

# 04 基于CPAMM的交易所实现

## 实验目的

- 掌握恒定乘积自动做市商算法；
- 掌握基于恒定乘积自动做市商算法交易所的实现；

## 实验环境

- VSCode
- Remix IDE: <https://remix.ethereum.org/> ;

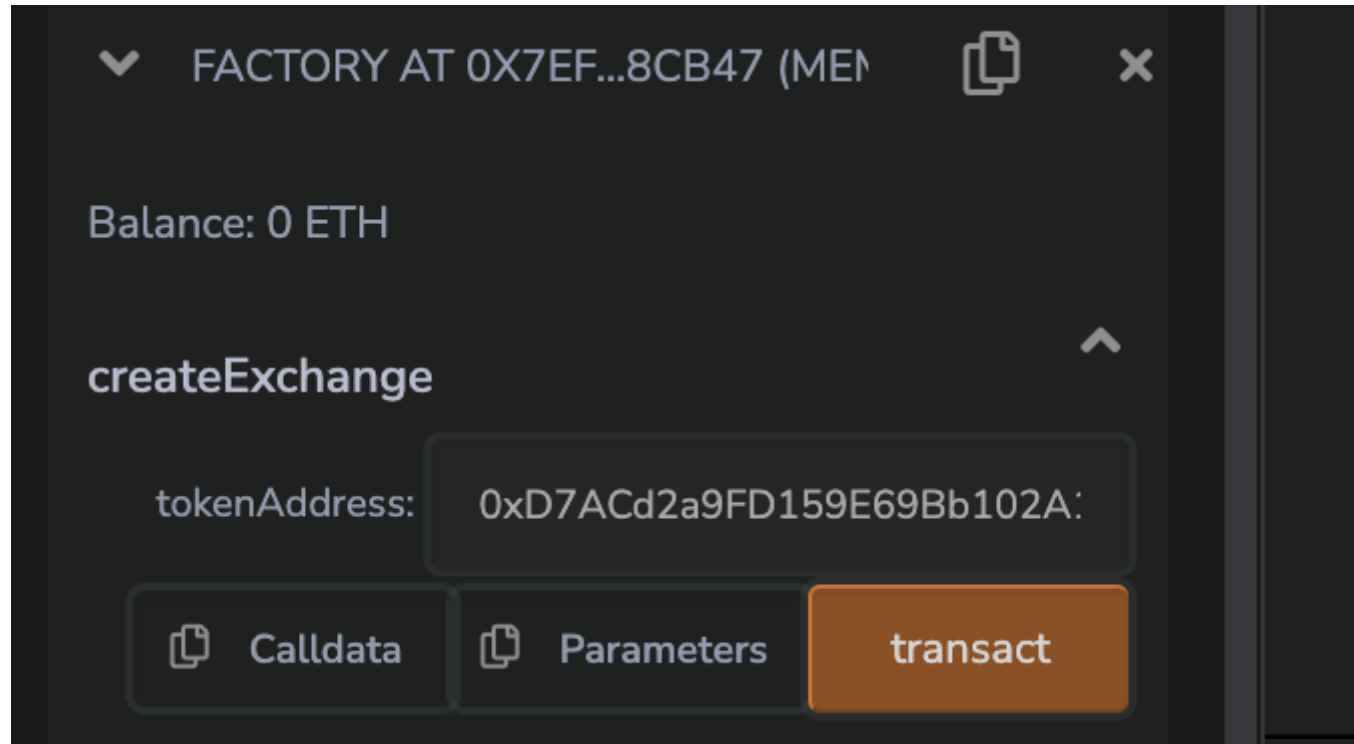
