

DECENTRALIZED CHARITY AID PLATFORM

BLOCKCHAIN 1 - FINAL EXAMINATION PROJECT
ETHEREUM TESTNET BASED DAPP



PURPOSE OF THE PROJECT

- Demonstrate practical skills in blockchain development
- Design and deploy smart contracts using Solidity
- Build a decentralized application with MetaMask integration
- Work with Ethereum test networks and ERC-20 tokens

PROJECT IDEA

A decentralized charity and aid crowdfunding platform built on blockchain technology

Other users can donate test ETH to active campaigns through MetaMask integration

Users can create aid campaigns by specifying a funding goal and a campaign deadline

Donors automatically receive internal ERC-20 reward tokens for educational demonstration purposes



APPLICATION ARCHITECTURE



Frontend:
JavaScript +
ethers.js

Smart contracts: Solidity

Wallet integration:
MetaMask

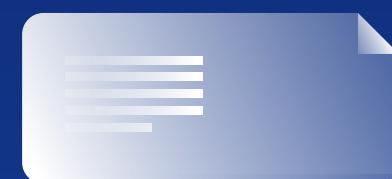
Blockchain network:
Ethereum Sepolia
testnet



SMART CONTRACTS OVERVIEW



- 01**
Campaign Creation
Users can create charity campaigns with a funding goal and deadline.
- >
- 02**
Donation Handling
Users donate test ETH to active campaigns through the smart contract.
- >
- 03**
Contribution Tracking
The contract securely tracks each contributor and donation amount.
- >
- 04**
Campaign Finalization
After the deadline, campaigns are either successful or failed.
- >
- 05**
Reward Token Minting
ERC-20 reward tokens are minted automatically for donors.



CROWDFUNDING LOGIC



Each campaign has a funding goal and a deadline

All contributions are recorded on the blockchain

Successful Campaign

- Total funds \geq goal
- Campaign creator can withdraw funds

Users donate test ETH to active campaigns via MetaMask

After the deadline, the campaign is finalized

Failed Campaign

- Total funds $<$ goal
- Contributors can claim refunds



ERC-20 REWARD TOKEN

Custom ERC-20 Token

A custom ERC-20 token (AidToken) is used as a reward mechanism for donor participation.

Automatic Minting

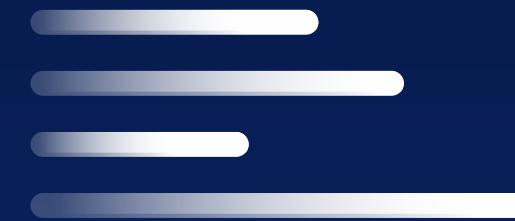
Tokens are minted automatically during the donation process via the smart contract.

Educational Purpose

The token has no real monetary value and is used only for educational demonstration.

Token distribution is proportional to the ETH contribution amount.
(1 ETH → X AidToken)

METAMASK INTEGRATION



Wallet Connection

Users connect their Ethereum wallet via MetaMask.

Network Verification

The application verifies that the user is connected to the Sepolia test network..

Transaction Execution

All blockchain transactions are signed and executed through MetaMask.

Transaction confirmations are displayed to the user.



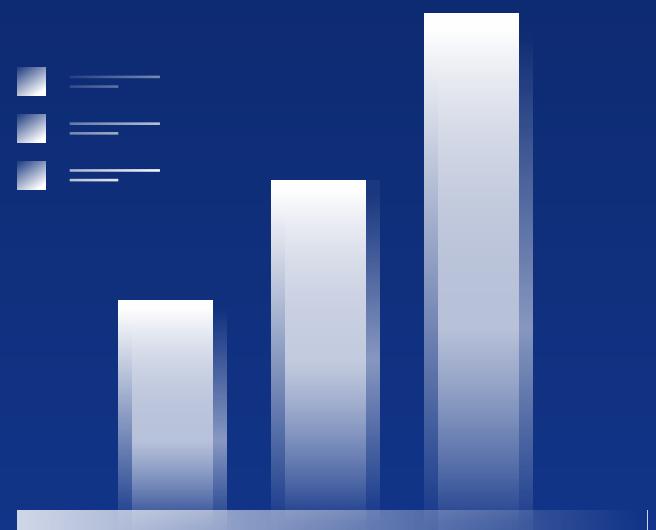
TEST DETWORX USAGE

Ethereum Test Network

- Network used: Sepolia
- Only free test ETH is used
- No real cryptocurrency involved
 - Application is not deployed on mainnet

Test ETH is obtained from an official faucet:

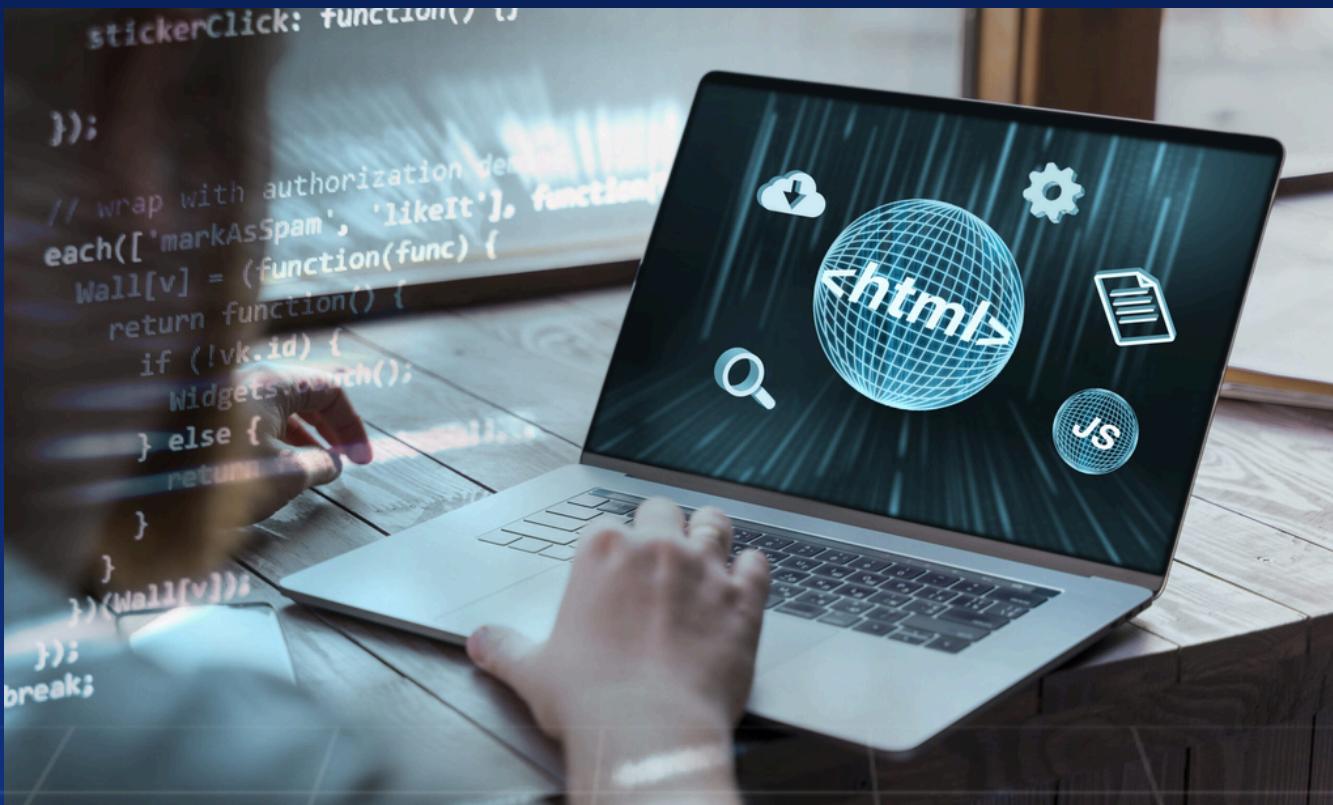
<https://cloud.google.com/application/web3/faucet/ethereum/sepolia>



FRONTEND FUNCTIONALITY

Wallet Interaction

- Connect wallet via MetaMask
- Display connected wallet address
 - Show ETH and reward token balances



Transaction status and confirmations are displayed in the user interface.

User Actions

- Create a crowdfunding campaign
- Donate test ETH to campaigns
- Finalize campaigns
- Withdraw funds or claim refunds

DEMO FLOW



1. Connect MetaMask wallet
2. Create a crowdfunding campaign
3. Donate test ETH to the campaign
4. Receive ERC-20 reward tokens
5. Finalize the campaign after the deadline
6. Withdraw funds or claim refunds
7. View transaction confirmation

Live demonstration of frontend
and smart contract interaction.





SECURITY & CONSTRAINTS

Test Network Only

The application runs exclusively on the Ethereum Sepolia test network.

No Real Cryptocurrency

Only free test ETH is used. No real funds are involved.

Smart Contract Security

Reentrancy protection is implemented to prevent common attack vectors.

Restricted Minting

ERC-20 token minting is restricted to the platform smart contract.



PROJECT CONCLUSION

This project successfully demonstrates the development of a decentralized crowdfunding application using blockchain technology.

The application integrates smart contracts, a web-based frontend, MetaMask wallet interaction, and an ERC-20 reward token on the Ethereum Sepolia test network.

- Implemented secure crowdfunding smart contracts
- Integrated MetaMask for real blockchain interaction
- Demonstrated ERC-20 token minting and distribution
- Operated exclusively on an Ethereum test network

This project provided hands-on experience with decentralized application architecture and blockchain development principles.