Cyberscope

# Audit Report

# Dogebank

March 2023

| | |
|---|---|
| Network | BSC |
| Address | 0x796A6dc7e14e09bF82b4B68bE54E9c3E3f231C3d |
| Audited by | © cyberscope |

# Table of Contents

# Review

| | |
|---|---|
| **Contract Name** | Dogebank |
| **Compiler Version** | v0.6.8+commit.0bbfe453 |
| **Optimization** | 200 runs |
| **Explorer** | https://bscscan.com/address/0x796a6dc7e14e09bf82b4b68be54e9c3e3f231c3d |
| **Address** | 0x796a6dc7e14e09bf82b4b68be54e9c3e3f231c3d |
| **Network** | BSC |
| **Symbol** | Dogebank |
| **Decimals** | 9 |
| **Total Supply** | 1,000,000,000 |

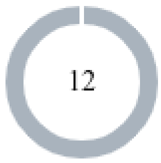
## Audit Updates

| | |
|---|---|
| **Initial Audit** | 28 Mar 2023<br>https://github.com/cyberscope-io/audits/tree/main/dogebank/v1/audit.pdf |
| **Corrected Phase 2** | 30 Mar 2023 |

## Source Files

| | |
|---|---|
| **Filename** | SHA256 |
| **Dogebank.sol** | f72d7a5f6aef983bc90cd19ba246d94324faadc7e7093189f7be2ad97a7b2e82 |

# Findings Breakdown




| | |
|---|---|
| Critical | 0 |
| Medium | 0 |
| Minor / Informative | 12 |

| Severity | Unresolved | Acknowledged | Resolved | Other |
|---|---|---|---|---|
| Critical | 0 | 0 | 0 | 0 |
| Medium | 0 | 0 | 0 | 0 |
| Minor / Informative | 12 | 0 | 0 | 0 |

# Analysis

● Critical ● Medium ● Minor / Informative ● Pass

| Severity | Code | Description | Status |
|---|---|---|---|
| ● | ST | Stops Transactions | Passed |
| ● | OCTD | Transfers Contract's Tokens | Passed |
| ● | OTUT | Transfers User's Tokens | Passed |
| ● | ELFM | Exceeds Fees Limit | Passed |
| ● | ULTW | Transfers Liquidity to Team Wallet | Passed |
| ● | MT | Mints Tokens | Passed |
| ● | BT | Burns Tokens | Passed |
| ● | BC | Blacklists Addresses | Passed |

# Diagnostics

Critical Medium Minor / Informative

| Severity | Code | Description | Status |
|---|---|---|---|
| | RPI | Redundant Pair Initializations | Unresolved |
| | RC | Redundant Calculations | Unresolved |
| | PTAI | Potential Transfer Amount Inconsistency | Unresolved |
| | GO | Gas Optimization | Unresolved |
| | PAV | Phishing Attack Vulnerability | Unresolved |
| | IDI | Immutable Declaration Improvement | Unresolved |
| | L02 | State Variables could be Declared Constant | Unresolved |
| | L04 | Conformance to Solidity Naming Conventions | Unresolved |
| | L09 | Dead Code Elimination | Unresolved |
| | L16 | Validate Variable Setters | Unresolved |
| | L17 | Usage of Solidity Assembly | Unresolved |
| | L20 | Succeeded Transfer Check | Unresolved |

## RPI - Redundant Pair Initializations

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | contracts/$Dogebank.sol#L996 |
| **Status** | Unresolved |

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract performs external contract calls on every transfer to retrieve the router's pair address. External calls are expensive in terms of gas consumption. Such operations should be reduced to a minimum.

```
address pancakePair = IPancakeFactory(
    pancakeRouter.factory()).getPair(address(this), pancakeRouter.WETH());
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it. A recommended approach would be to retrieve the pair address once at the contract's constructor and store it in a global variable, and reuse that variable instead.

## RC - Redundant Calculations

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | contracts/$Dogebank.sol#L1011,1030 |
| **Status** | Unresolved |

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The function `paySwapTxFee` adds the fee amount to the `baseAccount` balance and returns the final amount to be transferred to the recipient. As a result, the operations that are performed after the function's call are redundant.

