Coinsult

Advanced Manual Smart Contract Audit

Project: Redpill

Website: https://redpillplay.com/

Low-Risk	Medium-Risk	High-Risk
10 low-risk code issues found	0 medium-risk code issues found	0 high-risk code issues found

Contract Address

0x80D3A1226FE1a185834e8CB44C66d5F7859a03d1

Disclaimer

Coinsult is not responsible if a project turns out to be a scam, rug-pull or honeypot. We only provide a detailed analysis for your own research.

Coinsult is not responsible for any financial losses. Nothing in this contract audit is financial advice, please do your own research.

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Coinsult can not be held responsible for when a project turns out to be a rug-pull, honeypot or scam.

Tokenomics

Rank	Address	Quantity (Token)	Percentage
1	PancakeSwap V2: RPP 10	461,916.3788	26.0740%
2	Magic Forest: Deployer	192,268.8	10.8531%
3	0x28655727c08bf984b67b995b01d3fbf941913b41	106,188	5.9940%
4	0x7035d620aaa0fd44de684ecdb7e37b7858533a25	33,362.284	1.8832%
5	0x6b38ef3519828725a2225227af11596693fa5a1d	31,443.4656	1.7749%

Source Code

Coinsult was comissioned by Redpill to perform an audit based on the following smart contract:

https://bscscan.com/address/0x80d3a1226fe1a185834e8cb44c66d5f7859a03d1#code

Manual Code Review

In this audit report we will highlight all these issues:

🟢 Low-Risk

10 low-risk code
issues found

🟡 Medium-Risk

0 medium-risk code
issues found

🔴 High-Risk

0 high-risk code
issues found

The detailed report continues on the next page...

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Contract contains Reentrancy vulnerabilities

Additional information: This combination increases risk of malicious intent. While it may be justified by some complex mechanics (e.g. rebase, reflections, buyback).

More information: Slither

```
function _transferFrom(
    address sender,
    address recipient,
    uint256 amount
) internal returns (bool) {
    if (inSwap || isFullExempt[sender] || isFullExempt[recipient]) {
        return _basicTransfer(sender, recipient, amount);
    }

    if (!authorizations[sender] &amp;amp;&amp;amp; !authorizations[recipient]) {
        require(tradingOpen, "Trading not open yet");
    }

    uint256 rAmount = amount.mul(rate);

    if (
        !authorizations[sender] &amp;amp;&amp;amp;
        recipient != address(this) &amp;amp;&amp;amp;
        recipient != address(DEAD) &amp;amp;&amp;amp;
        recipient != pair &amp;amp;&amp;amp;
        recipient != marketingFeeReceiver &amp;amp;&amp;amp;
        recipient != devFeeReceiver &amp;amp;&amp;amp;
```

Recommendation

Apply the check-effects-interactions pattern.

Exploit scenario

```
function withdrawBalance(){
    // send userBalance[msg.sender] Ether to msg.sender
    // if mgs.sender is a contract, it will call its fallback function
    if( ! (msg.sender.call.value(userBalance[msg.sender])() ) ){
        throw;
    }
    userBalance[msg.sender] = 0;
}
```

Bob uses the re-entrancy bug to call withdrawBalance two times, and withdraw more than its initial deposit to the contract.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Avoid relying on block.timestamp

block.timestamp can be manipulated by miners.

```
shareholderClaims[shareholder] = block.timestamp;
```

Recommendation

Do not use `block.timestamp`, now or `blockhash` as a source of randomness

Exploit scenario

```
contract Game {

    uint reward_determining_number;

    function guessing() external{
      reward_determining_number = uint256(block.blockhash(10000)) % 10;
    }
}
```

Eve is a miner. Eve calls `guessing` and re-orders the block containing the transaction. As a result, Eve wins the game.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Too many digits

Literals with many digits are difficult to read and review.

```
uint256 public maxRoomRent = 8000000000;
```

Recommendation

Use: Ether suffix, Time suffix, or The scientific notation

Exploit scenario

```
contract MyContract{
    uint 1_ether = 10000000000000000000;
}
```

While `1_ether` looks like `1 ether`, it is `10 ether`. As a result, it's likely to be used incorrectly.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

No zero address validation for some functions

Detect missing zero address validation.

```
function setFeeReceivers(
    address _autoLiquidityReceiver,
    address _marketingFeeReceiver,
    address _devFeeReceiver
) external authorized {
    autoLiquidityReceiver = _autoLiquidityReceiver;
    marketingFeeReceiver = _marketingFeeReceiver;
    devFeeReceiver = _devFeeReceiver;
}
```

Recommendation

Check that the new address is not zero.

