Snek.fun – Milestone 2 Report (Fund 12 – Cardano Catalyst)

This document provides a comprehensive Proof of Achievement for Milestone 2 of the Snek.fun project, funded under Cardano Catalyst Fund 12. It outlines the development and testing of the Bonding Curve Pool and Order Smart Contract systems, along with their deployment on-chain and third-party verification.

Table of Content:

In this report we will provide everything for each component of the system strictly according to the Acceptance criteria of this milestone. If you need access to smart contract code to close this milestone, please send us your contacts and how do we share access with you.

Bonding Curve Pool smart contract

The Aiken implementation of this smart contract as well as the bonding curve formula are closed source due to business reasons so we can provide you only tests.

Testfunctions annotation

`execution_of_correct_ada_to_token_swap_should_succeed` **Purpose**: Tests a valid ADA-to-token swap in the bonding curve pool. **Key Logic**: Verifies the swap correctly adjusts ADA and token balances per the bonding curve formula, ensuring the transaction succeeds.

`validation_of_incorrect_ada_value_in_final_pool_after_ada_to_token_swap_should_fail`
Purpose: Tests rejection of an ADA-to-token swap with incorrect final ADA balance.
Key Logic: Ensures the transaction fails if the pool's final ADA value deviates from the expected bonding curve calculation.

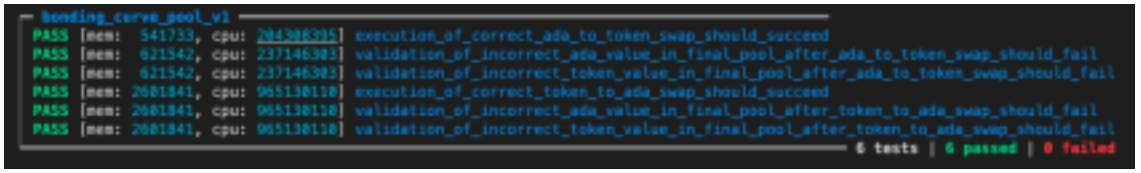
`validation_of_incorrect_token_value_in_final_pool_after_ada_to_token_swap_should_fail`
Purpose: Tests rejection of an ADA-to-token swap with incorrect final token balance.
Key Logic: Ensures the transaction fails if the pool's final token value does not match the bonding curve formula.

`execution_of_correct_token_to_ada_swap_should_succeed` **Purpose**: Tests a valid token-to-ADA swap in the bonding curve pool. **Key Logic**: Confirms the swap correctly adjusts token and ADA balances per the bonding curve formula, ensuring the transaction succeeds.

`validation_of_incorrect_ada_value_in_final_pool_after_token_to_ada_swap_should_fail`
Purpose: Tests rejection of a token-to-ADA swap with incorrect final ADA balance.
Key Logic: Ensures the transaction fails if the pool's final ADA value deviates from the expected bonding curve calculation.

`validation_of_incorrect_token_value_in_final_pool_after_token_to_ada_swap_should_fail`
Purpose: Tests rejection of a token-to-ADA swap with incorrect final token balance.
Key Logic: Ensures the transaction fails if the pool's final token value does not align with the bonding curve formula.

Test results screenshot



On-chain examples

Launch bonding curve pool: https://cardanoscan.io/transaction/b752f988e0bed856b09992bacf39e 7f1f34a6cde4e90a5a35500375aa67d66bb?tab=tokenmint

Examples of trading operations with the bonding curve pool are in the "Order smart contract" section.

Order smart contract

Order smart contract and fully open sourced. You can check it . All tests here are included in the file. Below we will explain how each test function ensure proper work of the smart contract.

Testfunctions annotation

`test_reproduce_preprod_execution_one_to_one`

Purpose: Tests a one-to-one swap execution between two limit orders (ADA → token, token → ADA) in a batched transaction.

Key Logic: Validates batched swap of two orders in a single transaction, ensuring correct asset exchange, fees, and authorization.

`test_normal_partial_swap_ada_to_token`

Purpose: Tests partial swap of ADA for a token.
Key Logic: Ensures partial execution adjusts input/output amounts, satisfies base price, fees, and marginal output constraints.