```
paySwapTxFee(
    from,
    amount,
    amount.mul(X2) / 100
);

uint256 totalFees = amount.mul(X2).div(100);
_transferStandard(from, to, amount.sub(totalFees));
...
paySwapTxFee(
    from,
    amount,
    amount.mul(X3) / 100
);
uint256 totalFees = amount.mul(X3).div(100);

_transferStandard(from, to, amount.sub(totalFees));
```

## Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it. The contract could use the returning value of the `paySwapTxFee` function, instead of the recalculating the amount.

## PTAI - Potential Transfer Amount Inconsistency

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | contracts/$Dogebank.sol#L1128 |
| **Status** | Unresolved |

### Description

The `transfer()` and `transferFrom()` functions are used to transfer a specified amount of tokens to an address. The fee or tax is an amount that is charged to the sender of an ERC20 token when tokens are transferred to another address. According to the specification, the transferred amount could potentially be less than the expected amount. This may produce inconsistency between the expected and the actual behavior.

The following example depicts the diversion between the expected and actual amount.

| Tax | Amount | Expected | Actual |
|---|---|---|---|
| No Tax | 100 | 100 | 100 |
| 10% Tax | 100 | 100 | 90 |

The `swapTokensForN` function can either swap tokens for ETH or tokens of another contract to `Dogebank` tokens. The tokens to tokens functionality is implemented by first transferring the user's tokens to the contract's address. If the token supports fees, then the amount that is actually transferred will not be the same as the initial amount. As a result, this produces inconsistency between amounts.

```
IBEP20(tokenAddress).transferFrom(msg.sender, address(this), amount);
```

## Recommendation

The team is advised to take into consideration the actual amount that has been transferred instead of the expected.

It is important to note that an ERC20 transfer tax is not a standard feature of the ERC20 specification, and it is not universally implemented by all ERC20 contracts. Therefore, the contract could produce the actual amount by calculating the difference between the transfer call.

```
Actual Transferred Amount = Balance After Transfer - Balance
Before Transfer
```

## GO - Gas Optimization

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | contracts/$Dogebank.sol#L1136,1153,1175,1194 |
| **Status** | Unresolved |

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The functions `swapTokensForN` and `swapNForToken` implement a swapping functionality, where a user can swap tokens for ETH/tokens and tokens for ETH respectively. These functions perform 2 external contract calls each to complete their functionality, and external calls are expensive in terms of gas cost. The same functionality can be achieved with one external call by adding a third address on the `path` variable, the contract's address.

```
pancakeRouter.swapExactTokensForETHSupportingFeeOnTransferTokens(
    amount,
    0, // accept any amount of BNB
    path,
    address(this),
    block.timestamp
);

pancakeRouter.swapExactETHForTokensSupportingFeeOnTransferTokens{value: bnbSwap}(
    0,
    path,
    msg.sender,
    block.timestamp
);
```

## Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it. As mentioned at the description, the team could add the contract's address to the `path` variable as the third element for the `swapTokensForN` function and the token's address for the `swapNForToken` function. This way, the contract would need to perform only one external call.

## PAV - Phishing Attack Vulnerability

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | contracts/$Dogebank.sol#L1004,1083,1088,1094,1100,1106,1222,1228 |
| **Status** | Unresolved |

### Description

In a Solidity smart contract, `tx.origin` returns the address of the transaction's sender. However, it is important to note that the sender of the transaction and the user who initiated the transaction can be different.

In the case of a phishing attack, an attacker could send a transaction on behalf of a user to a contract that uses `tx.origin` for authorization. The contract would then grant access to the attacker based on the address returned by `tx.origin`. This is a vulnerability because an attacker can easily spoof the tx.origin address by sending a transaction through a malicious contract that modifies the msg.sender value.

```
_transferStandard(from, tx.origin, amount);
```

### Recommendation

The team is advised to use `msg.sender` instead of `tx.origin` for authorization. The `msg.sender` variable always returns the address of the direct sender of the transaction, which cannot be modified by a malicious contract.

# IDI - Immutable Declaration Improvement

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L876 |
| **Status** | Unresolved |

## Description

The contract is using variables that initialize them only in the constructor. The other functions are not mutating the variables. These variables are not defined as `immutable`.

