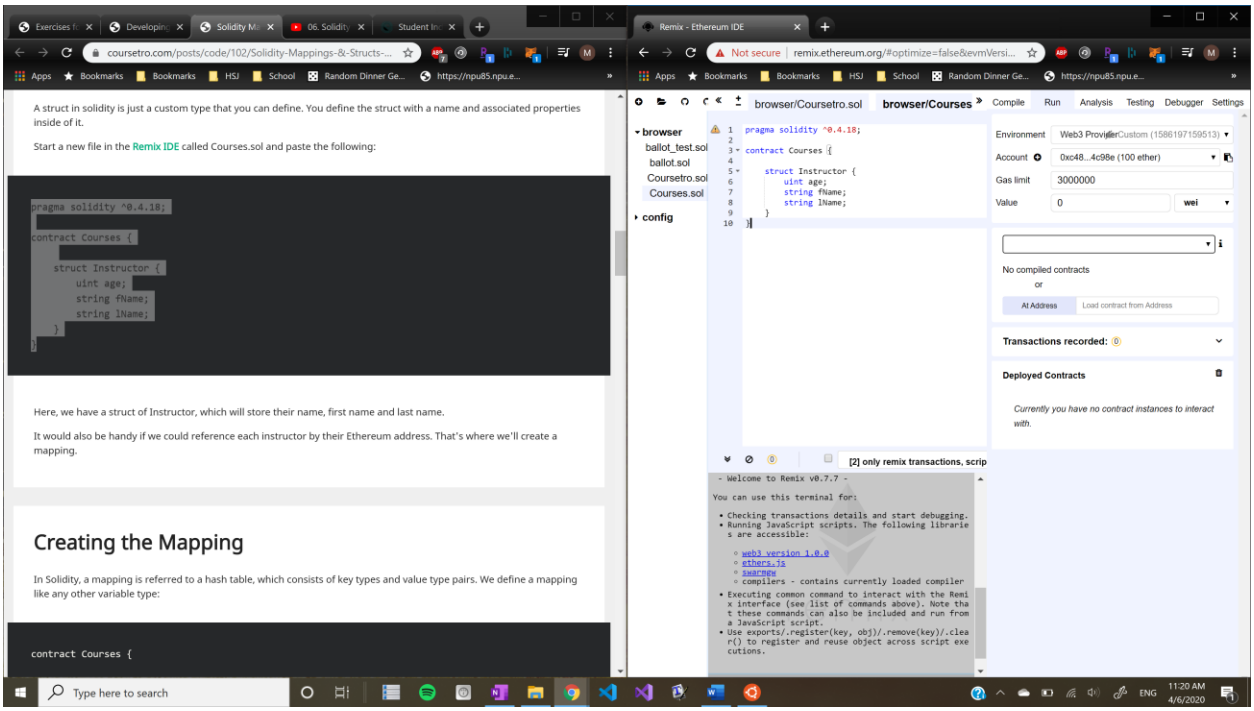
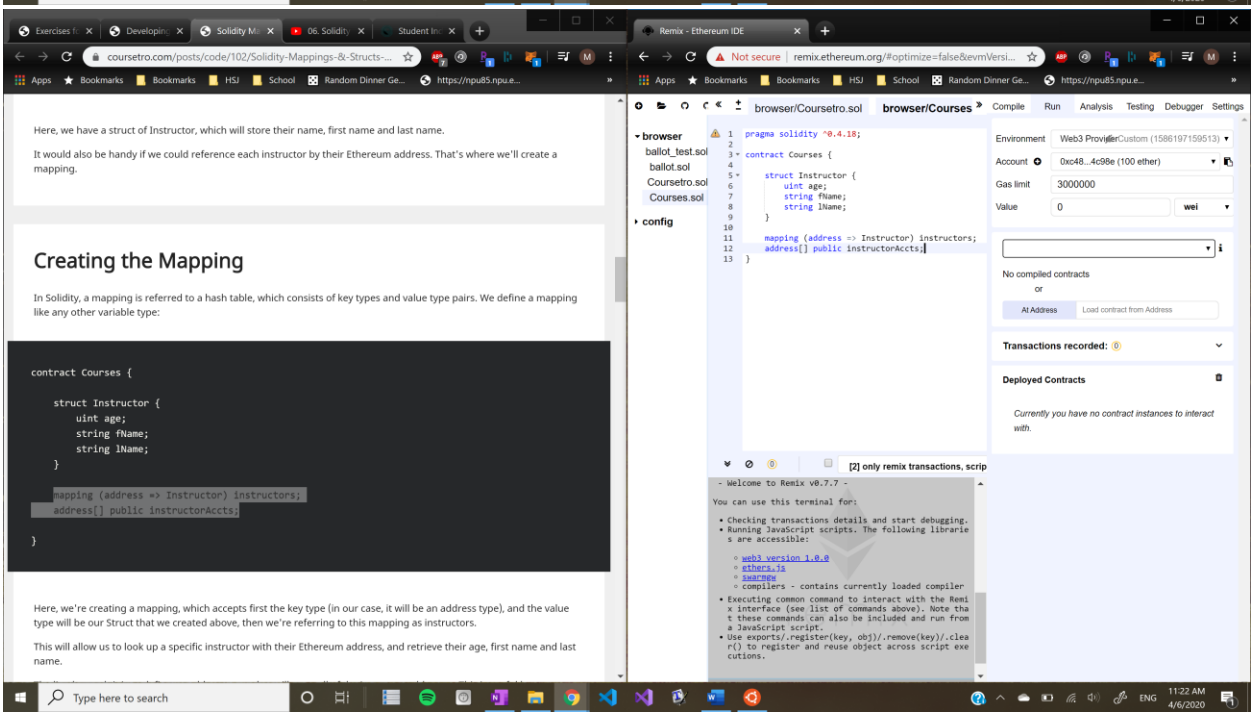