## 实验内容

1. 仔细阅读 `Factory.sol` 合约，思考它与 `Exchange.sol` 的关系；
2. 根据初始合约，完善合约内容；

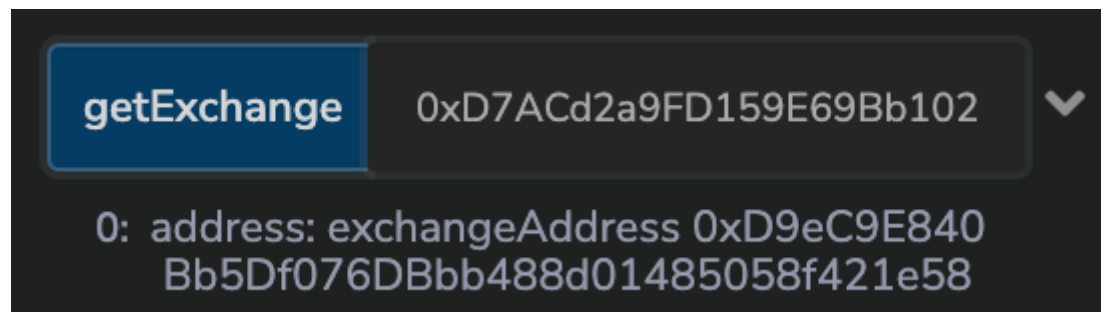
3. 写完合约后，对相关合约进行部署；



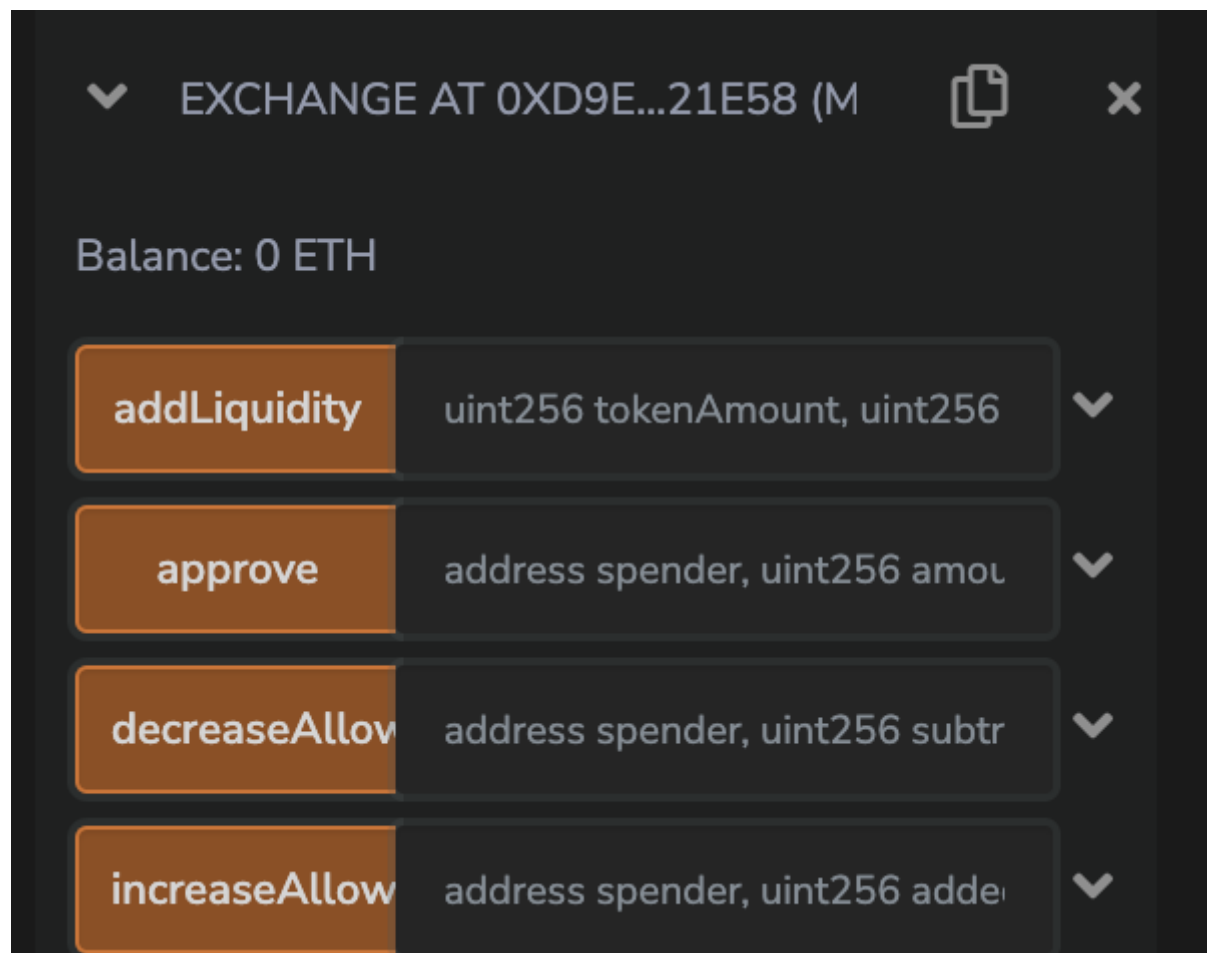
4. 调用 factory 的 createExchange 方法，创建自己名字命名的币的交易对



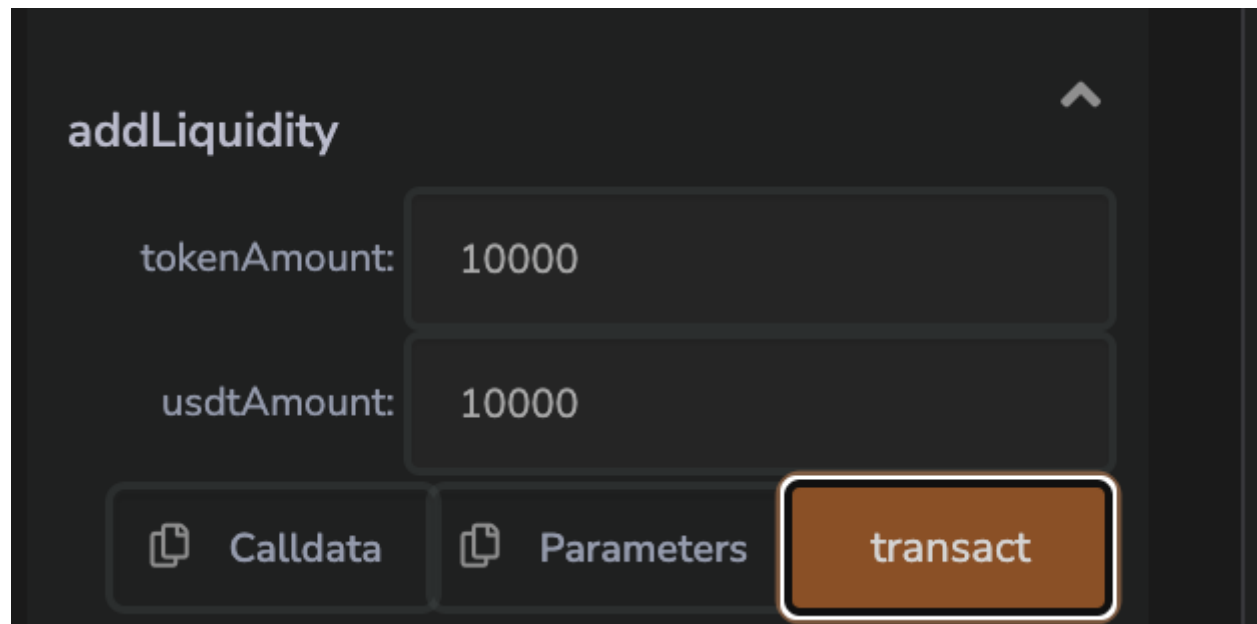
5. 查询交易对的地址



## 6. 引入交易对

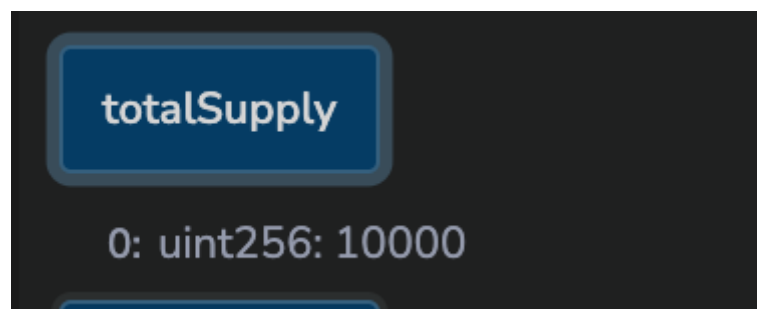


7. 添加流动性, 每边 10000 个 token



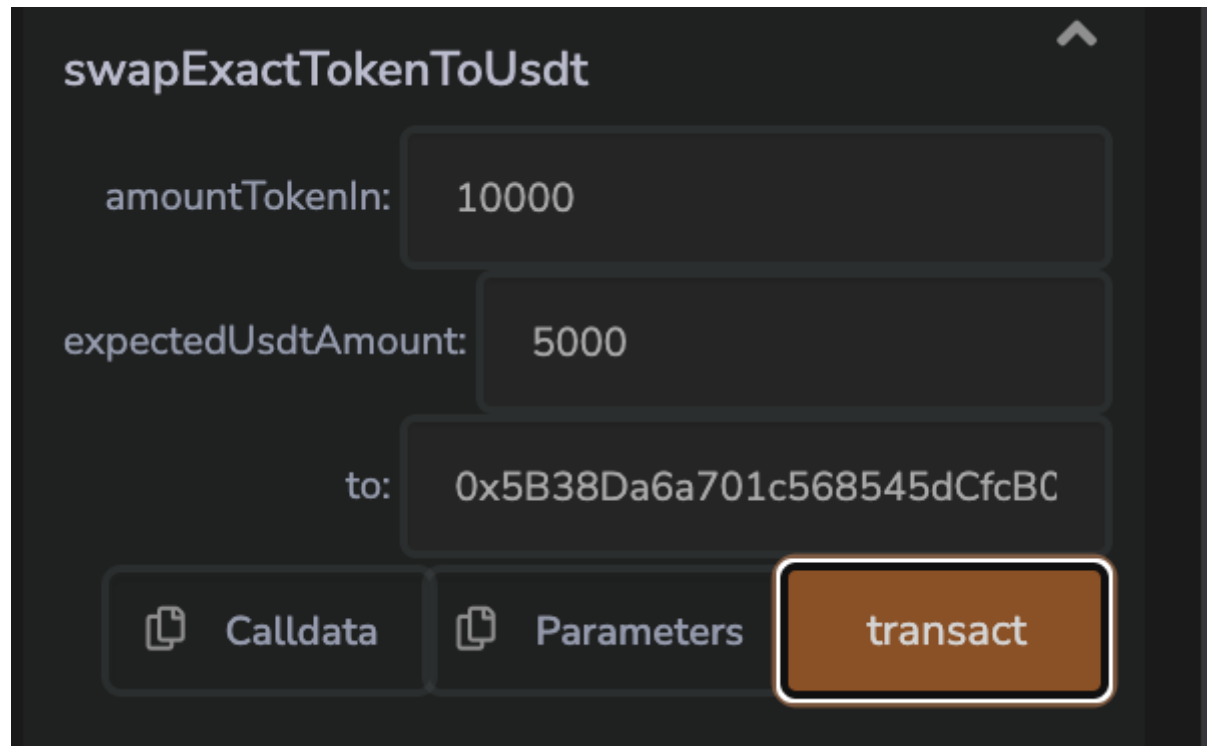
The screenshot shows a dark-themed interface for the `addLiquidity` function. At the top left, the function name `addLiquidity` is displayed. Below it, there are two input fields: `tokenAmount:` with the value `10000` and `usdtAmount:` with the value `10000`. At the bottom, there are three buttons: `Calldata` (with a clipboard icon), `Parameters` (with a clipboard icon), and `transact` (highlighted with a white border). An upward-pointing arrow is visible in the top right corner.

8. 查看 `totalSupply`



The screenshot shows a dark-themed interface for the `totalSupply` function. A blue button labeled `totalSupply` is at the top. Below it, the text `0: uint256: 10000` is displayed. A portion of another blue button is visible at the bottom.