Exploit scenario

```
contract C {

  modifier onlyAdmin {
    if (msg.sender != owner) throw;
    _;
  }

  function updateOwner(address newOwner) onlyAdmin external {
    owner = newOwner;
  }
}
```

Bob calls `updateOwner` without specifying the `newOwner`, soBob loses ownership of the contract.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Functions that send Ether to arbitrary destinations

Unprotected call to a function sending Ether to an arbitrary address.

```
function swapBack() internal swapping {
    uint256 dynamicLiquidityFee = isOverLiquified(
        targetLiquidity,
        targetLiquidityDenominator
    )
        ? 0
        : liquidityFee;
    uint256 tokensToSell = swapThreshold.div(rate);

    uint256 amountToLiquify = tokensToSell
        .div(totalFee)
        .mul(dynamicLiquidityFee)
        .div(2);
    uint256 amountToSwap = tokensToSell.sub(amountToLiquify);

    address[] memory path = new address[](2);
    path[0] = address(this);
    path[1] = WBNB;

    uint256 balanceBefore = address(this).balance;

    router.swapExactTokensForETHSupportingFeeOnTransferTokens(
```

Recommendation

Ensure that an arbitrary user cannot withdraw unauthorized funds.

Exploit scenario

```
contract ArbitrarySend{
    address destination;
    function setDestination(){
        destination = msg.sender;
    }

    function withdraw() public{
        destination.transfer(this.balance);
    }
}
```

Bob calls `setDestination` and `withdraw`. As a result he withdraws the contract's balance.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Unchecked transfer

The return value of an external transfer/transferFrom call is not checked.

```
function distributeDividend(address shareholder) internal {
    if (shares[shareholder].amount == 0) {
        return;
    }

    uint256 amount = getUnpaidEarnings(shareholder);
    if (amount &gt; 0) {
        totalDistributed = totalDistributed.add(amount);
        RWRD.transfer(shareholder, amount);
        shareholderClaims[shareholder] = block.timestamp;
        shares[shareholder].totalRealised = shares[shareholder]
            .totalRealised
            .add(amount);
        shares[shareholder].totalExcluded = getCumulativeDividends(
            shares[shareholder].amount
        );
    }
}
```

Recommendation

Use `SafeERC20`, or ensure that the transfer/transferFrom return value is checked.

Exploit scenario

```
contract Token {
    function transferFrom(address _from, address _to, uint256 _value) public returns (bool success);
}
contract MyBank{
    mapping(address => uint) balances;
    Token token;
    function deposit(uint amount) public{
        token.transferFrom(msg.sender, address(this), amount);
        balances[msg.sender] += amount;
    }
}
```

Several tokens do not revert in case of failure and return false. If one of these tokens is used in `MyBank`, `deposit` will not revert if the transfer fails, and an attacker can call `deposit` for free..

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Write after write

Variables that are written but never read and written again.

```
try distributor.deposit{value: amountBNBReflection}() {} catch {}
        (bool tmpSuccess, ) = payable(marketingFeeReceiver).call{
            value: amountBNBMarketing,
            gas: 30000
        }("");
        (tmpSuccess, ) = payable(devFeeReceiver).call{
            value: amountBNBDev,
            gas: 30000
        }("");

        // only to supress warning msg
        tmpSuccess = false;
```

Recommendation

Fix or remove the writes.

Exploit scenario

```
```solidity
contract Buggy{
    function my_func() external initializer{
        // ...
        a = b;
        a = c;
        // ..
    }
}
```

`a` is first asigned to `b`, and then to `c`. As a result the first write does nothing.
```

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Divide before multiply

Solidity integer division might truncate. As a result, performing multiplication before division can sometimes avoid loss of precision.

```
uint256 feeAmount = rAmount.div(feeDenominator * 100).mul(totalFee).mul(
```

Recommendation

Consider ordering multiplication before division.

Exploit scenario

```
contract A {
    function f(uint n) public {
        coins = (oldSupply / n) * interest;
    }
}
```

If n is greater than `oldSupply`, `coins` will be zero. For example, with `oldSupply = 5; n = 10, interest = 2`, coins will be zero. If `(oldSupply * interest / n)` was used, `coins` would have been 1. In general, it's usually a good idea to re-arrange arithmetic to perform multiplication before division, unless the limit of a smaller type makes this dangerous.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Missing events arithmetic

Detect missing events for critical arithmetic parameters.

```
function setDistributionCriteria(
    uint256 _minPeriod,
    uint256 _minDistribution
) external override onlyToken {
    minPeriod = _minPeriod;
    minDistribution = _minDistribution;
}
```

Recommendation

Emit an event for critical parameter changes.

Exploit scenario

```
contract C {

  modifier onlyAdmin {
    if (msg.sender != owner) throw;
    _;
  }

  function updateOwner(address newOwner) onlyAdmin external {
    owner = newOwner;
  }
}
```

`updateOwner()` has no event, so it is difficult to track off-chain changes in the buy price.

🟢 **Low-Risk:** Could be fixed, will not bring problems.

Costly operations inside a loop

Costly operations inside a loop might waste gas, so optimizations are justified.

```
function process(uint256 gas) external override onlyToken {
    uint256 shareholderCount = shareholders.length;

    if (shareholderCount == 0) {
        return;
    }

    uint256 gasUsed = 0;
    uint256 gasLeft = gasleft();

    uint256 iterations = 0;

    while (gasUsed &lt; gas &amp;&amp; iterations = shareholderCount) {
            currentIndex = 0;
        }

        if (shouldDistribute(shareholders[currentIndex])) {
            distributeDividend(shareholders[currentIndex]);
```

Recommendation

Use a local variable to hold the loop computation result.

Exploit scenario

```
contract CostlyOperationsInLoop{

    function bad() external{
        for (uint i=0; i < loop_count; i++){
            state_variable++;
        }
    }

    function good() external{
      uint local_variable = state_variable;
      for (uint i=0; i < loop_count; i++){
        local_variable++;
      }
      state_variable = local_variable;
    }
}
```

Incrementing `state_variable` in a loop incurs a lot of gas because of expensive `SSTORE`s, which might lead to an `out-of-gas`.

Owner privileges

- 🟢 Owner cannot set fees higher than 25%
- 🟡 Owner can change max transaction amount
- 🟡 Owner can exclude from fees
- 🟡 Owner can pause the contract
- ⚠️ Owner can exclude addresses from dividend
- ⚠️ Owner can set a sell multiplier which will be applied on sell fees

Extra notes by the team

No notes

Contract Snapshot

```
contract RedPill is IBEP20, Auth {
using SafeMath for uint256;
using SafeMathInt for int256;

address WBNB = 0xbb4CdB9CBd36B01bD1cBaEBF2De08d9173bc095c;
address DEAD = 0x000000000000000000000000000000000000dEaD;
address ZERO = 0x0000000000000000000000000000000000000000;

string constant _name = "RedPill";
string constant _symbol = "RPP";
uint8 constant _decimals = 4;

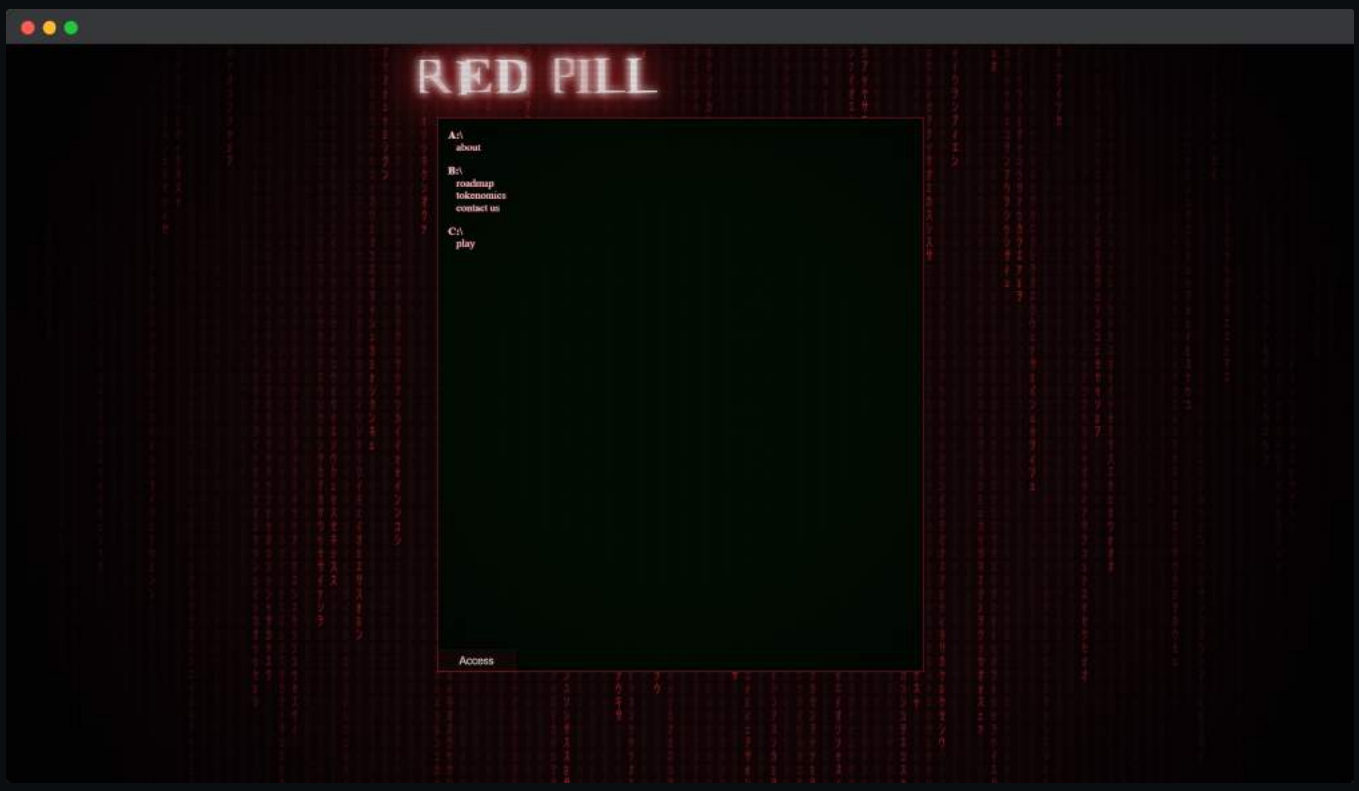
//mapping (address =&gt; uint256) _balances;
mapping(address =&gt; uint256) _rBalance;
mapping(address =&gt; mapping(address =&gt; uint256)) _allowances;

mapping(address =&gt; bool) public isFeeExempt;
mapping(address =&gt; bool) public isTxLimitExempt;
mapping(address =&gt; bool) public isTimelockExempt;
mapping(address =&gt; bool) public isDividendExempt;
mapping(address =&gt; bool) public isFullExempt;

uint256 public liquidityFee = 0;
uint256 public reflectionFee = 0;
uint256 public marketingFee = 4;
uint256 public devFee = 2;
uint256 public totalFee =
    marketingFee + reflectionFee + liquidityFee + devFee;
uint256 public feeDenominator = 100;
```

Website Review

Coinsult checks the website completely manually and looks for visual, technical and textual errors. We also look at the security, speed and accessibility of the website. In short, a complete check to see if the website meets the current standard of the web development industry.



- Mobile Friendly
- Does not contain jQuery errors
- SSL Secured
- No major spelling errors

Project Overview

Not KYC verified by Coinsult