`test_normal_partial_swap_token_to_ada`

Purpose: Tests partial swap of a token for ADA.

Key Logic: Verifies token-to-ADA swap handles non-ADA input, ADA output, and maintains price and fee constraints.

`test_normal_partial_swap_token_to_token`

Purpose: Tests partial swap between two non-ADA tokens. **Key Logic**: Confirms token-to-token swap manages non-ADA assets, Lovelace for fees, and adheres to price and integrity constraints.

`test_normal_cancellation`

Purpose: Tests valid cancellation of a limit order.

Key Logic: Ensures cancellation is authorized, returns full value to the correct address.

`test_bad_cancellation_wrong_redeemer`

Purpose: Tests invalid cancellation due to incorrect redeemer address. **Key Logic**: Verifies cancellation fails if output address does not match redeemer address.

`test_bad_cancellation_unauthorized`

Purpose: Tests invalid cancellation due to unauthorized signer. **Key Logic**: Ensures cancellation fails if signer does not match cancellation PKH.

`test_valid_batched_full_swap_at_base_price`

Purpose: Tests batched full swap of multiple identical limit orders at

base price.
Key Logic: Confirms batched swaps process multiple orders, maintaining price, fees, and authorization.

`test_valid_full_swap_at_base_price`
Purpose: Tests single full swap at base price with restricted executors.
Key Logic: Verifies single swap enforces executor restrictions, handles asset exchange correctly.

`test_valid_mixed_full_swap_at_base_price`
Purpose: Tests full swap in a transaction with mixed inputs. **Key Logic**: Ensures full swap validates correctly despite unrelated UTXOs in the transaction.

`test_invalid_full_swap_bad_exchange_rate`
Purpose: Tests invalid full swap due to insufficient output amount. **Key Logic**: Verifies swap fails if output does not meet base price requirement.

Test results screenshots

Since the smart contract is open sourced, you can run tests yourself

On-chain examples

Buy token (add ADA, get Token) order placement:
https://cardanoscan.io/transaction/98d8e1985b72068fc1d3846af39756567a0eef1fdd053e490b7b590d9528c6f5

Buy token (add ADA, get Token) order execution:
https://cardanoscan.io/transaction/682a63cb59c93c77a18af4dbb4ea60ac1f6a04152e57aadf67612ae5ff671da8

Sell token (add Token, get ADA) order placement:
https://cardanoscan.io/transaction/287615f7243424cbe356da30bb25207088ef691f4d4d9c4033a37b6977efe833

Sell token (add Token, get ADA) order execution:
https://cardanoscan.io/transaction/6362e8cf4a935a85a8b033ffc60ac5

677a4abce8cfa34ae5a9f408ef232f225c

Batching (order execution) system

Snekfun is a trading platfrom and function pretty much as all regular AMM DEXes on Cardano. Saying that we mean that a batching system to execute orders . We mentioned that we will show how the batching system works. You can see the full explanation how the batching system works in the video below:

https://drive.google.com/file/d/1W6J-V4INw9PPuNJ0fryyCF_u_jypIgMy/view

https://youtu.be/FzvikF6AM4Q

Conclusion

In conclusion, all core components required by Milestone 2 have been implemented, tested, and deployed on-chain. The tests are open-source and verifiable, and all transactions are publicly accessible. The batching system is demonstrated in the video linked below.

Annex: Third Proof of Achievement: Link to Explorer

Bonding curve pool:
https://cardanoscan.io/transaction/b752f988e0bed856b09992bacf39e7f1f34a6cde4e90a5a35500375aa67d66bb?tab=tokenmint

Buy Token:
https://cardanoscan.io/transaction/98d8e1985b72068fc1d3846af39756567a0eef1fdd053e490b7b590d9528c6f5

https://cardanoscan.io/transaction/682a63cb59c93c77a18af4dbb4ea60ac1f6a04152e57aadf67612ae5ff671da8

Sell Token:
https://cardanoscan.io/transaction/287615f7243424cbe356da30bb25207088ef691f4d4d9c4033a37b6977efe833

https://cardanoscan.io/transaction/6362e8cf4a935a85a8b033ffc60ac5677a4abce8cfa34ae5a9f408ef232f225c