Exercise 5 - Polymorphism in solidity

Implementation of polymorphism and its types in solidity using Remix IDE

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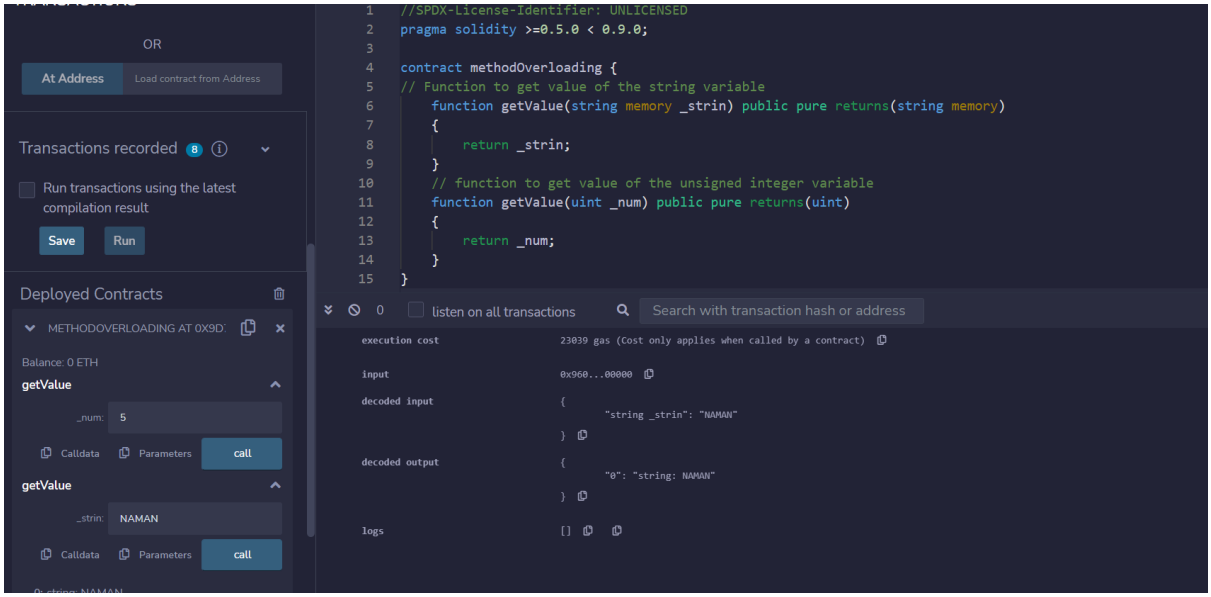
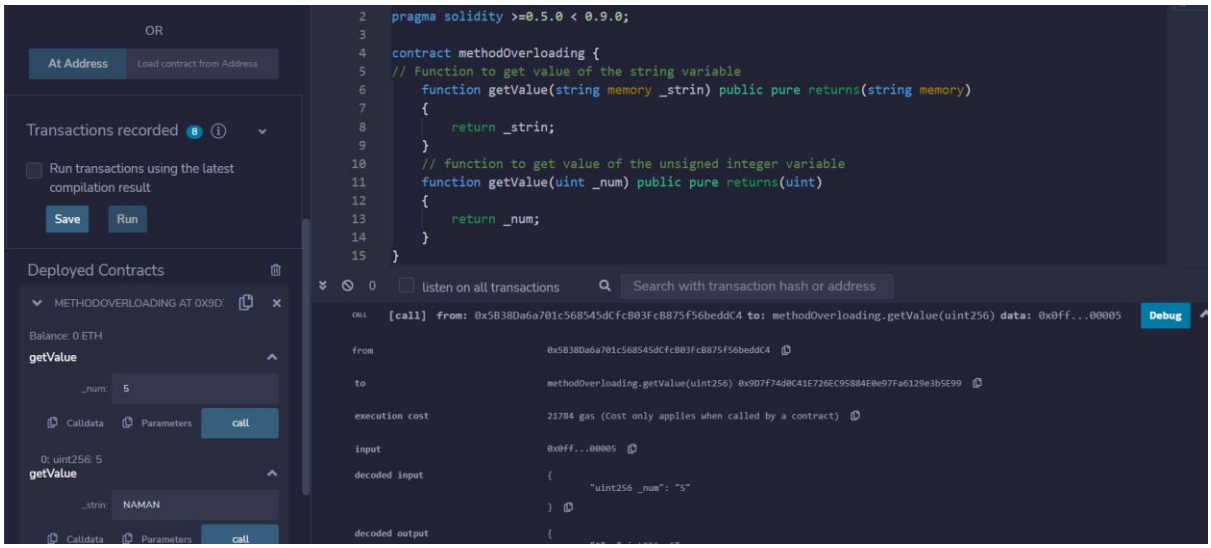
Q1) Implementation of function polymorphism

Code:

```
//SPDX-License-Identifier: UNLICENSED
pragma solidity >=0.5.0 < 0.9.0;

contract methodOverloading {
// Function to get value of the string variable
    function getValue(string memory _strin) public pure returns(string memory)
    {
        return _strin;
    }
    // function to get value of the unsigned integer variable
    function getValue(uint _num) public pure returns(uint)
    {
        return _num;
    }
}
```