9. 调用 swapExactTokenToUsdt, 参数如下



swapExactTokenToUsdt

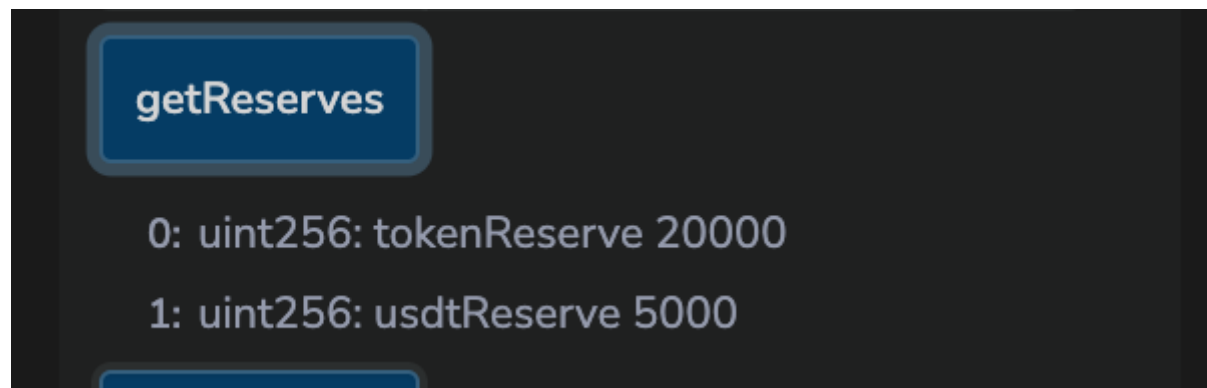
amountTokenIn: 10000

expectedUsdtAmount: 5000

to: 0x5B38Da6a701c568545dCfcBC

Calldata Parameters transact

10. 查看 getReserves

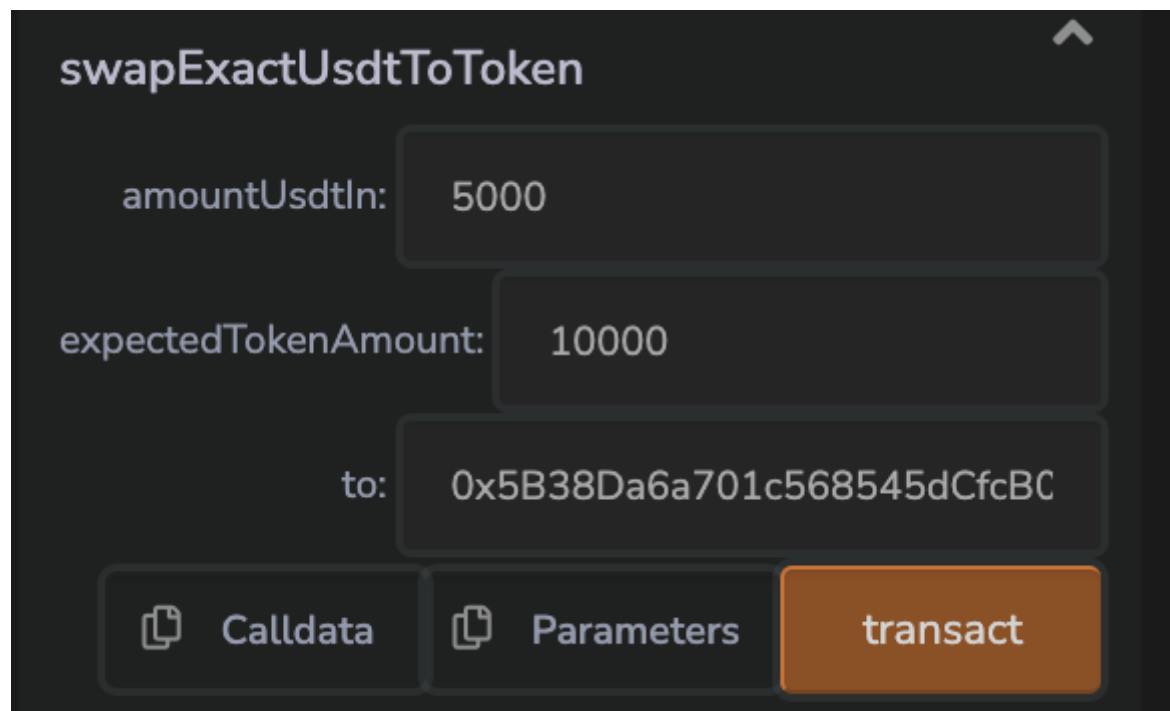


getReserves

0: uint256: tokenReserve 20000

1: uint256: usdtReserve 5000

11. 调用 swapExactUsdtToToken, 参数如下



swapExactUsdtToToken

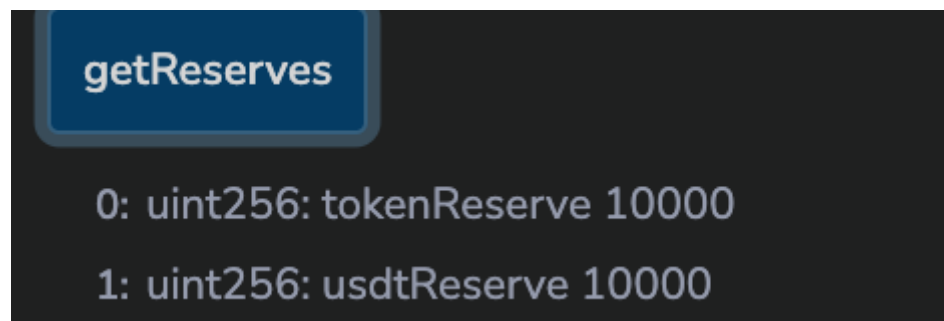
amountUsdtIn: 5000

expectedTokenAmount: 10000

to: 0x5B38Da6a701c568545dCfcBC

Calldata Parameters transact

12. 查看 getReserves

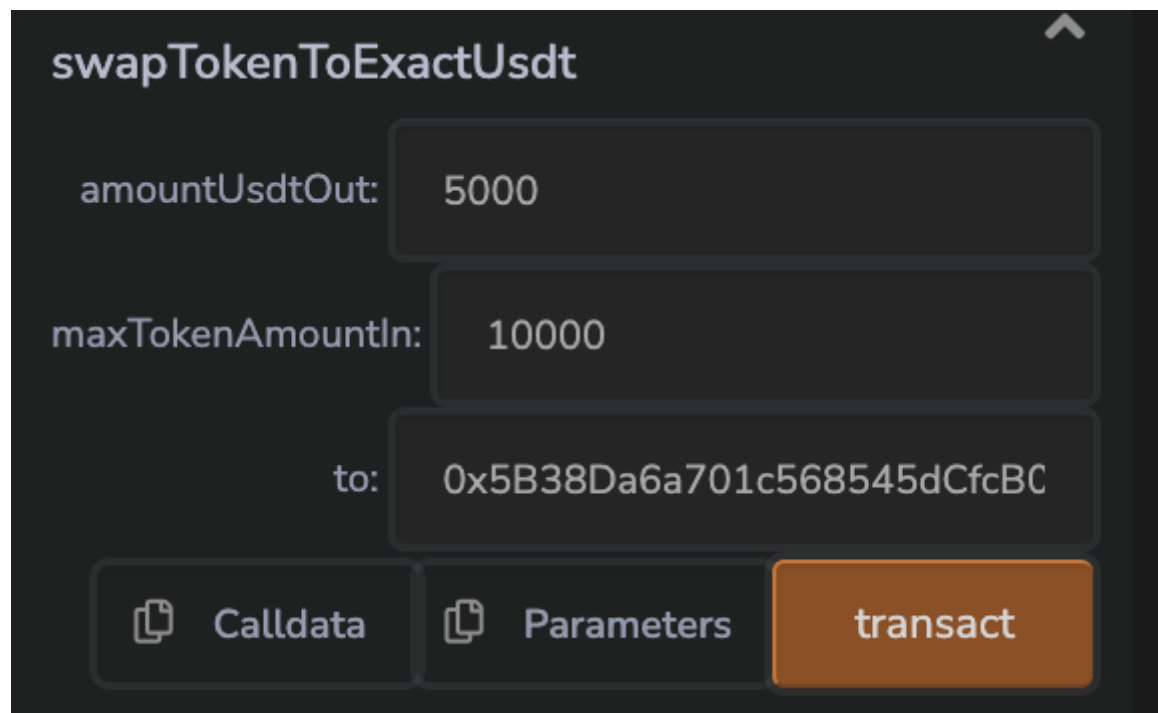


getReserves

0: uint256: tokenReserve 10000

1: uint256: usdtReserve 10000

13. 调用 swapTokenToExactUsdt 参数如下



The screenshot shows a transaction interface for the function `swapTokenToExactUsdt`. It features three input fields: `amountUsdtOut` with the value 5000, `maxTokenAmountIn` with the value 10000, and `to` with the address `0x5B38Da6a701c568545dCfcBC`. Below the inputs are three buttons: `Calldata`, `Parameters`, and `transact`. The `transact` button is highlighted in orange.

swapTokenToExactUsdt

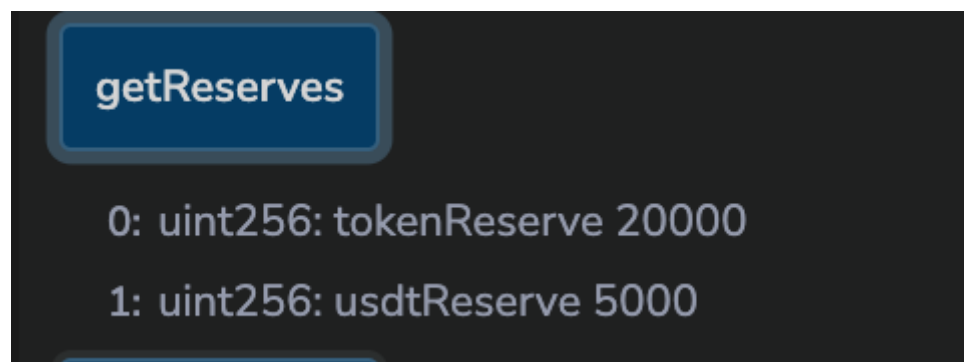
amountUsdtOut: 5000

maxTokenAmountIn: 10000

to: 0x5B38Da6a701c568545dCfcBC

Calldata Parameters transact

14. 查看 getReserves



The screenshot shows the `getReserves` function call. The function name is highlighted in a blue box. Below it, the return values are displayed: `0: uint256: tokenReserve 20000` and `1: uint256: usdtReserve 5000`.

