\Hackathon Code Challange(Hedera SDK & HashPack Wallet)

Guidelines for Students – Hedera Hackathon (4-Student Team, Open-Book)

1. Understanding the Problem Statement

- Read and analyze the problem statement carefully.
- Identify key requirements: **Hedera SDK, HashPack wallet, smart contracts, or HTS tokens.**
- Break the solution into **frontend, backend, and blockchain interactions.**

2. Setup & Development

- **Set up Hedera Testnet Account** → Use the Hedera Portal
- **Install Dependencies** → npm install @hashgraph/sdk hashconnect ethers ans others
- **Use Mirror Node API for transaction tracking** if needed
- **Integrate HashPack Wallet** for seamless user transactions

3. Debugging & Testing

- Use **console logs** for debugging transactions.
- Validate **wallet connections and smart contract interactions.**
- Test transactions using **Hedera Testnet** before finalizing.

4. Resources for Quick Reference

- **Hedera SDK Docs:** https://docs.hedera.com/
- **HashPack Wallet:** https://www.hashpack.app/
- **HTS Token Service:** https://docs.hedera.com/guides/token-service
- **Solidity & Smart Contracts:** https://soliditylang.org/

1. Decentralized Payment Splitter

Task:

Build a payment splitter that allows a user to send HBAR to multiple recipients using predefined percentage splits.

Details:

- A smart contract will distribute payments proportionally to multiple recipients based on pre-set rules.
- Users will input a total payment amount and recipient addresses with their respective percentage allocations.
- Transactions will be processed on Hedera, ensuring transparent and efficient payment splitting.
- HashPack wallet integration for seamless user experience.

2. NFT Minting & Transfer

Task:

Develop a dApp that allows users to mint, view, and transfer NFTs on Hedera using the Hedera Token Service (HTS).

Details:

- Users can mint NFTs with metadata and store them on the Hedera network.
- The dApp will allow viewing and managing NFT collections within the HashPack wallet.
- Users can transfer NFTs securely between wallet addresses.
- Hedera's consensus service ensures fast and immutable NFT transactions.

3. Hedera Smart Contract Auction

Task:

Create a smart contract auction where users can bid for an NFT or tokenized asset using HBAR payments.

Details:

- The auction smart contract will manage bid submissions, bid tracking, and auction finalization.
- Users place bids in HBAR, with the highest bidder winning the asset after a set period.
- The system ensures fair and transparent auction processing using Hedera smart contracts.
- HashPack wallet integration enables seamless bidding and asset transfer.

4. Subscription-Based Payments

Task:

Implement a subscription service where users can pay HBAR to access premium content, using time-based transactions.

Details:

- Users subscribe by making periodic HBAR payments, unlocking access to premium content.
- Smart contracts enforce access duration and manage renewals/cancellations.
- Payments are processed automatically, reducing manual interventions.
- HashPack wallet integration streamlines user onboarding and payments.

5. DAO Voting System

Task:

Develop a DAO voting dApp where HashPack wallet users can cast votes using HTS tokens representing voting power.

Details:

- Users participate in governance decisions by staking HTS tokens as votes.
- Smart contracts manage proposal creation, voting periods, and result tallying.
- Voting power is proportional to token holdings, ensuring fair decision-making.
- HashPack wallet support allows easy participation in decentralized governance.

6. Tokenized Crowdfunding Platform

Task:

Create a crowdfunding dApp where users contribute HBAR and receive reward-based NFTs upon reaching funding goals.

Details:

- Campaign creators set funding goals, deadlines, and reward tiers.
- Supporters contribute HBAR, unlocking exclusive NFTs as milestones are met.
- Smart contracts manage funds and distribute rewards transparently.
- HashPack wallet ensures seamless contributions and NFT distribution.

7. Micro-Lending Smart Contract

Task:

Design a micro-lending protocol where users can borrow and repay HBAR with interest tracked on the Hedera network.

Details:

- Lenders provide HBAR liquidity, while borrowers take loans with predefined terms.
- Smart contracts enforce repayment schedules, interest accrual, and collateral requirements.
- Loan statuses and repayment history are transparently recorded on-chain.
- HashPack wallet integration simplifies user interactions and fund management.

8. Real-Time Transaction Tracker

Task:

Build a dashboard that monitors live Hedera transactions and displays them using the Mirror Node API.

Details:

- The dashboard fetches and displays real-time transaction data from Hedera's Mirror Node.
- Users can filter transactions by account, token transfers, or contract interactions.
- A user-friendly UI provides graphical insights into network activity.
- HashPack wallet integration allows users to track their personal transactions.

9. NFT-Based Event Ticketing

Task:

Develop an NFT-based ticketing system where users buy event tickets as HTS NFTs and verify ownership.

Details:

- Event organizers mint tickets as HTS NFTs with metadata such as event details and seat numbers.
- Users purchase and store tickets in their HashPack wallet.
- At event entry, NFT ownership verification ensures secure and fraud-free access.
- Smart contracts manage ticket issuance, resale, and validity checks.

10. Peer-to-Peer Marketplace

Task:

Create a decentralized e-commerce store where users can list products, pay with HBAR, and verify transactions via smart contracts.

Details:

- Sellers list products, and buyers purchase using HBAR.
- Smart contracts handle escrow, ensuring secure transactions.
- Transaction records are stored on Hedera for transparency.
- HashPack wallet integration enables seamless payments and product transfers.

11. Token Airdrop Mechanism

Task:

Build a tool that enables HBAR or HTS token airdrops to multiple wallet addresses in one transaction.