A struct in solidity is just a custom type that you can define. You define the struct with a name and associated properties inside of it.
Start a new file in the Remix IDE called Courses.sol and paste the following:
pragma solidity ^0.4.18;
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
}
Here, we have a struct of Instructor, which will store their name, first name and last name.
It would also be handy if we could reference each instructor by their Ethereum address. That's where we'll create a mapping.
Creating the Mapping
In Solidity, a mapping is referred to a hash table, which consists of key types and value type pairs. We define a mapping like any other variable type:
contract Courses {
Remix - Ethereum IDE
browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
Environment
Account
Gas limit
Value
No compiled contracts
At Address
Transactions recorded:
Deployed Contracts
Currently you have no contract instances to interact with.
- Welcome to Remix v0.7.7 -
You can use this terminal for:
Type here to search
ENG
11:20 AM
4/6/2020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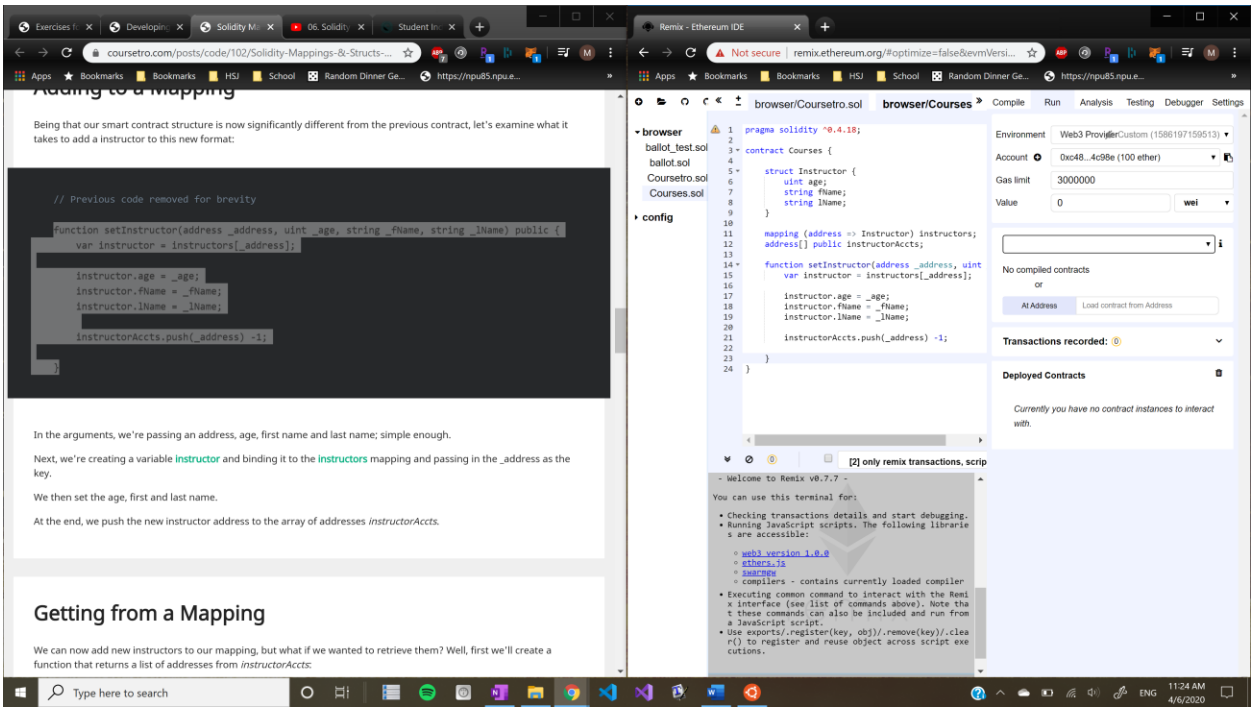
Creating the Mapping
In Solidity, a mapping is referred to a hash table, which consists of key types and value type pairs. We define a mapping like any other variable type:
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
}
Here, we're creating a mapping, which accepts first the key type (in our case, it will be an address type), and the value type will be our Struct that we created above, then we're referring to this mapping as instructors.
This will allow us to look up a specific instructor with their Ethereum address, and retrieve their age, first name and last name.
Remix - Ethereum IDE
browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
Environment
Account
Gas limit
Value
No compiled contracts
At Address
Transactions recorded:
Deployed Contracts
Currently you have no contract instances to interact with.
- Welcome to Remix v0.7.7 -
You can use this terminal for:
Type here to search
ENG
11:22 AM
4/6/2020


Exercises
Developing
Solidity Ma
06. Solidity
Student In
coursetro.com/posts/code/102/Solidity-Mappings-&-Structs-...
Apps
Bookmarks
Bookmarks
HSJ
School
Random Dinner Ge...
https://npu85.npu.e...
Adding to a Mapping
Being that our smart contract structure is now significantly different from the previous contract, let's examine what it takes to add a instructor to this new format:
// Previous code removed for brevity
function setInstructor(address _address, uint _age, string _fName, string _lName) public {
var instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
In the arguments, we're passing an address, age, first name and last name; simple enough.
Next, we're creating a variable instructor and binding it to the instructors mapping and passing in the _address as the key.
We then set the age, first and last name.
At the end, we push the new instructor address to the array of addresses instructorAccts.
Getting from a Mapping
We can now add new instructors to our mapping, but what if we wanted to retrieve them? Well, first we'll create a function that returns a list of addresses from instructorAccts:
Type here to search
Remix - Ethereum IDE
Not secure
remix.ethereum.org/#optimize=false&evmVersi...
browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
pragma solidity ^0.4.18;
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint
var instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
}
Environment
Web3 Provider
Custom (1586197159513)
Account
0xc48...4c98e (100 ether)
Gas limit
3000000
Value
0
wei
No compiled contracts
or
At Address
Load contract from Address
Transactions recorded:
Deployed Contracts
Currently you have no contract instances to interact with.
[2] only remix transactions, scrip
- Welcome to Remix v0.7.7 -
You can use this terminal for:
• Checking transactions details and start debugging.
• Running JavaScript scripts. The following libraries are accessible:
web3 version 1.0.0
ethers.js
swarmgw
compilers - contains currently loaded compiler
• Executing common command to interact with the Remix interface (see list of commands above). Note that these commands can also be included and run from a JavaScript script.
• Use exports/.register(key, obj)/.remove(key)/.clear() to register and reuse object across script executions.
ENG
11:24 AM
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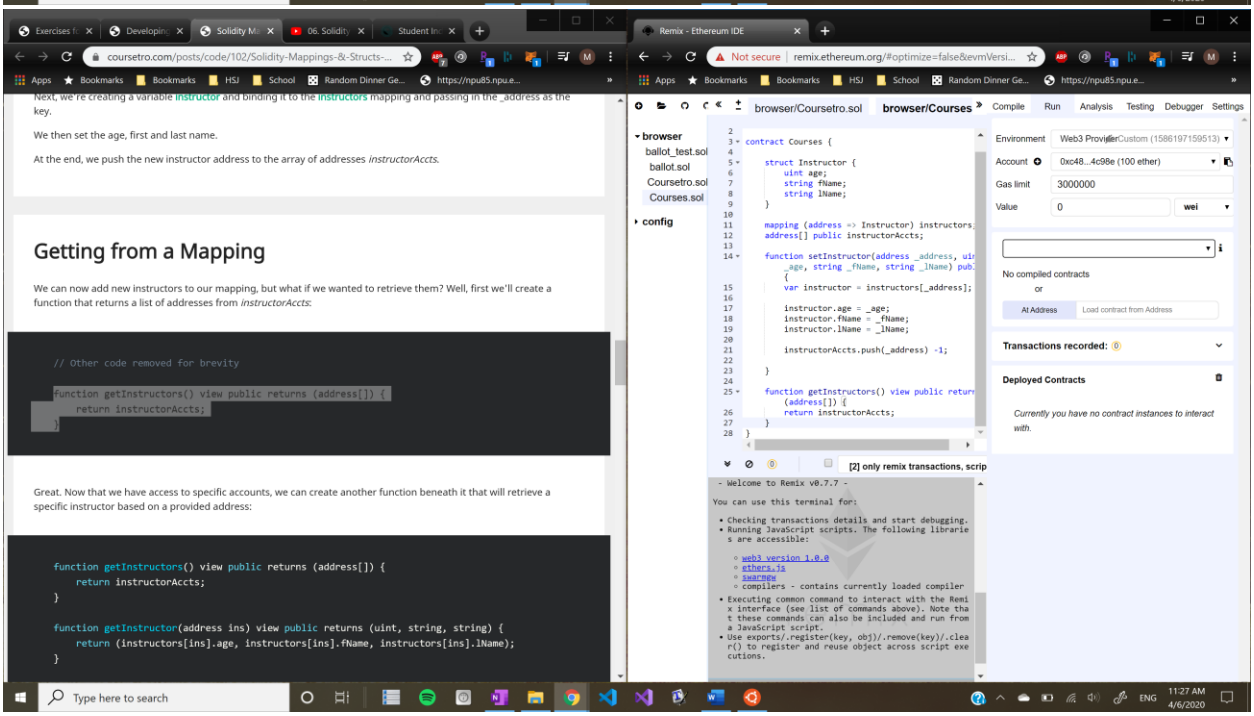
Exercises
Developing
Solidity Ma
06. Solidity
Student In
coursetro.com/posts/code/102/Solidity-Mappings-&-Structs-...
Apps
Bookmarks
Bookmarks
HSJ
School
Random Dinner Ge...
https://npu85.npu.e...
Next, we're creating a variable instructor and binding it to the instructors mapping and passing in the _address as the key.
We then set the age, first and last name.
At the end, we push the new instructor address to the array of addresses instructorAccts.
Getting from a Mapping
We can now add new instructors to our mapping, but what if we wanted to retrieve them? Well, first we'll create a function that returns a list of addresses from instructorAccts:
// Other code removed for brevity
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
Great. Now that we have access to specific accounts, we can create another function beneath it that will retrieve a specific instructor based on a provided address:
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
function getInstructor(address ins) view public returns (uint, string, string) {
return (instructors[ins].age, instructors[ins].fName, instructors[ins].lName);
}
Type here to search
Remix - Ethereum IDE
Not secure
remix.ethereum.org/#optimize=false&evmVersi...
browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, ui
_age, string _fName, string _lName) pub
{
var instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public retur
(address[]) {
return instructorAccts;
}
}
Environment
Web3 Provider
Custom (1586197159513)
Account
0xc48...4c98e (100 ether)
Gas limit
3000000
Value
0
wei
No compiled contracts
or
At Address
Load contract from Address
Transactions recorded:
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Currently you have no contract instances to interact with.
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ethers.js
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ENG
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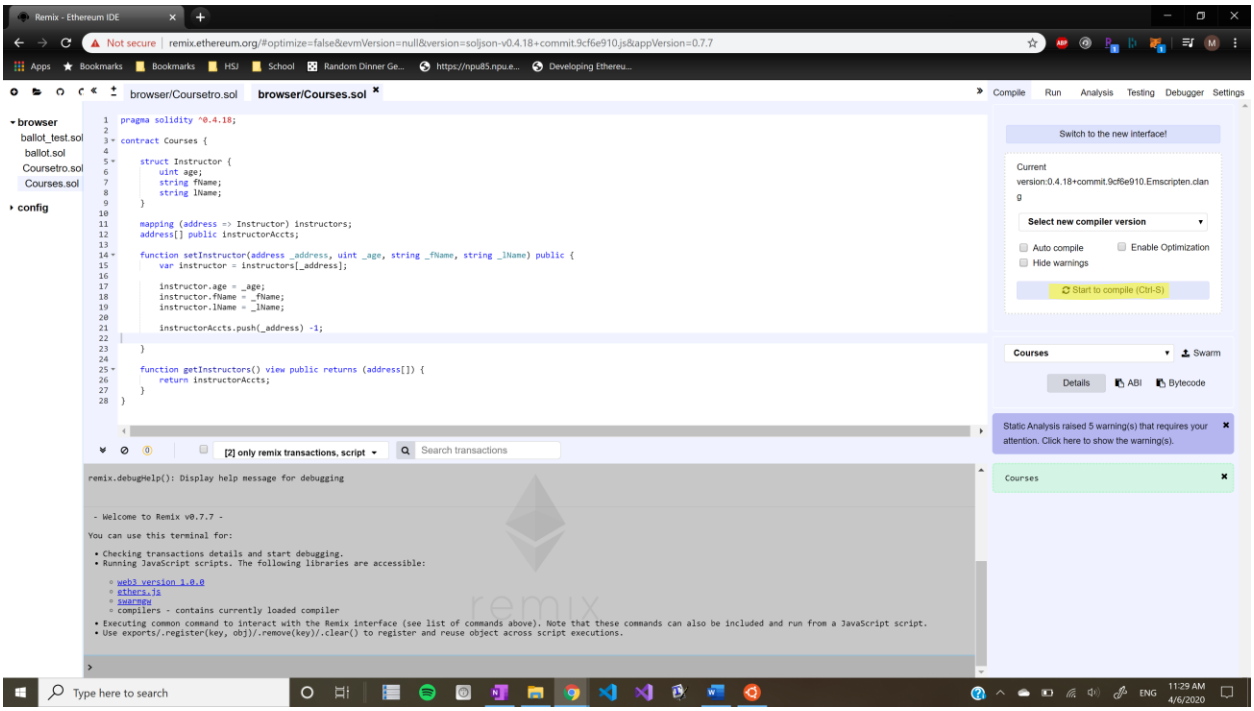
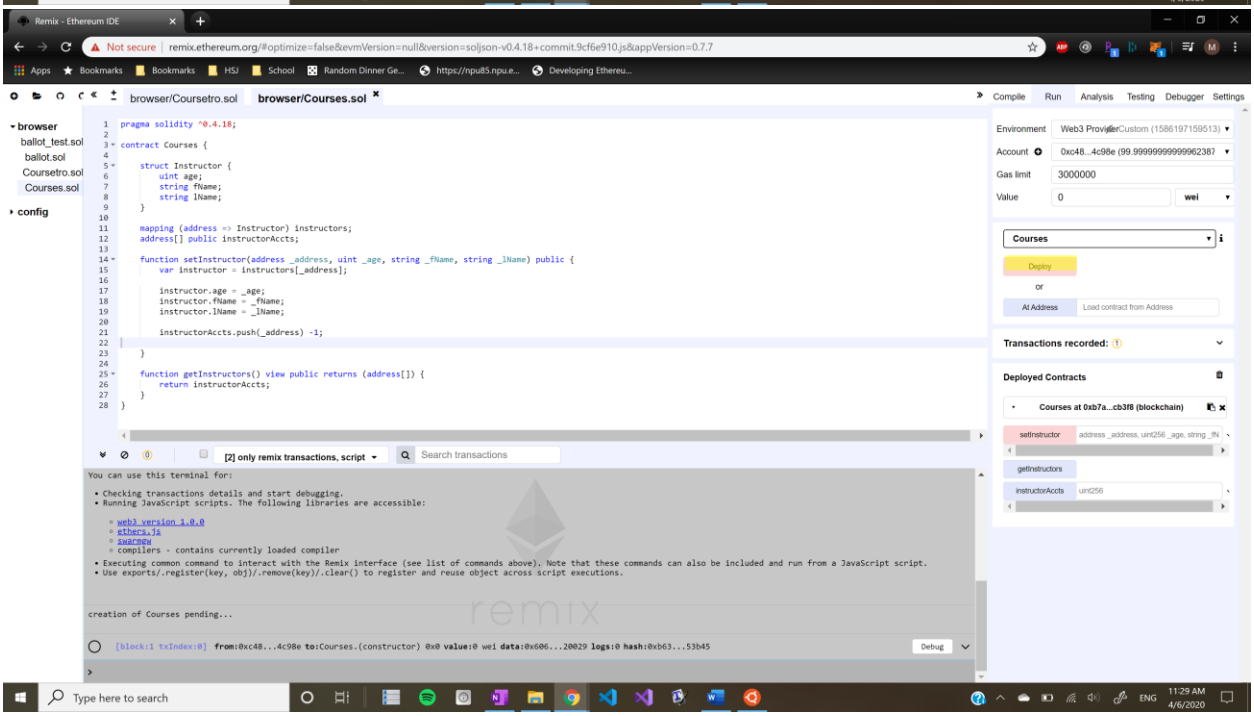
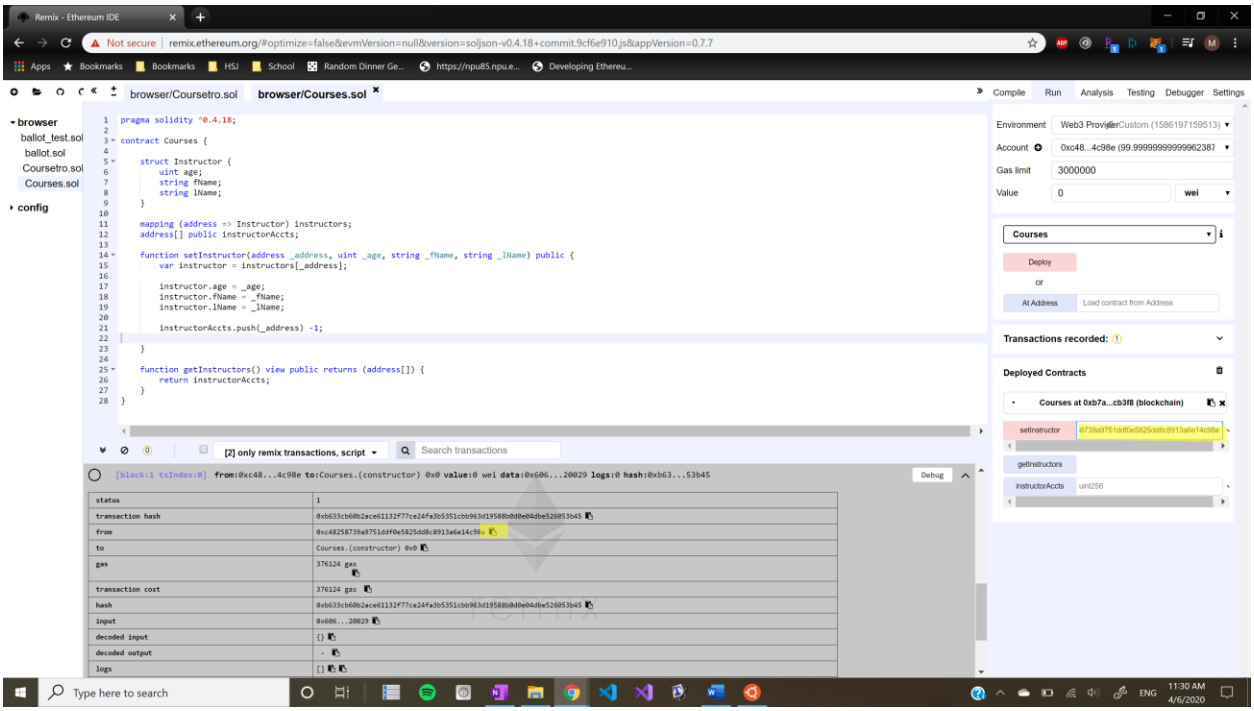
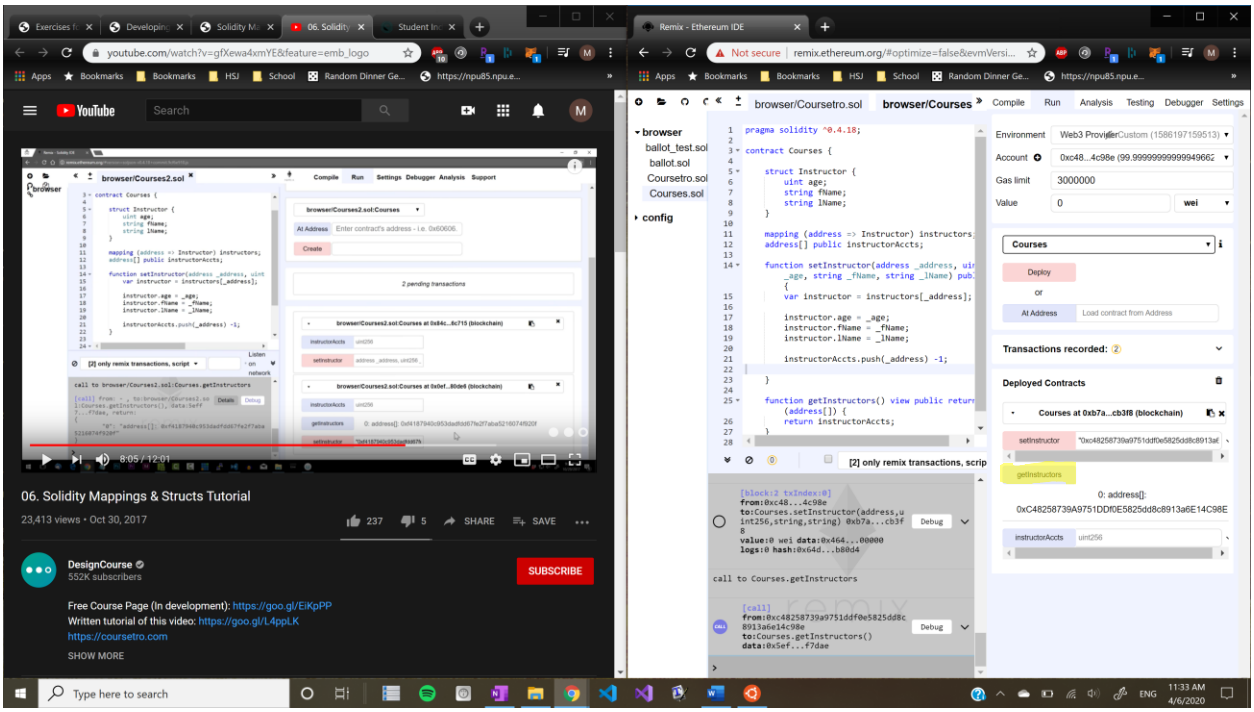
4/6/2020