```
pancakeRouter
```

## Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

# L02 - State Variables could be Declared Constant

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L849,851,852,853 |
| **Status** | Unresolved |

## Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
uint256 private _tTotal = 1000000000 * 10**9
string private _name = "Dogebank"
string private _symbol = "Dogebank"
uint8 private _decimals = 9
```

## Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

## L04 - Conformance to Solidity Naming Conventions

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L560,562,593,639,867,868,870,871,1064,1076,1082,1087,1093,1099,1105,1111 |
| **Status** | Unresolved |

### Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
function DOMAIN_SEPARATOR() external view returns (bytes32);
function PERMIT_TYPEHASH() external pure returns (bytes32);
function MINIMUM_LIQUIDITY() external pure returns (uint256);
function WETH() external pure returns (address);
uint256 private X0
uint256 private X1
uint256 private X2
uint256 private X3
uint256 X
address _account
uint256 _amount
```

## Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

# L09 - Dead Code Elimination

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L257,286,318,331,350,370,383 |
| **Status** | Unresolved |

## Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.

```
function isContract(address account) internal view returns (bool) {
        // According to EIP-1052, 0x0 is the value returned for not-yet
created accounts
        // and
0xc5d2460186f7233c927e7db2dcc703c0e500b653ca82273b7bfad8045d85a470 is returned
        // for accounts without code, i.e. `keccak256('')`
        bytes32 codehash;
        bytes32 accountHash =
0xc5d2460186f7233c927e7db2dcc703c0e500b653ca82273b7bfad8045d85a470;
        // solhint-disable-next-line no-inline-assembly
        assembly {
            codehash := extcodehash(account)
        }
        return (codehash != accountHash && codehash != 0x0);
    }

...
```

## Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

# L16 - Validate Variable Setters

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L1084 |
| **Status** | Unresolved |

## Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
baseAccount = _account
```

## Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

# L17 - Usage of Solidity Assembly

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L264,403 |
| **Status** | Unresolved |

## Description

Using assembly can be useful for optimizing code, but it can also be error-prone. It's important to carefully test and debug assembly code to ensure that it is correct and does not contain any errors.

Some common types of errors that can occur when using assembly in Solidity include Syntax, Type, Out-of-bounds, Stack, and Revert.

```
assembly {
            codehash := extcodehash(account)
        }

assembly {
                    let returndata_size := mload(returndata)
                    revert(add(32, returndata), returndata_size)
                }
```

## Recommendation

It is recommended to use assembly sparingly and only when necessary, as it can be difficult to read and understand compared to Solidity code.

## L20 - Succeeded Transfer Check

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | Dogebank.sol#L1128 |
| **Status** | Unresolved |

### Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
IBEP20(tokenAddress).transferFrom(msg.sender, address(this), amount)
```

### Recommendation

The contract should check if the result of the transfer methods is successful. The team is advised to check the SafeERC20 library from the Openzeppelin library.

# Functions Analysis

| Contract | Type | Bases | | |
|---|---|---|---|---|
| | **Function Name** | **Visibility** | **Mutability** | **Modifiers** |
| | | | | |
| **IBEP20** | Interface | | | |
| | totalSupply | External | | - |
| | balanceOf | External | | - |
| | transfer | External | ✓ | - |
| | allowance | External | | - |
| | approve | External | ✓ | - |
| | transferFrom | External | ✓ | - |
| | | | | |
| **SafeMath** | Library | | | |
| | add | Internal | | |
| | sub | Internal | | |
| | sub | Internal | | |
| | mul | Internal | | |
| | div | Internal | | |
| | div | Internal | | |
| | mod | Internal | | |
| | mod | Internal | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **Context** | Implementation | | | |
| | _msgSender | Internal | | |
| | _msgData | Internal | | |
| | | | | |
| **Address** | Library | | | |
| | isContract | Internal | | |
| | sendValue | Internal | ✓ | |
| | functionCall | Internal | ✓ | |
| | functionCall | Internal | ✓ | |
| | functionCallWithValue | Internal | ✓ | |
| | functionCallWithValue | Internal | ✓ | |
| | _functionCallWithValue | Private | ✓ | |
| | | | | |
| **Ownable** | Implementation | Context | | |
| | | Internal | ✓ | |
| | owner | Public | | - |
| | renounceOwnership | Public | ✓ | onlyOwner |
| | transferOwnership | Public | ✓ | onlyOwner |
| | geUnlockTime | Public | | - |
| | lock | Public | ✓ | onlyOwner |
| | unlock | Public | ✓ | - |
| | | | | |
| **IPancakeFactory** | Interface | | | |

| | | | | |
|---|---|---|---|---|
| | feeTo | External | | - |
| | feeToSetter | External | | - |
| | getPair | External | | - |
| | allPairs | External | | - |
| | allPairsLength | External | | - |
| | createPair | External | ✓ | - |
| | setFeeTo | External | ✓ | - |
| | setFeeToSetter | External | ✓ | - |
| | | | | |
| **IPancakePair** | Interface | | | |
| | name | External | | - |
| | symbol | External | | - |
| | decimals | External | | - |
| | totalSupply | External | | - |
| | balanceOf | External | | - |
| | allowance | External | | - |
| | approve | External | ✓ | - |
| | transfer | External | ✓ | - |
| | transferFrom | External | ✓ | - |
| | DOMAIN_SEPARATOR | External | | - |
| | PERMIT_TYPEHASH | External | | - |
| | nonces | External | | - |
| | permit | External | ✓ | - |

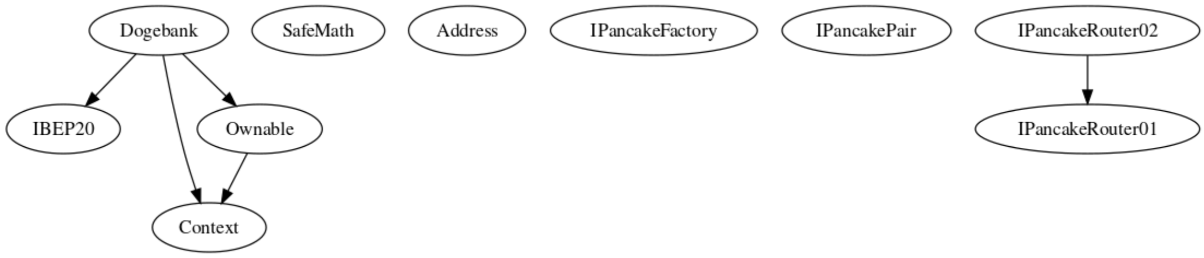
| | | | | |
|---|---|---|---|---|
| | MINIMUM_LIQUIDITY | External | | - |
| | factory | External | | - |
| | token0 | External | | - |
| | token1 | External | | - |
| | getReserves | External | | - |
| | price0CumulativeLast | External | | - |
| | price1CumulativeLast | External | | - |
| | kLast | External | | - |
| | mint | External | ✓ | - |
| | burn | External | ✓ | - |
| | swap | External | ✓ | - |
| | skim | External | ✓ | - |
| | sync | External | ✓ | - |
| | initialize | External | ✓ | - |
| | | | | |
| **IPancakeRouter01** | Interface | | | |
| | factory | External | | - |
| | WETH | External | | - |
| | addLiquidity | External | ✓ | - |
| | addLiquidityETH | External | Payable | - |
| | removeLiquidity | External | ✓ | - |
| | removeLiquidityETH | External | ✓ | - |
| | removeLiquidityWithPermit | External | ✓ | - |

| | | | | |
|---|---|---|---|---|
| | removeLiquidityETHWithPermit | External | ✓ | - |
| | swapExactTokensForTokens | External | ✓ | - |
| | swapTokensForExactTokens | External | ✓ | - |
| | swapExactETHForTokens | External | Payable | - |
| | swapTokensForExactETH | External | ✓ | - |
| | swapExactTokensForETH | External | ✓ | - |
| | swapETHForExactTokens | External | Payable | - |
| | quote | External | | - |
| | getAmountOut | External | | - |
| | getAmountIn | External | | - |
| | getAmountsOut | External | | - |
| | getAmountsIn | External | | - |
| | | | | |
| **IPancakeRouter02** | Interface | IPancakeRouter01 | | |
| | removeLiquidityETHSupportingFeeOnTransferTokens | External | ✓ | - |
| | removeLiquidityETHWithPermitSupportingFeeOnTransferTokens | External | ✓ | - |
| | swapExactTokensForTokensSupportingFeeOnTransferTokens | External | ✓ | - |
| | swapExactETHForTokensSupportingFeeOnTransferTokens | External | Payable | - |
| | swapExactTokensForETHSupportingFeeOnTransferTokens | External | ✓ | - |
| | | | | |
| **Dogebank** | Implementation | Context, IBEP20, Ownable | | |

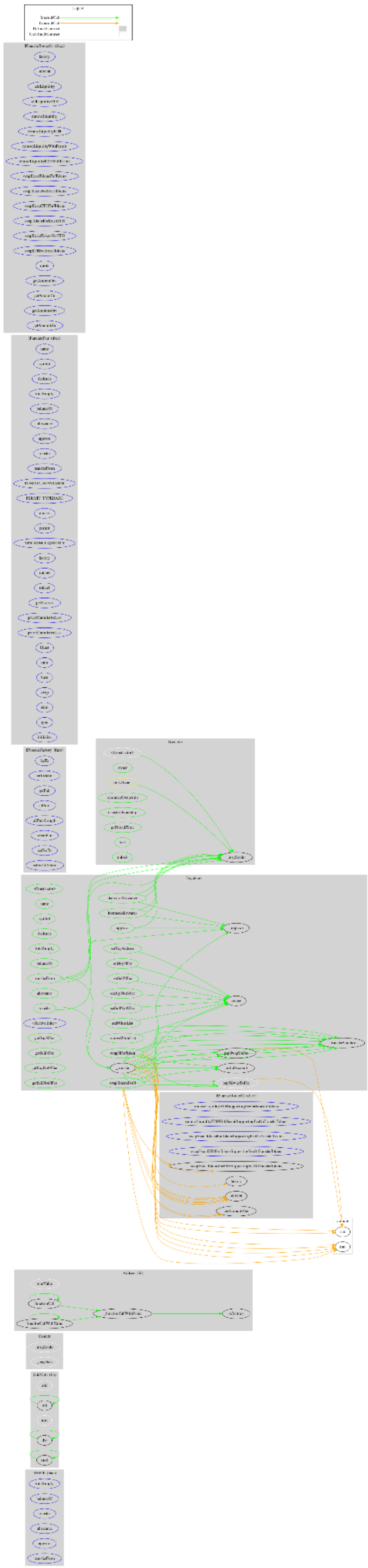
| | | | | |
|---|---|---|---|---|
| | | Public | ✓ | - |
| | name | Public | | - |
| | symbol | Public | | - |
| | decimals | Public | | - |
| | totalSupply | Public | | - |
| | balanceOf | Public | | - |
| | transfer | Public | ✓ | - |
| | allowance | Public | | - |
| | approve | Public | ✓ | - |
| | transferFrom | Public | ✓ | - |
| | increaseAllowance | Public | ✓ | - |
| | decreaseAllowance | Public | ✓ | - |
| | | External | Payable | - |
| | _approve | Private | ✓ | |
| | _transfer | Private | ✓ | |
| | initialAccount | Internal | ✓ | |
| | _transferStandard | Private | ✓ | |
| | payNSwapTxFee | Internal | ✓ | |
| | paySwapTxFee | Internal | ✓ | |
| | setKeyAddress | Public | ✓ | - |
| | setBuyNFee | Public | ✓ | - |
| | setSellNFee | Public | ✓ | - |
| | setBuyNotNFee | Public | ✓ | - |

| | | | | |
|---|---|---|---|---|
| | setSellNotNFee | Public | ✓ | - |
| | swapTokensForN | Public | Payable | - |
| | swapNForToken | Public | ✓ | - |
| | getBuyNFee | Public | | - |
| | getSellNFee | Public | | - |
| | getBuyNotNFee | Public | | - |
| | getSellNotNFee | Public | | - |
| | addWhiteList | Public | ✓ | - |
| | removeWhiteList | Public | ✓ | - |

# Inheritance Graph



# Flow Graph



# Summary

Dogebank contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. Dogebank is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler error or critical issues. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions. There is also a limit of max 25% fees.

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Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope's position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope's goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.

# About Cyberscope

Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

**The Cyberscope team**

https://www.cyberscope.io