Complete Project Description: HashForge Mod and ForgeCoin Cryptocurrency Integration 1. Overview HashForge is a comprehensive cryptocurrency mod for Minecraft, designed to introduce a real-world economic system into the game through ForgeCoin, a cryptocurrency integrated with the ForgeChain blockchain. The mod allows players to mine, trade, and manage their wealth using a secure and transparent wallet system. All interactions, from mining to trading, are recorded on the blockchain for real-world value management. New Feature: The HashForge mod includes a client version for offline play, which allows players to run their own in-house economy. When connected to the official HashForge server mod, the client syncs with the ForgeCoin blockchain, ensuring secure and real-time interaction with the global currency. Obfuscation and Security Features To prevent tampering and exploitation of the mod’s code and blockchain interactions, the following security measures will be implemented: 1. Code Obfuscation • Obfuscation will be applied to all critical mod files to prevent reverse engineering and code manipulation. This ensures that the internal workings of the mod remain protected from malicious users. 2. Secure Debugging and Logging • Logs will be kept for all critical transactions and interactions, such as mining rewards, voucher redemptions, and wallet transfers. Logging will use a rotating log system to avoid excessive memory consumption. Debug logs will be encrypted and obfuscated to prevent misuse by unauthorized players. 3. Efficient Memory Management • All security features, including logging and debugging, will be optimized to minimize memory usage on the client side. Techniques such as lazy loading, conditional debugging, and asynchronous logging will be used to ensure that performance is not impacted for end users. 4. Transaction Logging and Audits • Every interaction with the blockchain (mining, trading, voucher creation) will be logged both locally and on the server, with frequent audits performed to ensure no unauthorized access or manipulation of assets. 5. API Security • The REST API that handles communication between Minecraft and the ForgeCoin blockchain will use secure authentication methods such as OAuth or JWT, ensuring that only authorized users can access or modify blockchain data. 2. Key Features 2.1 HashForge Mod Features 1. Customizable Currency • Administrators can configure the in-game currency name and properties, ensuring that the currency reflects the community’s theme. 2. Encryption for Sensitive Data • All sensitive data (wallets, transactions, vouchers) is encrypted using RSA for public/private key encryption and AES for secure data storage. 3. Coin Circulation Limit • The system enforces a 21 billion coin limit, ensuring scarcity and preventing inflation. 4. Dynamic Mining Difficulty • Mining difficulty increases as more coins are mined, ensuring balance and rewarding early players. 5. ASIC Miner Efficiency Cap • ASIC miners have an efficiency cap of 125%. Energy input beyond this cap does not yield higher efficiency, maintaining game balance. 6. Heat Production and Environmental Interaction • The more ASIC miners grouped together, the more heat is produced. The heat affects nearby players and environments, such as causing snow to melt or plants to wilt. 7. Data-Driven Biome and Environment Interaction • Biomes, blocks, and plants affected by ASIC miner heat can be defined through data packs, allowing for customizable and scalable environmental interaction. 8. Efficient Power Demand for Higher Efficiency • Power usage is optimized to prevent memory overload while ensuring that power demands scale with the size of mining operations. 9. Scalable Blockchain Integration • ForgeChain uses Layer 2 scaling solutions to handle high transaction volumes without incurring significant fees or delays. 10. Mining Pools and Parallel Processing • Multi-threading is employed to ensure that mining pool calculations are efficient and do not consume excess resources. Logs will be kept for each transaction within mining pools for auditing purposes. 11. Unified Wallet System • Each player has a wallet linked to their Minecraft UUID, and the wallet works across HashForge (in-game currency) and ForgeCoin (real-world currency). 12. Wallet Transfer Command • Players can transfer coins using the /send <wallet> <amount> command, facilitating peer-to-peer transactions. 13. Available Coins Command • Players can view all available coins using /availablecoins or /ac, enhancing visibility of the coin ecosystem. 14. Switch Coin Command • Players can change their active mining coin using /switchcoin <coin name> or /sc <coin name>, allowing flexibility in mining operations. 15. Global Coin Registry • A centralized coin registry is maintained and updated when new coins are introduced, ensuring easy coin tracking. 16. Player Coin Selection • Players can select which coin their miners will focus on through a simple user interface. 17. Mining Pool System • Players can join or create mining pools, sharing rewards based on contributions. All transactions within mining pools are logged for auditing. 18. ForgeChain Blockchain Integration • All transactions, mining operations, and trades are recorded on the ForgeChain blockchain, ensuring transparency and security. 19. Smart Contracts for Advanced Transactions • Smart contracts automate transactions such as item leasing, recurring payments, and staking, adding depth to the player-driven economy. 20. Cheat Prevention with Blockchain Audits • Blockchain audits and hash-based verification prevent unauthorized transactions, exploits, or manipulation of game economy assets. 21. In-Game Wallet Display and Leaderboard • Players can view their wallet balance, mining statistics, and leaderboard ranking through the in-game UI. 22. Voucher System for Trading • Players can create vouchers representing specific amounts of HashForge coins, which are cryptographically signed and can be traded securely. 23. Real-Time Voucher Validation • Vouchers are validated in real-time via blockchain lookup, ensuring authenticity and preventing duplication or fraud. 24. Decentralized Marketplace • Players can trade items and services in a decentralized marketplace using smart contracts for secure transactions. 25. DeFi Mechanisms for Players • Players can participate in decentralized finance (DeFi) activities such as staking, lending, and borrowing, earning rewards through blockchain-driven mechanisms. 26. Logging and Monitoring • Every significant interaction, such as mining rewards, voucher creation, or coin transfers, is logged with encrypted and obfuscated logs to prevent tampering. 2.2 Offline Client Mod 1. Standalone Economy for Offline Play • The offline client mod allows players to run their own in-house economy independently in single-player or modded environments. The economy can be fully customized and tested without interacting with the blockchain. 2. Seamless Blockchain Integration via Server Mod • When connected to the official HashForge server mod, the offline client mod will automatically sync with the ForgeCoin blockchain, preventing unauthorized manipulation of the blockchain by third parties. 2.3 Server Mod JAR 1. HashForge Server Mod JAR • The server mod JAR ensures that only Minecraft servers with this mod can register with the blockchain. The server mod enables clients to interact securely with the blockchain, ensuring no external tampering or unauthorized manipulation. 3. Integration Between HashForge and ForgeCoin ForgeCoin is a cryptocurrency integrated with the ForgeChain blockchain, which securely records all in-game transactions such as mining, trading, and staking. The blockchain is protected by obfuscation, security checks, and frequent audits. Clients will only interact with the ForgeCoin blockchain when connected to a HashForge server mod, ensuring that all blockchain activity is protected from unauthorized manipulation. In-Depth Roadmap for Project Completion Phase 1: Core Mod Development (1-2 months) • Set up NeoForge Environment: Establish the development environment with NeoForge 1.21 and set up the project structure. • Wallet System Development: Implement wallet creation linked to players’ Minecraft UUIDs. Ensure wallets are created securely and automatically upon server join. • ASIC Miner Development: Develop the mining mechanics, including energy consumption (FE/EU), mining output, and efficiency caps. • Command Implementation: Implement the core wallet transfer and mining commands, including /send, /availablecoins, and /switchcoin. Phase 2: Blockchain and ForgeCoin Integration (2-3 months) • Create ForgeCoin: Implement ForgeCoin as a cryptocurrency token on a Layer 1 blockchain (e.g., Ethereum, Binance Smart Chain). • REST API Development: Build a REST API to handle communication between Minecraft and the blockchain for wallet updates and transaction verification. • Layer 2 Integration: Incorporate Layer 2 solutions (such as Polygon) to ensure low transaction fees and high performance for blockchain interactions. Phase 3: Advanced Features, Smart Contracts, and Obfuscation (3-4 months) • Smart Contract Integration: Develop smart contracts for advanced transactions such as staking, mining pool management, and item leasing. • Obfuscation and Security Features: Implement code obfuscation, encrypted logs, and debug logs to protect the mod from tampering and reverse engineering. • Decentralized Marketplace: Build the decentralized marketplace for item trading using smart contracts. Phase 4: Heat and Biome Data Pack Features (2-3 months) • Data Pack Integration: Develop data pack-driven systems for defining biomes, blocks, and plants that interact with ASIC heat production. • Heat and Grouping Mechanics: Implement heat mechanics where grouping ASIC miners together increases heat production. Ensure biomes and environments dynamically respond to heat output. Phase 5: Security, Server Mod, and Testing (2-3 months) • Server Mod JAR Development: Build the HashForge server mod JAR that ensures only authorized clients and servers interact with the blockchain. • Smart Contract Audits: Perform security audits on all blockchain interactions and smart contracts to ensure the system is tamper-proof. • Load Testing and Optimization: Conduct load testing to ensure the mod scales efficiently without overloading memory resources on end-user machines. Phase 6: Finalization and Public Launch (1-2 months) • In-Game UI Development: Finalize the user interface for managing wallets, viewing leaderboards, and interacting with the marketplace. • Beta Testing: Conduct closed beta testing to gather feedback and resolve any outstanding issues. • Public Launch: Release the HashForge mod and ForgeCoin integration, including full documentation, tutorials, and support. By following this roadmap, the project will be developed efficiently, ensuring robust security, obfuscation, and minimal memory usage while delivering a powerful and scalable mod experience for Minecraft players.