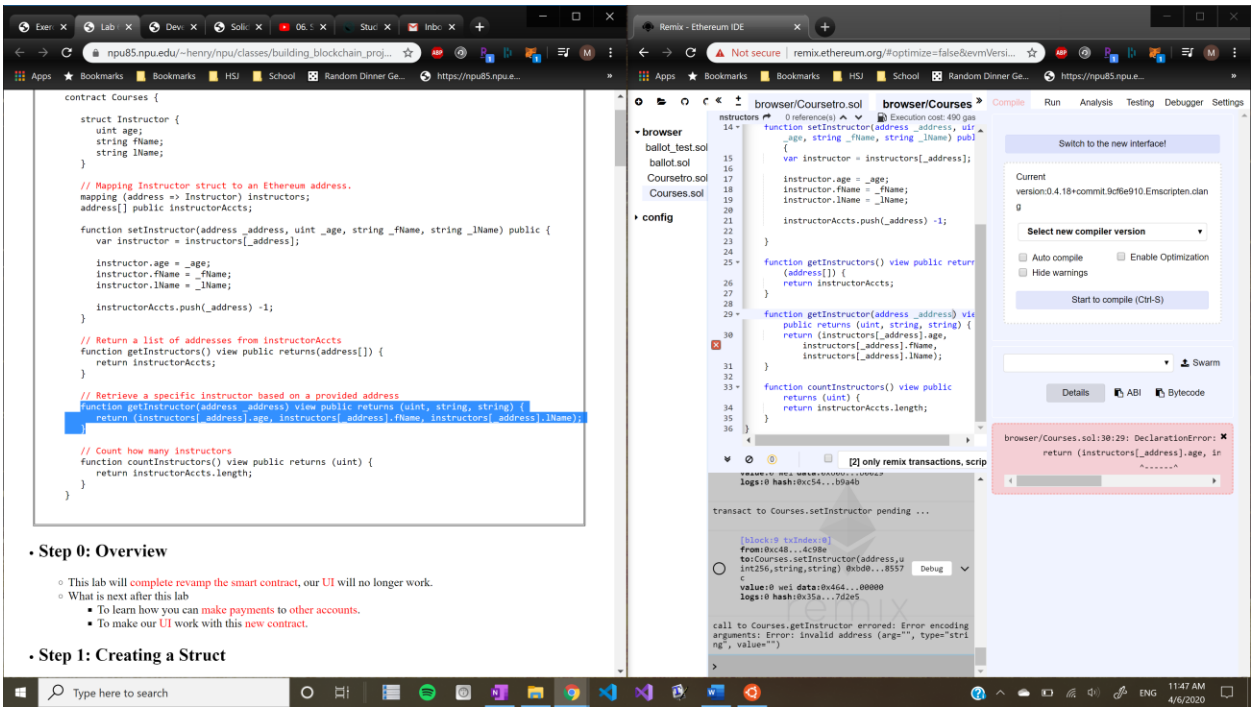

Remix - Ethereum IDE
Not secure
remix.ethereum.org/#optimize=false&evmVersion=null&version=soljson-v0.4.18+commit.9cf6e910.js&appVersion=0.7.7
browser/Coursetro.sol
browser/Courses.sol
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
pragma solidity ^0.4.18;
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint _age, string _fName, string _lName) public {
var instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
}
Switch to the new interface!
Current version:0.4.18+commit.9cf6e910.Emscripten.clang
Select new compiler version
Auto compile
Enable Optimization
Hide warnings
Start to compile (Ctrl-S)
Courses
Swarm
Details
ABI
Bytecode
Static Analysis raised 5 warning(s) that requires your attention. Click here to show the warning(s).
Courses
[2] only remix transactions, script
Search transactions
remix.debugHelp(): Display help message for debugging
- Welcome to Remix v0.7.7 -
You can use this terminal for:
• Checking transactions details and start debugging.
• Running JavaScript scripts. The following libraries are accessible:
web3 version 1.0.0
ethers.js
swarmgw
compilers - contains currently loaded compiler
• Executing common command to interact with the Remix interface (see list of commands above). Note that these commands can also be included and run from a JavaScript script.
• Use exports/.register(key, obj)/.remove(key)/.clear() to register and reuse object across script executions.
Type here to search
ENG
11:29 AM
4/6/2020


Remix - Ethereum IDE
Not secure
remix.ethereum.org/#optimize=false&evmVersion=null&version=soljson-v0.4.18+commit.9cf6e910.js&appVersion=0.7.7
browser/Coursetro.sol
browser/Courses.sol
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
pragma solidity ^0.4.18;
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint _age, string _fName, string _lName) public {
var instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
}
Environment
Web3 Provider Custom (1586197159513)
Account
0xc48...4c98e (99.99999999999962387
Gas limit
3000000
Value
0
wei
Courses
Deploy
or
At Address
Load contract from Address
Transactions recorded:
Deployed Contracts
Courses at 0xb7a...cb3f8 (blockchain)
setInstructor
address _address, uint256 _age, string _fN
getInstructors
instructorAccts
uint256
[2] only remix transactions, script
Search transactions
You can use this terminal for:
• Checking transactions details and start debugging.
• Running JavaScript scripts. The following libraries are accessible:
web3 version 1.0.0
ethers.js
swarmgw
compilers - contains currently loaded compiler
• Executing common command to interact with the Remix interface (see list of commands above). Note that these commands can also be included and run from a JavaScript script.
• Use exports/.register(key, obj)/.remove(key)/.clear() to register and reuse object across script executions.
creation of Courses pending...
[block:1 txIndex:0] from:0xc48...4c98e to:Courses.(constructor) 0x0 value:0 wei data:0x606...20029 logs:0 hash:0xb63...53b45
Debug
Type here to search
ENG
11:29 AM
4/6/2020