Q2) Implementation of contract polymorphism

Code:

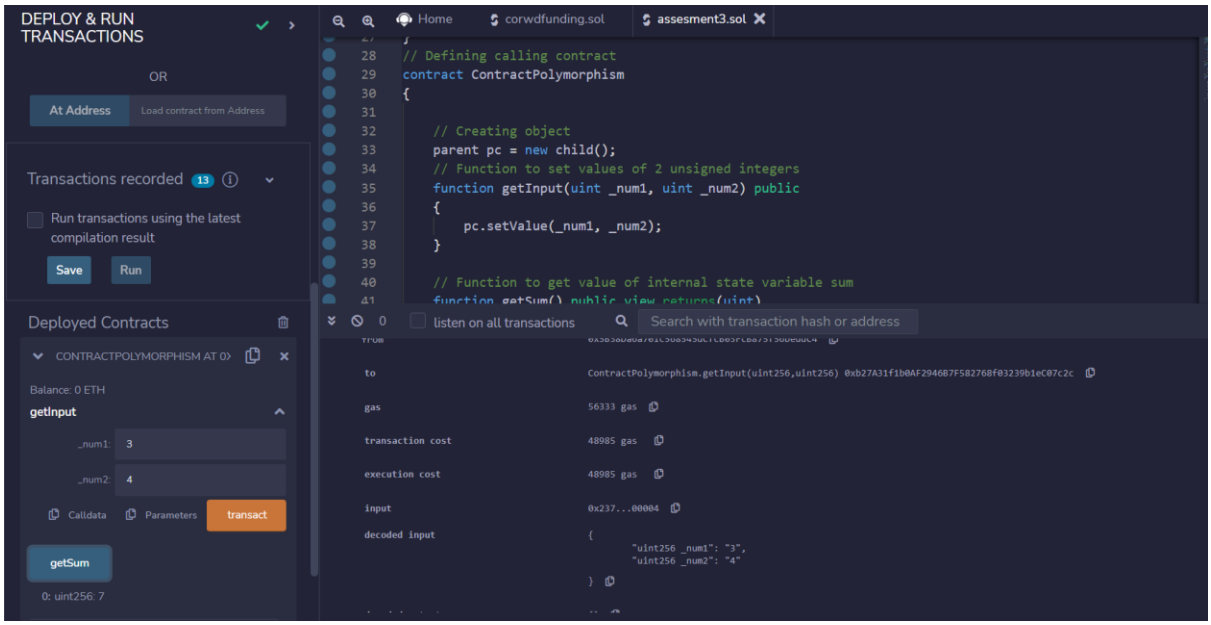
```
//SPDX-License-Identifier: UNLICENSED
pragma solidity >=0.5.0 < 0.9.0;
// Contract definition
contract parent
{
    // Internal state variable
    uint internal sum;
```

```
    // Function to set the value of internal state variable sum
    function setValue(uint _num1, uint _num2) public
    {
        sum = _num1 + _num2;
    }
    // Function to return a value 10
    function getValue() public view returns(uint)
    {
        return sum;
    }
}
// Defining child contract
contract child is parent
{
    // Function getValue overloaded to return internal state variable sum defined in the
parent contract
    function getValue() public view returns(uint)
    {
        return sum;
    }
}
// Defining calling contract
contract ContractPolymorphism
{

    // Creating object
    parent pc = new child();
    // Function to set values of 2 unsigned integers
    function getInput(uint _num1, uint _num2) public
```

```
    {
        pc.setValue(_num1, _num2);
    }

    // Function to get value of internal state variable sum
    function getSum() public view returns(uint)
    {
        return pc.getValue();
    }
}
```



3) Implementation of abstract contract in solidity

Code:

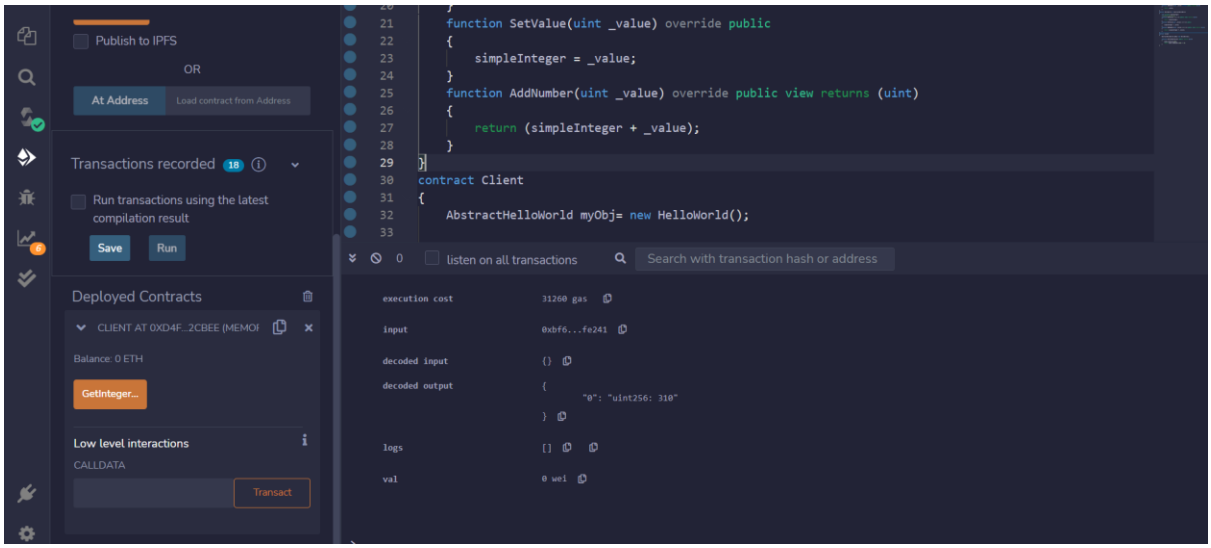
```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;
abstract contract AbstractHelloWorld
{
```

```
    //function declaration without definition in abstract contract
    function GetValue() virtual public view returns (uint);
    function SetValue(uint _value) virtual public;
    function AddNumber(uint _value) virtual public returns(uint)
    {
        return _value;
    }
}
contract HelloWorld is AbstractHelloWorld
{
    uint private simpleInteger;
    //function definition
    function GetValue() override public view returns (uint)
    {
        return simpleInteger;
    }
    function SetValue(uint _value) override public
    {
        simpleInteger = _value;
    }
    function AddNumber(uint _value) override public view returns (uint)
    {
        return (simpleInteger + _value);
    }
}
contract Client
{
    AbstractHelloWorld myObj= new HelloWorld();
```

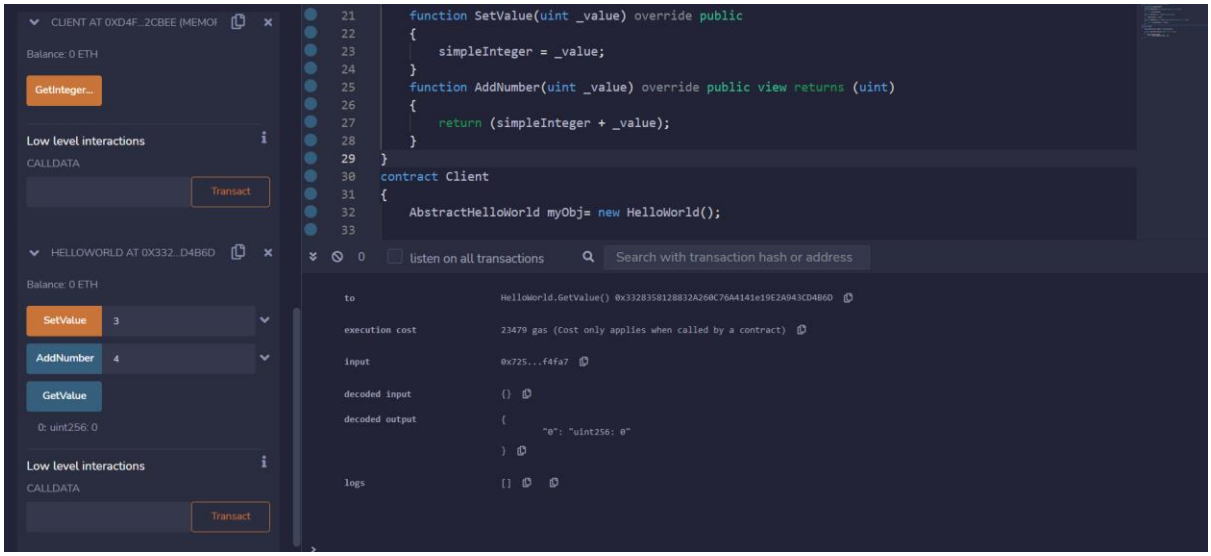
```
    function GetIntegerValue() public returns (uint)
    {
        myObj.SetValue(100);
        return myObj.AddNumber(200) + 10;
    }
}
```

Output:

Client:



HelloWorld



Q4) Implementation of the interface in solidity

Code:

```
// SPDX-License-Identifier: GPL-3.0
pragma solidity >=0.7.0 <0.9.0;
interface IHelloWorld
{
    function GetValue() external view returns (uint);
    function SetValue(uint _value) external;
}
contract HelloWorld is IHelloWorld
{
    uint private simpleInteger;
    function GetValue() public view returns (uint)
    {
        return simpleInteger;
    }
    function SetValue(uint _value) public
    {
        simpleInteger = _value;
```

```
    }
}
contract Client
{
    function GetSetIntegerValue() public returns (uint)
    {
        IHelloWorld myObj = new HelloWorld();
        myObj.SetValue(100);
        return myObj.GetValue() + 10;
    }
}
```

Output: