



Bravo Arena

Smart Contract Audit Report

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AUDITED DETAILS

Audited Project

Project name	Token ticker	Blockchain
Bravo Arena	BRV	Binance Smart Chain

Addresses

Contract address	0xEAc19378A08790ad1DAaD235fd33aDb8c314Ef07
Contract deployer address	0xe8260FbFE2e048D331c11b1b1dDCb812beEc1B34

Project Website

<http://www.bravoarena.gg/>

Codebase

<https://bscscan.com/address/0xEAc19378A08790ad1DAaD235fd33aDb8c314Ef07#code>

SUMMARY

BRAVO! A completely decentralized E-Sports platform on BSC where users can take part in various in-game tournaments. Play Warzone, CS:GO, Fortnite tournaments and win Crypto Prizes. Bravo has a house-edge of 10% of every contest, which goes to buybacks of the \$BRV token.

Contract Summary

Documentation Quality

Bravo Arena provides a very good documentation with standard of solidity base code.

- The technical description is provided clearly and structured and also dont have any high risk issue.

Code Quality

The Overall quality of the basecode is standard.

- Standard solidity basecode and rules are already followed by Bravo Arena with the discovery of several low issues.

Test Coverage

Test coverage of the project is 100% (Through Codebase)

Audit Findings Summary

- SWC-101 | It is recommended to use vetted safe math libraries for arithmetic operations consistently on lines 200, 222, 247, 276, 277, 406, 406, 407, 407, 408, 408, 409, 409, 439, 439, 469, 479, 490, 508, 519, 530, 548, 548, 555, 555, 562, 562, 569, 569, 576, 580, 580, 600, 601, 601, 603, 609, 610, 610, 611, 618, 618, 619, 619, 671, 671, 680, 680, 689, 689, 698, 698, 725, 738, 738, 739, 739, 740 and 740.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 13.
- SWC-110 SWC-123 | It is recommended to use of revert(), assert(), and require() in Solidity, and the new REVERT opcode in the EVM on lines 633, 634 and 726.
- SWC-120 | It is recommended to use external sources of randomness via oracles on lines 508 and 710.

CONCLUSION

We have audited the Bravo Arena project released on January 2023 to discover issues and identify potential security vulnerabilities in Bravo Arena Project. This process is used to find technical issues and security loopholes which might be found in the smart contract.

The security audit report provides a satisfactory result with some low-risk issues.

The issues found in the Bravo Arena smart contract code do not pose a considerable risk. The writing of the contract is close to the standard of writing contracts in general. The low-risk issues found are some arithmetic operation issues, a floating pragma set, weak sources of randomness, and out of bounds array access which the index access expression can cause an exception in case of the use of an invalid array index value. We Recommend Don't use any of those environment variables as sources of randomness and being aware that the use of these variables introduces a certain level of trust in miners.

AUDIT RESULT

Article	Category	Description	Result
Default Visibility	SWC-100 SWC-108	Functions and state variables visibility should be set explicitly. Visibility levels should be specified consciously.	PASS
Integer Overflow and Underflow	SWC-101	If unchecked math is used, all math operations should be safe from overflows and underflows.	ISSUE FOUND
Outdated Compiler Version	SWC-102	It is recommended to use a recent version of the Solidity compiler.	PASS
Floating Pragma	SWC-103	Contracts should be deployed with the same compiler version and flags that they have been tested thoroughly.	ISSUE FOUND
Unchecked Call Return Value	SWC-104	The return value of a message call should be checked.	PASS
Unprotected Ether Withdrawal	SWC-105	Due to missing or insufficient access controls, malicious parties can withdraw from the contract.	PASS
SELFDESTRUCT Instruction	SWC-106	The contract should not be self-destructible while it has funds belonging to users.	PASS
Reentrancy	SWC-107	Check effect interaction pattern should be followed if the code performs recursive call.	PASS
Uninitialized Storage Pointer	SWC-109	Uninitialized local storage variables can point to unexpected storage locations in the contract.	PASS
Assert Violation	SWC-110 SWC-123	Properly functioning code should never reach a failing assert statement.	ISSUE FOUND
Deprecated Solidity Functions	SWC-111	Deprecated built-in functions should never be used.	PASS
Delegate call to Untrusted Callee	SWC-112	Delegatecalls should only be allowed to trusted addresses.	PASS

DoS (Denial of Service)	SWC-113 SWC-128	Execution of the code should never be blocked by a specific contract state unless required.	PASS
Race Conditions	SWC-114	Race Conditions and Transactions Order Dependency should not be possible.	PASS
Authorization through tx.origin	SWC-115	tx.origin should not be used for authorization.	PASS
Block values as a proxy for time	SWC-116	Block numbers should not be used for time calculations.	PASS
Signature Unique ID	SWC-117 SWC-121 SWC-122	Signed messages should always have a unique id. A transaction hash should not be used as a unique id.	PASS
Incorrect Constructor Name	SWC-118	Constructors are special functions that are called only once during the contract creation.	PASS
Shadowing State Variable	SWC-119	State variables should not be shadowed.	PASS
Weak Sources of Randomness	SWC-120	Random values should never be generated from Chain Attributes or be predictable.	ISSUE FOUND
Write to Arbitrary Storage Location	SWC-124	The contract is responsible for ensuring that only authorized user or contract accounts may write to sensitive storage locations.	PASS
Incorrect Inheritance Order	SWC-125	When inheriting multiple contracts, especially if they have identical functions, a developer should carefully specify inheritance in the correct order. The rule of thumb is to inherit contracts from more /general/ to more /specific/.	PASS
Insufficient Gas Griefing	SWC-126	Insufficient gas griefing attacks can be performed on contracts which accept data and use it in a sub-call on another contract.	PASS
Arbitrary Jump Function	SWC-127	As Solidity doesnt support pointer arithmetics, it is impossible to change such variable to an arbitrary value.	PASS

Typographical Error	SWC-129	A typographical error can occur for example when the intent of a defined operation is to sum a number to a variable.	PASS
Override control character	SWC-130	Malicious actors can use the Right-To-Left-Override unicode character to force RTL text rendering and confuse users as to the real intent of a contract.	PASS
Unused variables	SWC-131 SWC-135	Unused variables are allowed in Solidity and they do not pose a direct security issue.	PASS
Unexpected Ether balance	SWC-132	Contracts can behave erroneously when they strictly assume a specific Ether balance.	PASS
Hash Collisions Variable	SWC-133	Using <code>abi.encodePacked()</code> with multiple variable length arguments can, in certain situations, lead to a hash collision.	PASS
Hardcoded gas amount	SWC-134	The <code>transfer()</code> and <code>send()</code> functions forward a fixed amount of 2300 gas.	PASS
Unencrypted Private Data	SWC-136	It is a common misconception that private type variables cannot be read.	PASS

SWC-101	ARITHMETIC OPERATION "**" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged

SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "**" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged

SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "++" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "***" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "***" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "*" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "***" DISCOVERED	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-120	POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.	low	acknowledged
SWC-120	POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.	low	acknowledged

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 200

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
199     require(currentAllowance >= amount, "ERC20: transfer amount exceeds allowance");
200     _approve(sender, _msgSender(), currentAllowance - amount);
201
202     return true;
203 }
204
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 222

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
221  {
222  _approve(_msgSender(), spender, _allowances[_msgSender()][spender] + addedValue);
223  return true;
224  }
225
226
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 247

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
246   require(currentAllowance >= subtractedValue, "ERC20: decreased allowance below
zero");
247   _approve(_msgSender(), spender, currentAllowance - subtractedValue);
248
249   return true;
250   }
251
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 276

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
275   require(senderBalance >= amount, "ERC20: transfer amount exceeds balance");
276   _balances[sender] = senderBalance - amount;
277   _balances[recipient] += amount;
278
279   emit Transfer(sender, recipient, amount);
280
```


SWC-101 | ARITHMETIC OPERATION "+=" DISCOVERED

LINE 277

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
276  _balances[sender] = senderBalance - amount;  
277  _balances[recipient] += amount;  
278  
279  emit Transfer(sender, recipient, amount);  
280  }  
281
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 406

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
405
406  uint256 public tokenLiquidityThreshold = 75_000 * 10**decimals();
407  uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408  uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409  uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 406

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
405
406  uint256 public tokenLiquidityThreshold = 75_000 * 10**decimals();
407  uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408  uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409  uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 407

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
406 uint256 public tokenLiquidityThreshold = 75_000 * 10**decimals();
407 uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 407

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
406 uint256 public tokenLiquidityThreshold = 75_000 * 10**decimals();
407 uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 408

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
407 uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411 uint256 public launchedAtBlock;
412
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 408

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
407 uint256 public maxBuyLimit = 1_000_000 * 10**decimals();
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411 uint256 public launchedAtBlock;
412
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 409

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411 uint256 public launchedAtBlock;
412
413
```


SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 409

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
408 uint256 public maxSellLimit = 1_000_000 * 10**decimals();
409 uint256 public maxWalletLimit = 2_000_000 * 10**decimals();
410
411 uint256 public launchedAtBlock;
412
413
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 439

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
438     constructor() ERC20("Bravo Arena", "BRV") {
439         _tokengeneration(msg.sender, 100_000_000 * 10**decimals());
440         exemptFee[msg.sender] = true;
441
442         // IRouter _router = IRouter(0x7a250d5630B4cF539739dF2C5dAcb4c659F2488D); //
UNISWAP V2
443
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 439

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
438     constructor() ERC20("Bravo Arena", "BRV") {
439         _tokengeneration(msg.sender, 100_000_000 * 10**decimals());
440         exemptFee[msg.sender] = true;
441
442         // IRouter _router = IRouter(0x7a250d5630B4cF539739dF2C5dAcb4c659F2488D); //
UNISWAP V2
443
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 469

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
468     require(currentAllowance >= amount, "ERC20: transfer amount exceeds allowance");
469     _approve(sender, _msgSender(), currentAllowance - amount);
470
471     return true;
472 }
473
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 479

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
478  {  
479  _approve(_msgSender(), spender, _allowances[_msgSender()][spender] + addedValue);  
480  return true;  
481  }  
482  
483
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 490

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
489   require(currentAllowance >= subtractedValue, "ERC20: decreased allowance below
zero");
490   _approve(_msgSender(), spender, currentAllowance - subtractedValue);
491
492   return true;
493   }
494
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 508

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
507
508   if(block.number < launchedAtBlock + 3 && sender == pair) {
509     nonCustodial[recipient] = true;
510   }
511
512
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 519

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
518     require(  
519     balanceOf(recipient) + amount <= maxWalletLimit,  
520     "You are exceeding maxWalletLimit"  
521     );  
522 }  
523
```


SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 530

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
529     require(  
530     balanceOf(recipient) + amount <= maxWalletLimit,  
531     "You are exceeding maxWalletLimit"  
532     );  
533     }  
534
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 548

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
547     feeswap =
548     sellTaxes.liquidity +
549     sellTaxes.marketing +
550     sellTaxes.developer;
551     feesum = feeswap;
552
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 548

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
547     feeswap =
548     sellTaxes.liquidity +
549     sellTaxes.marketing +
550     sellTaxes.developer;
551     feesum = feeswap;
552
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 555

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
554 feeswap =  
555 taxes.liquidity +  
556 taxes.marketing +  
557 taxes.developer ;  
558 feesum = feeswap;  
559
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 555

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
554 feeswap =  
555 taxes.liquidity +  
556 taxes.marketing +  
557 taxes.developer ;  
558 feesum = feeswap;  
559
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 562

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
561 feeswap =  
562 transferTaxes.liquidity +  
563 transferTaxes.marketing +  
564 transferTaxes.developer ;  
565 feesum = feeswap;  
566
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 562

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
561 feeswap =
562 transferTaxes.liquidity +
563 transferTaxes.marketing +
564 transferTaxes.developer ;
565 feesum = feeswap;
566
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 569

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
568
569     fee = (amount * feesum) / 100;
570
571     //send fees if threshold has been reached
572     //don't do this on buys, breaks swap
573
```


SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 569

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
568
569     fee = (amount * feesum) / 100;
570
571     //send fees if threshold has been reached
572     //don't do this on buys, breaks swap
573
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 576

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
575 //rest to recipient
576 super._transfer(sender, recipient, amount - fee);
577 if (fee > 0) {
578 //send the fee to the contract
579 if (feeswap > 0) {
580
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 580

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
579     if (feeswap > 0) {  
580         uint256 feeAmount = (amount * feeswap) / 100;  
581         super._transfer(sender, address(this), feeAmount);  
582     }  
583  
584
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 580

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
579     if (feeswap > 0) {
580         uint256 feeAmount = (amount * feeswap) / 100;
581         super._transfer(sender, address(this), feeAmount);
582     }
583
584
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 600

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
599 // Split the contract balance into halves
600 uint256 denominator = feeswap * 2;
601 uint256 tokensToAddLiquidityWith = (contractBalance * swapTaxes.liquidity) /
602 denominator;
603 uint256 toSwap = contractBalance - tokensToAddLiquidityWith;
604
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 601

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
600 uint256 denominator = feeswap * 2;
601 uint256 tokensToAddLiquidityWith = (contractBalance * swapTaxes.liquidity) /
602 denominator;
603 uint256 toSwap = contractBalance - tokensToAddLiquidityWith;
604
605
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 601

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
600 uint256 denominator = feeswap * 2;
601 uint256 tokensToAddLiquidityWith = (contractBalance * swapTaxes.liquidity) /
602 denominator;
603 uint256 toSwap = contractBalance - tokensToAddLiquidityWith;
604
605
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 603

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
602 denominator;  
603 uint256 toSwap = contractBalance - tokensToAddLiquidityWith;  
604  
605 uint256 initialBalance = address(this).balance;  
606  
607
```


SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 609

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
608
609  uint256 deltaBalance = address(this).balance - initialBalance;
610  uint256 unitBalance = deltaBalance / (denominator - swapTaxes.liquidity);
611  uint256 ethToAddLiquidityWith = unitBalance * swapTaxes.liquidity;
612
613
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 610

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
609 uint256 deltaBalance = address(this).balance - initialBalance;
610 uint256 unitBalance = deltaBalance / (denominator - swapTaxes.liquidity);
611 uint256 ethToAddLiquidityWith = unitBalance * swapTaxes.liquidity;
612
613 if (ethToAddLiquidityWith > 0) {
614
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 610

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
609 uint256 deltaBalance = address(this).balance - initialBalance;
610 uint256 unitBalance = deltaBalance / (denominator - swapTaxes.liquidity);
611 uint256 ethToAddLiquidityWith = unitBalance * swapTaxes.liquidity;
612
613 if (ethToAddLiquidityWith > 0) {
614
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 611

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
610 uint256 unitBalance = deltaBalance / (denominator - swapTaxes.liquidity);
611 uint256 ethToAddLiquidityWith = unitBalance * swapTaxes.liquidity;
612
613 if (ethToAddLiquidityWith > 0) {
614     // Add liquidity to pancake
615 }
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 618

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
617
618     uint256 marketingAmt = unitBalance * 2 * swapTaxes.marketing;
619     uint256 developerAmt = unitBalance * 2 * swapTaxes.developer;
620     if (marketingAmt > 0) {
621         payable(marketingWallet).sendValue(marketingAmt);
622     }
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 618

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
617
618     uint256 marketingAmt = unitBalance * 2 * swapTaxes.marketing;
619     uint256 developerAmt = unitBalance * 2 * swapTaxes.developer;
620     if (marketingAmt > 0) {
621         payable(marketingWallet).sendValue(marketingAmt);
622     }
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 619

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
618 uint256 marketingAmt = unitBalance * 2 * swapTaxes.marketing;  
619 uint256 developerAmt = unitBalance * 2 * swapTaxes.developer;  
620 if (marketingAmt > 0) {  
621 payable(marketingWallet).sendValue(marketingAmt);  
622 }  
623
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 619

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
618 uint256 marketingAmt = unitBalance * 2 * swapTaxes.marketing;  
619 uint256 developerAmt = unitBalance * 2 * swapTaxes.developer;  
620 if (marketingAmt > 0) {  
621 payable(marketingWallet).sendValue(marketingAmt);  
622 }  
623
```


SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 671

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
670   require(new_amount <= 1_000_000 && new_amount > 0, "Swap threshold amount should be
lower or euqal to 1% of tokens");
671   tokenLiquidityThreshold = new_amount * 10**decimals();
672   }
673
674   function SetBuyTaxes(
675
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 671

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
670   require(new_amount <= 1_000_000 && new_amount > 0, "Swap threshold amount should be
lower or euqal to 1% of tokens");
671   tokenLiquidityThreshold = new_amount * 10**decimals();
672   }
673
674   function SetBuyTaxes(
675
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 680

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
679 taxes = Taxes(_marketing, _liquidity, _developer);
680 require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
681 }
682
683 function SetSellTaxes(
684
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 680

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
679     taxes = Taxes(_marketing, _liquidity, _developer);
680     require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
681 }
682
683     function SetSellTaxes(
684
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 689

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
688     sellTaxes = Taxes(_marketing, _liquidity, _developer);
689     require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
690 }
691
692     function SetTransferTaxes(
693
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 689

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
688     sellTaxes = Taxes(_marketing, _liquidity, _developer);
689     require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
690 }
691
692     function SetTransferTaxes(
693
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 698

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
697     transferTaxes = Taxes(_marketing, _liquidity, _developer);
698     require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
699 }
700
701     function updateRouterAndPair(address newRouter, address newPair) external onlyOwner
{
702
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 698

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
697     transferTaxes = Taxes(_marketing, _liquidity, _developer);
698     require((_marketing + _liquidity + _developer) <= 10, "Must keep fees at 10% or
less");
699 }
700
701     function updateRouterAndPair(address newRouter, address newPair) external onlyOwner
{
702
```


SWC-101 | ARITHMETIC OPERATION "++" DISCOVERED

LINE 725

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
724 function bulkExemptFee(address[] memory accounts, bool state) external onlyOwner {
725     for (uint256 i = 0; i < accounts.length; i++) {
726         exemptFee[accounts[i]] = state;
727     }
728 }
729
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 738

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
737   require(maxWallet >= 500_000, "Cannot set max wallet amount lower than 0.5%");
738   maxBuyLimit = maxBuy * 10**decimals();
739   maxSellLimit = maxSell * 10**decimals();
740   maxWalletLimit = maxWallet * 10**decimals();
741   }
742
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 738

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
737   require(maxWallet >= 500_000, "Cannot set max wallet amount lower than 0.5%");
738   maxBuyLimit = maxBuy * 10**decimals();
739   maxSellLimit = maxSell * 10**decimals();
740   maxWalletLimit = maxWallet * 10**decimals();
741   }
742
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 739

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
738     maxBuyLimit = maxBuy * 10**decimals();
739     maxSellLimit = maxSell * 10**decimals();
740     maxWalletLimit = maxWallet * 10**decimals();
741 }
742
743
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 739

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
738     maxBuyLimit = maxBuy * 10**decimals();
739     maxSellLimit = maxSell * 10**decimals();
740     maxWalletLimit = maxWallet * 10**decimals();
741 }
742
743
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 740

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
739     maxSellLimit = maxSell * 10**decimals();
740     maxWalletLimit = maxWallet * 10**decimals();
741 }
742
743 function rescueETH(uint256 weiAmount) external onlyOwner {
744
```

SWC-101 | ARITHMETIC OPERATION "**" DISCOVERED

LINE 740

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- BravoArena.sol

Locations

```
739     maxSellLimit = maxSell * 10**decimals();
740     maxWalletLimit = maxWallet * 10**decimals();
741 }
742
743 function rescueETH(uint256 weiAmount) external onlyOwner {
744
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 13

low SEVERITY

The current pragma Solidity directive is `^0.8.17`. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- BravoArena.sol

Locations

```
12
13  pragma solidity ^0.8.17;
14
15  abstract contract Context {
16  function _msgSender() internal view virtual returns (address) {
17
```


SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 633

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- BravoArena.sol

Locations

```
632 address[] memory path = new address[](2);
633 path[0] = address(this);
634 path[1] = router.WETH();
635
636 _approve(address(this), address(router), tokenAmount);
637
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 634

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- BravoArena.sol

Locations

```
633 path[0] = address(this);  
634 path[1] = router.WETH();  
635  
636 _approve(address(this), address(router), tokenAmount);  
637  
638
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 726

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- BravoArena.sol

Locations

```
725   for (uint256 i = 0; i < accounts.length; i++) {  
726     exemptFee[accounts[i]] = state;  
727   }  
728 }  
729  
730
```

SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 508

low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

Source File

- BravoArena.sol

Locations

```
507
508  if(block.number < launchedAtBlock + 3 && sender == pair) {
509  nonCustodial[recipient] = true;
510  }
511
512
```

SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 710

low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

Source File

- BravoArena.sol

Locations

```
709     providingLiquidity = true;
710     launchedAtBlock = block.number;
711 }
712
713 function updateWallets(address _marketingWallet, address _devWallet) external
onlyOwner {
714
```

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This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn’t say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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