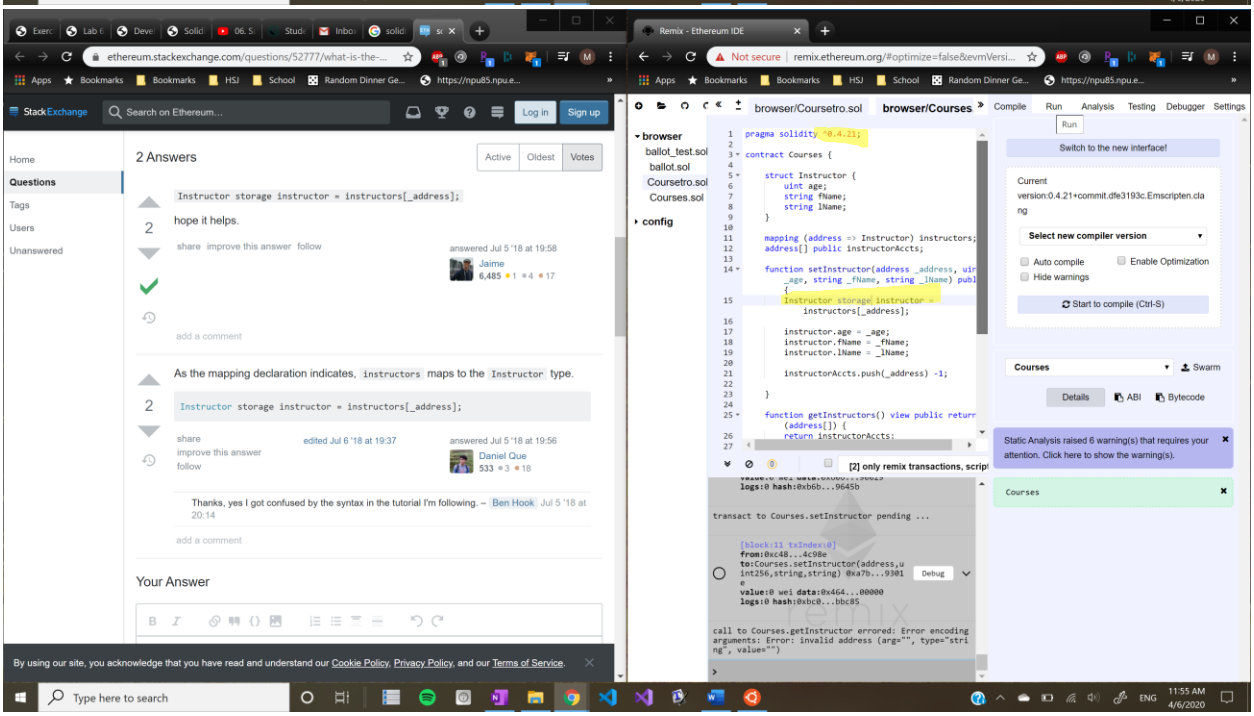
“from address” , 34, "Gary", "Simon"





```
contract Courses {

   struct Instructor {
      uint age;
      string fName;
      string lName;
   }

   // Mapping Instructor struct to an Ethereum address.
   mapping (address => Instructor) instructors;
   address[] public instructorAccts;

   function setInstructor(address _address, uint _age, string _fName, string _lName) public {
      var instructor = instructors[_address];

      instructor.age = _age;
      instructor.fName = _fName;
      instructor.lName = _lName;

      instructorAccts.push(_address) -1;
   }

   // Return a list of addresses from instructorAccts
   function getInstructors() view public returns(address[]) {
      return instructorAccts;
   }

   // Retrieve a specific instructor based on a provided address
   function getInstructor(address _address) view public returns (uint, string, string) {
      return (instructors[_address].age, instructors[_address].fName, instructors[_address].lName);
   }

   // Count how many instructors
   function countInstructors() view public returns (uint) {
      return instructorAccts.length;
   }
}
```

- **Step 0: Overview**
  - This lab will complete revamp the smart contract, our UI will no longer work.
  - What is next after this lab
    - To learn how you can make payments to other accounts.
    - To make our UI work with this new contract.
- **Step 1: Creating a Struct**



```
pragma solidity ^0.4.21;
contract Courses {

    struct Instructor {
        uint age;
        string fName;
        string lName;
    }

    mapping (address => Instructor) instructors;
    address[] public instructorAccts;

    function setInstructor(address _address, uint
        _age, string _fName, string _lName) public
        {
        Instructor storage instructor =
            instructors[_address];

        instructor.age = _age;
        instructor.fName = _fName;
        instructor.lName = _lName;

        instructorAccts.push(_address) -1;

    }

    function getInstructors() view public returns
        (address[]) {
        return instructorAccts;
```

Instructor storage instructor = instructors[_address];

hope it helps.

share improve this answer follow

answered Jul 5 '18 at 19:58 Jaime 6,485 ●1 ●4 ●17

add a comment

As the mapping declaration indicates, `instructors` maps to the `Instructor` type.

```
Instructor storage instructor = instructors[_address];
```

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edited Jul 6 '18 at 19:37

answered Jul 5 '18 at 19:56 Daniel Que 533 ●3 ●18

Thanks, yes I got confused by the syntax in the tutorial I'm following. – Ben Hook Jul 5 '18 at 20:14