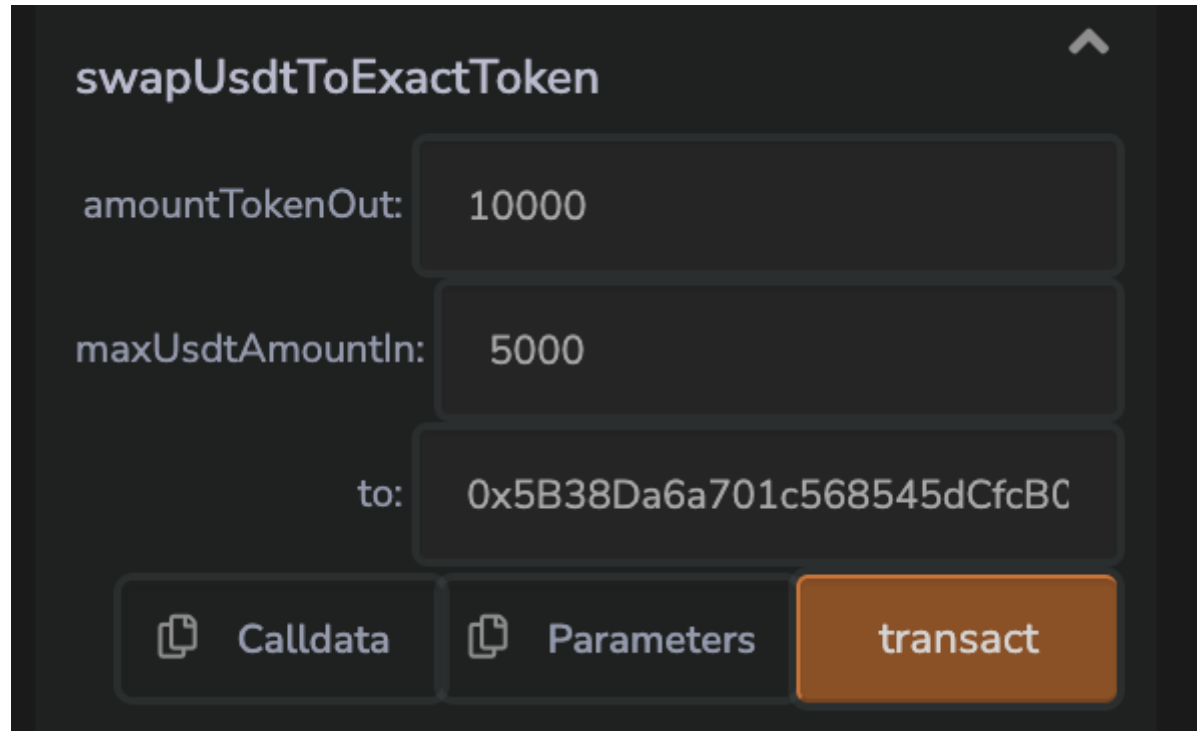
getReserves

0: uint256: tokenReserve 20000

1: uint256: usdtReserve 5000



15. 调用 swapUsdtToExactToken, 参数如下



The screenshot shows a transaction interface for the function `swapUsdtToExactToken`. It features three input fields: `amountTokenOut` with the value 10000, `maxUsdtAmountIn` with the value 5000, and `to` with the address `0x5B38Da6a701c56854dCfcBC`. At the bottom, there are three buttons: `Calldata`, `Parameters`, and `transact` (which is highlighted in orange).

swapUsdtToExactToken

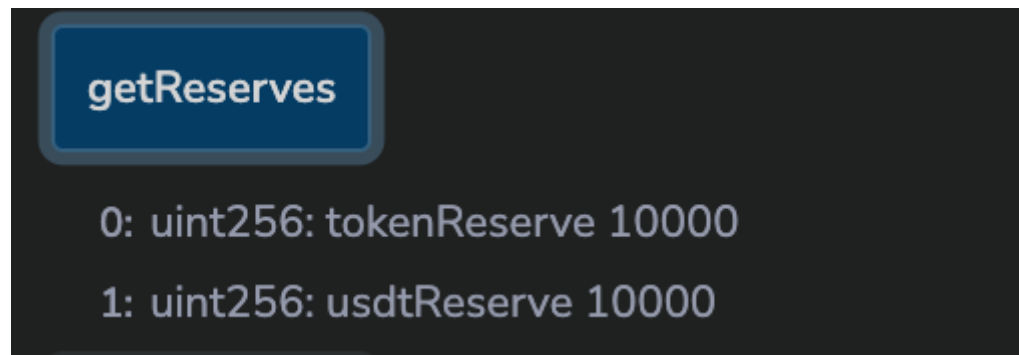
amountTokenOut: 10000

maxUsdtAmountIn: 5000

to: 0x5B38Da6a701c56854dCfcBC

Calldata Parameters transact

16. 查看 getReserves



The screenshot shows the `getReserves` function call. Below the function name, it displays two results: `0: uint256: tokenReserve 10000` and `1: uint256: usdtReserve 10000`.

getReserves

0: uint256: tokenReserve 10000

1: uint256: usdtReserve 10000

实验报告内容

合约代码+上面的截图

## 实验报告提交方式

实验报告完成后发送到邮箱 [cbireport@163.com](mailto:cbireport@163.com)，标题为 [学号-班级-姓名-第X次实验报告](#)，实验报告提交截止时间为实验课一星期内。