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Class: BE – A – A1

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.
    }
}
```

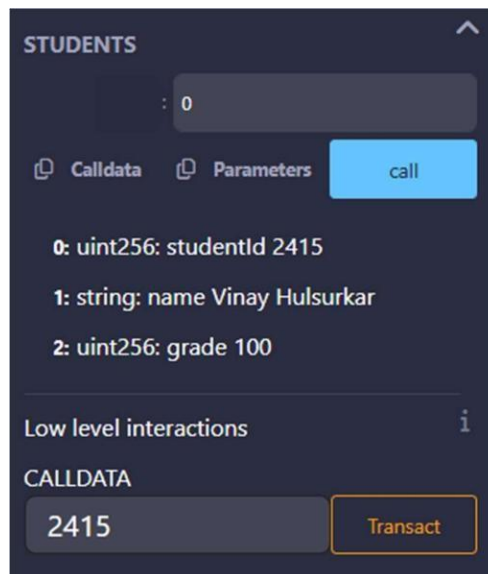
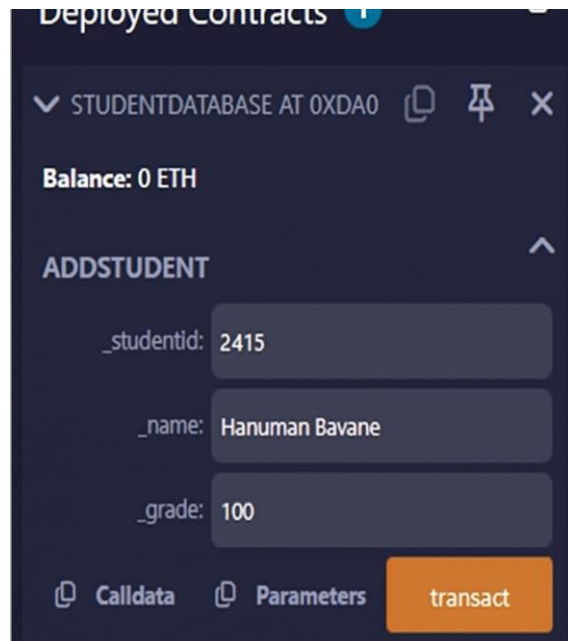
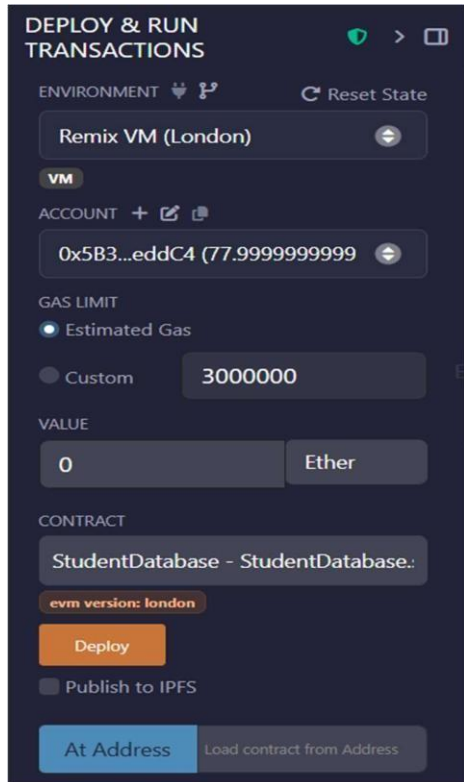
```

}

/**
 * @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 0xDA0bab807633f07f013f940D0E6A4F96F8742B53
from 0x5B38Da6a701c568545dCfcB03FcB875f56beddC4
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...42B53 value: 0 wei data: 0xc1b...00000 logs: 0 hash: 0xa78...589fa
status 0x1 Transaction mined and execution succeed
transaction hash 0xa78a2f1cd02f8dbb2ae5ec9ebdd93e0b18a4f7879cd9151055e1191298589fa
block hash 0x30f7ed94db7138932a635d7cd0b38df755d510772ffebfc6ecb0eef1afdd16d8c
block number 7
from 0x5B38Da6a701c568545dCfcB03FcB875f56beddC4
to StudentDatabase.addStudent(uint256,string,uint256) 0xDA0bab807633f07f013f940D0E6A4F96F8742B53
gas 129392 gas
transaction cost 112514 gas
execution cost 90570 gas
input 0xc1b...00000
output 0x
decoded input {
```

Add Student

```

[vm] from: 0x5B3...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 0xcfd70e466818f8bc3be4479ecac04aece214f5c3bf42ccd1ac578a3a5216726b ⓘ

block hash      0x2684559ea06902e227de44ba8bbbd3bd7a8cc80c69d717b2c44b9c94814e60 ⓘ

block number    8 ⓘ

from            0x5B38Da6a701c568545dCfc803Fc8875f56beddC4 ⓘ

to             StudentDatabase.(fallback) 0xDA0bab807633f07f013f94D00E6A4F96F8742B53 ⓘ

gas            24234 gas ⓘ

transaction cost 21073 gas ⓘ

execution cost  41 gas ⓘ

input          0x241...x2415 ⓘ

output         0x ⓘ

decoded input   - ⓘ

```

Fallback

[illegible]

View Database