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Practical 4

Program:

```
// SPDX-License-Identifier: MIT pragma  
solidity ^0.8.20;
```

```
/**  
 * @title StudentDatabase  
 * @dev This contract stores and manages student records.  
 * It demonstrates the use of structs, arrays, and fallback functions.  
 */  
contract StudentDatabase {  
  
    /**  
     * @dev Defines the structure for a Student.  
     * Each student has a unique ID, a name, and a grade.  
     */  
    struct Student {  
        uint studentId;  
        string name;  
        uint grade;  
    }  
  
    /**  
     * @dev An array to store all the student records.  
     * The 'public' keyword automatically creates a getter function for it.  
     */  
    Student[] public students;  
  
    /**  
     * @dev Adds a new student to the `students` array.  
     * @param _studentId The unique identifier for the student.  
     * @param _name The name of the student.  
     * @param _grade The grade of the student.  
     */  
    function addStudent(uint _studentId, string memory _name, uint _grade) public { //  
        Creates a new Student struct in memory and adds it to the storage array.  
        students.push(Student(_studentId, _name, _grade));  
    }  
  
    /**  
     * @dev A receive function is the modern way to handle plain Ether transfers.  
     * This function is executed when the contract receives Ether without any data.  
     */  
    receive() external payable {  
        // This function is intentionally left simple.  
        // In a real-world scenario, you might emit an event or log the deposit.
```

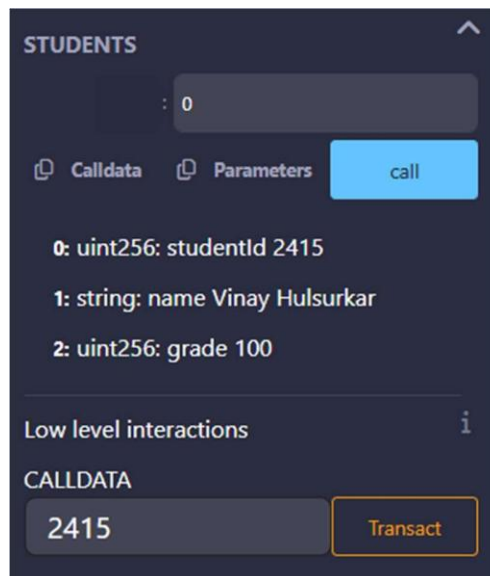
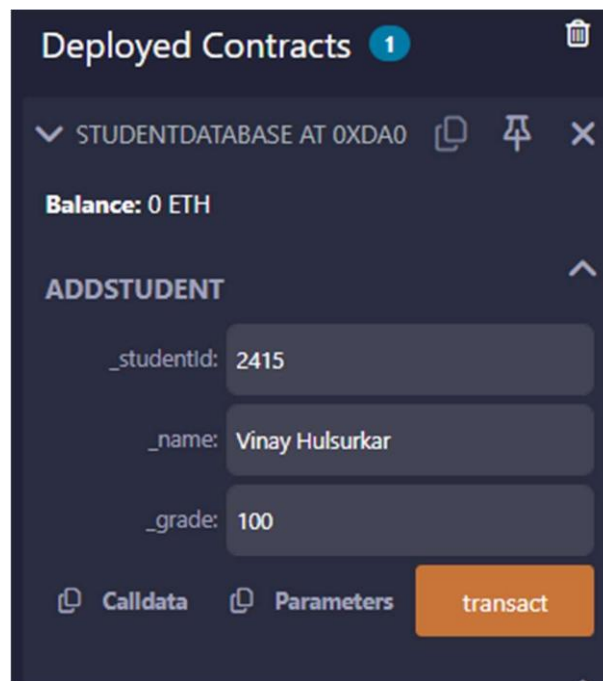
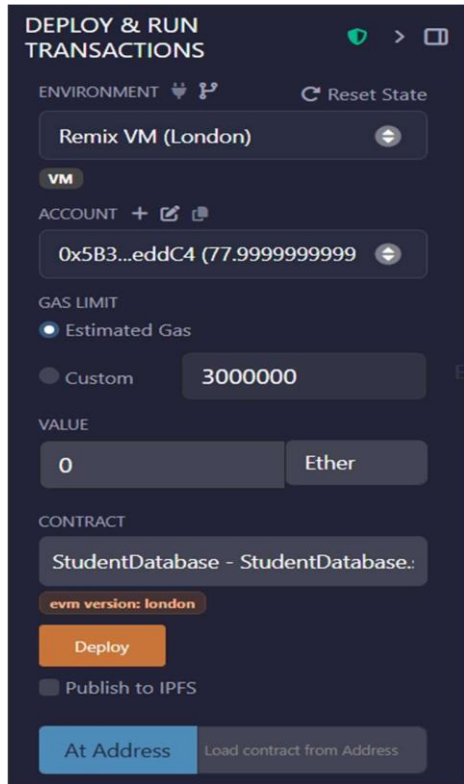
```

}

/**
 * @dev A fallback function is executed when a function that doesn't exist
 * is called on the contract, or if Ether is sent with some data but * no other function
 * matches.
 */
fallback() external payable {
    // This function is also kept simple for demonstration.
}
}
}

```

Output:



```
creation of StudentDatabase pending...

[vm] from: 0x5B3...eddC4 to: StudentDatabase.(constructor) value: 0 wei data: 0x608...e0033 logs: 0 hash: 0x043...4bdf
status 0x1 Transaction mined and execution succeed
transaction hash 0x04392a447ce28e7c0fa76403de54865bc4c3353601fadaa9fc5cecfbe9d4bdf
block hash 0xa65f518e61357a2e5601ab0c1da35a77d9827c59e3e19b889e72e7bc303d50db
block number 6
contract address 0xDA0bab807633f07f013f94D0E6A4F96F8742853
from 0x5B380a6a701c568545dCfcB03FcB875f56beddC4
to StudentDatabase.(constructor)
gas 560023 gas
transaction cost 486976 gas
execution cost 403036 gas
input 0x608...e0033
```

Creation Of DB

```
[vm] from: 0x5B3...eddC4 to: StudentDatabase.addStudent(uint256,string,uint256) 0xDA0...42853 value: 0 wei data: 0xc1b...00000 logs: 0 hash: 0xa78...589fa
status 0x1 Transaction mined and execution succeed
transaction hash 0xa78a2f1c0d2f8dbb2ae5ec9ebdd93e0b18a4f7879cdc9151055e1191298589fa
block hash 0x30f7ed94db7138932a635d7cd0b38df755d510772f7ebfc6ecb0ee1fafd16d8c
block number 7
from 0x5B380a6a701c568545dCfcB03FcB875f56beddC4
to StudentDatabase.addStudent(uint256,string,uint256) 0xDA0bab807633f07f013f94D0E6A4F96F8742853
gas 129392 gas
transaction cost 112514 gas
execution cost 90570 gas
input 0xc1b...00000
output 0x
decoded input {
```

Add Student

```

[vm] from: 0x583...eddC4 to: StudentDatabase.(fallback) 0xDA0...42B53 value: 0 wei data: 0x241...x2415 logs: 0 hash: 0xcfd...6726b
status                                0x1 Transaction mined and execution succeed
transaction hash                      0xcfd70e466818f8bc3be4479ecac04aeca214f5c3bf42ccd1ac578a3a5216726b ⓘ
block hash                           0x2684559ea06902e227de44ba8bbbd3bdf7a8cc80c69d717b2c44b9c94814e60 ⓘ
block number                          8 ⓘ
from                                  0x5838Da6a701c568545dCfc803Fc8875f56beddC4 ⓘ
to                                    StudentDatabase.(fallback) 0xDA0bab807633f07f013f94DD0E6A4F96F8742B53 ⓘ
gas                                    24234 gas ⓘ
transaction cost                      21073 gas ⓘ
execution cost                        41 gas ⓘ
input                                 0x241...x2415 ⓘ
output                                0x ⓘ
decoded input                         - ⓘ

```

Fallback

[illegible]

View Database