Details:

- Users specify recipient addresses and token distribution amounts.
- A smart contract automates bulk token transfers efficiently.
- Ensures fair and gas-efficient airdrop execution on Hedera.
- HashPack wallet integration allows users to claim or verify airdrops.

12. Play-to-Earn Game Integration

Task:

Develop a simple P2E game where players earn HTS tokens or NFTs as rewards for completing challenges.

Details:

- Players complete in-game tasks to earn rewards.
- Rewards are distributed as HTS tokens or NFTs stored on Hedera.
- Smart contracts manage reward distribution and anti-cheat mechanisms.
- HashPack wallet integration enables secure storage and transactions.

13. Gasless Transactions via Smart Contracts

Task:

Create a meta-transaction system that allows users to submit transactions without paying gas fees, where a relayer covers the cost.

Details:

- Users sign transactions, which are relayed and executed by a sponsor.
- Smart contracts handle fee delegation and reimbursement.
- Improves usability by removing transaction fee barriers.
- HashPack wallet integration enables seamless signing and transaction flow.

14. Multi-Sig Wallet for Hedera

Task:

Develop a multi-signature wallet where multiple users must approve HBAR transfers before execution.

Details:

- Transactions require approval from a predefined number of signers.
- Smart contracts enforce multi-sig rules for added security.
- Enhances treasury management for DAOs and enterprises.
- HashPack wallet integration allows users to sign and track approvals.

15. Token Swap (DEX Prototype)

Task:

Build a basic token swap mechanism allowing users to swap between HTS tokens using smart contracts.

Details:

- Users can exchange one HTS token for another via liquidity pools.
- Smart contracts manage price determination and transaction execution.
- Enhances DeFi capabilities on the Hedera network.
- HashPack wallet integration ensures smooth token swaps.

16. Reputation System with Token Rewards

Task:

Create a reputation system where users earn HTS tokens for completing specific actions, such as contributing to a forum.

Details:

- Users gain reputation points by performing valuable actions (e.g., posting, reviewing).
- Smart contracts convert reputation points into HTS token rewards.
- Ensures a transparent and decentralized reputation economy.
- HashPack wallet integration allows users to track and redeem rewards.

17. Hedera-Based Supply Chain Tracking

Task:

Develop a supply chain tracker where product movements are recorded on the Hedera ledger via smart contracts.

Details:

- A smart contract records each stage of the supply chain, ensuring transparency and authenticity.
- Manufacturers, distributors, and retailers update product status on the Hedera ledger.

- Users can verify product history and authenticity using a decentralized tracking system.
- HashPack wallet integration allows stakeholders to interact with the supply chain records securely.

18. Charity Donation Platform

Task:

Create a decentralized charity platform where donations in HBAR are publicly tracked on-chain.

Details:

- Smart contracts handle donation collection and distribution, ensuring transparency.
- Donors can track where their funds go using Hedera's immutable ledger.
- Charities can set up donation goals and milestones for accountability.
- HashPack wallet integration simplifies HBAR donations and fund management.

19. NFT Staking for Passive Rewards

Task:

Develop a staking platform where users can stake their NFTs and receive HTS tokens as rewards.

Details:

- Users lock their NFTs in a staking contract to earn passive HTS token rewards.
- Smart contracts calculate rewards based on staking duration and NFT attributes.
- The system supports multiple NFT collections with different reward mechanisms.
- HashPack wallet integration enables seamless NFT staking and reward withdrawals.

20. Gasless Voting System

Task:

Implement a gasless voting system where users vote on governance proposals using a smart contract without paying fees.

Details:

- Votes are cast using HTS tokens or specific governance tokens without requiring gas fees.
- A smart contract tallies votes securely and transparently on Hedera.
- Off-chain relayers or sponsored transactions ensure gasless voting.
- HashPack wallet integration enables users to participate in governance effortlessly.

21. Private Transactions on Hedera

Task:

Design a privacy-focused transaction system where sender and receiver details are hashed before being stored on-chain.

Details:

- Transactions are obfuscated using cryptographic hashing before being recorded on Hedera.
- Only authorized parties can decrypt and verify transaction details.
- Zero-knowledge proofs (ZKPs) or similar techniques ensure privacy.
- HashPack wallet integration enables secure and private transactions.

22. NFT Fractionalization & Ownership

Task:

Create a system where NFTs are fractionalized into multiple HTS tokens, allowing multiple users to co-own an NFT.

Details:

- A smart contract splits NFT ownership into multiple HTS tokens, representing fractional shares.
- Owners can trade, transfer, or redeem fractions for full NFT ownership.
- The system supports governance mechanisms for co-owners to make decisions.
- HashPack wallet integration allows users to manage their fractionalized assets easily.

23. Decentralized Certificate Issuance

Task:
Develop a platform where organizations can issue certificates as NFTs on Hedera.

Details:

- Institutions mint certificates as NFTs with metadata (e.g., course name, student details).c
- Employers and institutions can verify certificate authenticity on-chain.
- Users store and share certificates through their HashPack wallet.

24. Multi-Tenant Tokenized Reward System

Task:
Develop a multi-tenant rewards program where businesses can issue loyalty tokens using HTS.

Details:

- Businesses can create custom loyalty tokens for customers.
- Customers earn and redeem tokens for discounts or rewards.
- Smart contracts enforce token distribution and redemption rules.
- HashPack wallet integration allows users to store and use their reward tokens seamlessly.

25. Hedera-Based Land Registry System

Task:
Create a land registry system that records property ownership on the Hedera network.

Details:

- Land ownership details are tokenized as NFTs on Hedera.
- Smart contracts verify ownership transfers and prevent fraudulent claims.
- Authorities and users can verify land records securely.
- HashPack wallet integration allows property owners to manage their digital titles.