If there is no famous NFT available at that moment, the system tell the user and suggest searching other NFTs group. |

* + - 1. **UC ID: UC014**

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| **Use Case Name:** | Placing a Bid on an NFT |
| **Primary Actor:** | Collector/Buyer |
| **Stakeholders and Interests:** | Collector/Buyer: Concerned in buying NFT through bidding.  NFT Creator/Artist: Interested in accepting bids and selling their NFTs.  Marketplace Platform: Interested in fostering the bidding process. |
| **Pre-condition:** | The purchaser must register on the platform and logged in. |
| **Post-condition:** | The bid is successfully set on the NFT, and the purchaser receives a verification of bid. |
| **Success Guarantee:** | The bid is successfully put on the NFT, and the buyer can track the level of their bid. |
| **Main Flow** | 1. Purchaser navigates to the specific NFT listing and selects the option to place a bid. 2. System moves the buyer to enter their bid amount. 3. Collector/Purchaser enters the bid amount and decides the bid. 4. System records the bid and updates the bid status for the NFT listing.   NFT artist/creator is informed for the new bid. |
| **Alternative Flow** | If the amount of bid is less than that of present highest bid, the system informed the collector/purchaser that their bid was not successful and produces them to place a greater bid if needed. |

* + - 1. **UC ID: UC015**

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| **Use Case Name:** | Buying an NFT with MetaMask |
| **Primary Actor:** | Buyer/Collector |
| **Stakeholders and Interests:** | Buyer/Collector: By using MetaMask, interesting in buying NFTs safely.  Seller: Interested in selling their NFTs to buyers.  Marketplace Platform: Interested in fostering safe transactions between purchaser and sellers. |
| **Pre-condition:** | Buyer/Collector has a MetaMask wallet set up and linked to the marketplace.  The preferred NFT is listed for sale on the marketplace. |
| **Post-condition:** | The MetaMask wallet of buyer is removed with the purchase amount, and NFT is shifted to the buyer’s wallet**.** |
| **Success Guarantee:** | By using MetaMask, the buyer successfully buys the NFT, and the NFT is shifted to their wallet. |
| **Main Flow** | 1. Collector/Buyer chooses the preferred NFT for purchase. 2. System shows the buy details, including seller information and price. 3. Collector/Buyer chooses the option to purchase and confirms the purchase. 4. System makes the buyer to link their MetaMask wallet if no already linked. 5. Collector/Buyer linked their MetaMask wallet and confirms the transaction. 6. System checks the amount of purchase from the buyer’s MetaMask wallet and shifted the NFT to the buyer’s wallet.   System improves the record of owner for the NFT. |
| **Alternative Flow** | If the MetaMask wallet of purchaser is not sufficient, the system mentions the buyer to refill their wallet before go on to the purchase. |