add a comment

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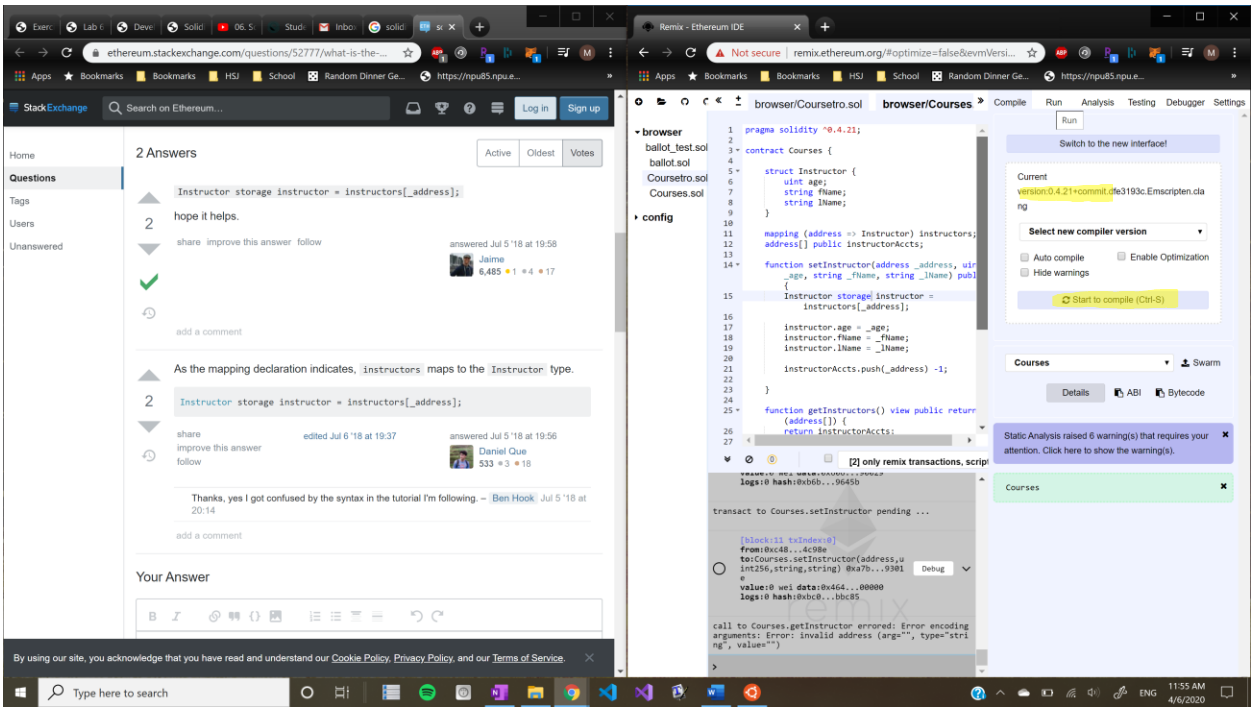
ethereum.stackexchange.com/questions/52777/what-is-the-...
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Search on Ethereum...
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Unanswered
2 Answers
Active
Oldest
Votes
Instructor storage instructor = instructors[_address];
hope it helps.
share improve this answer follow
answered Jul 5 '18 at 19:58
Jaime
6,485 1 4 17
add a comment
As the mapping declaration indicates, instructors maps to the Instructor type.
Instructor storage instructor = instructors[_address];
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answered Jul 5 '18 at 19:56
Daniel Que
533 3 18
Thanks, yes I got confused by the syntax in the tutorial I'm following. – Ben Hook Jul 5 '18 at 20:14
add a comment
Your Answer
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browser/Coursetro.sol
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Compile
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Analysis
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config
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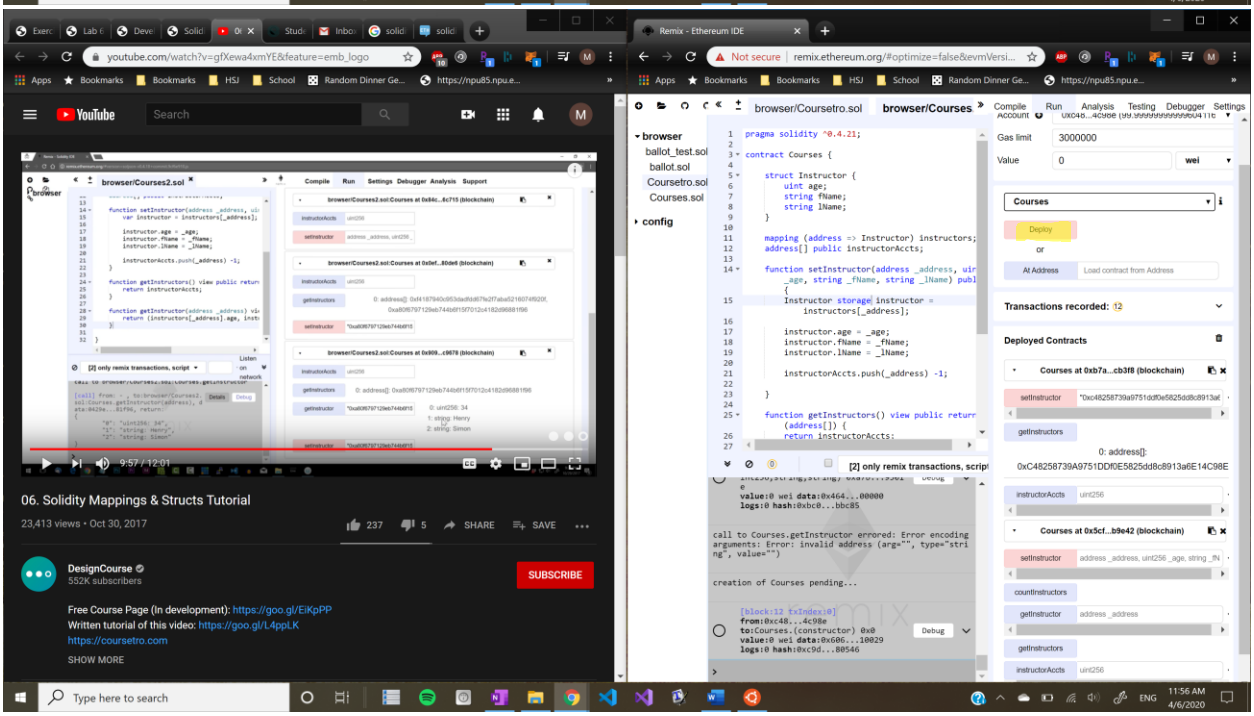
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint _age, string _fName, string _lName) public
{
Instructor storage instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
Switch to the new interface!
Current version:0.4.21+commit.dfe3193c.Emscripten.clang
Select new compiler version
Auto compile
Enable Optimization
Hide warnings
Start to compile (Ctrl-S)
Courses
Swarm
Details
ABI
Bytecode
Static Analysis raised 6 warning(s) that requires your attention. Click here to show the warning(s).
[2] only remix transactions, script
transact to Courses.setInstructor pending ...
call to Courses.getInstructor errored: Error encoding arguments: Error: invalid address (arg="", type="string", value="")
Type here to search
ENG
11:55 AM
4/6/2020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9:57 / 12:01
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browser/Coursetro.sol
browser/Courses
Compile
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Testing
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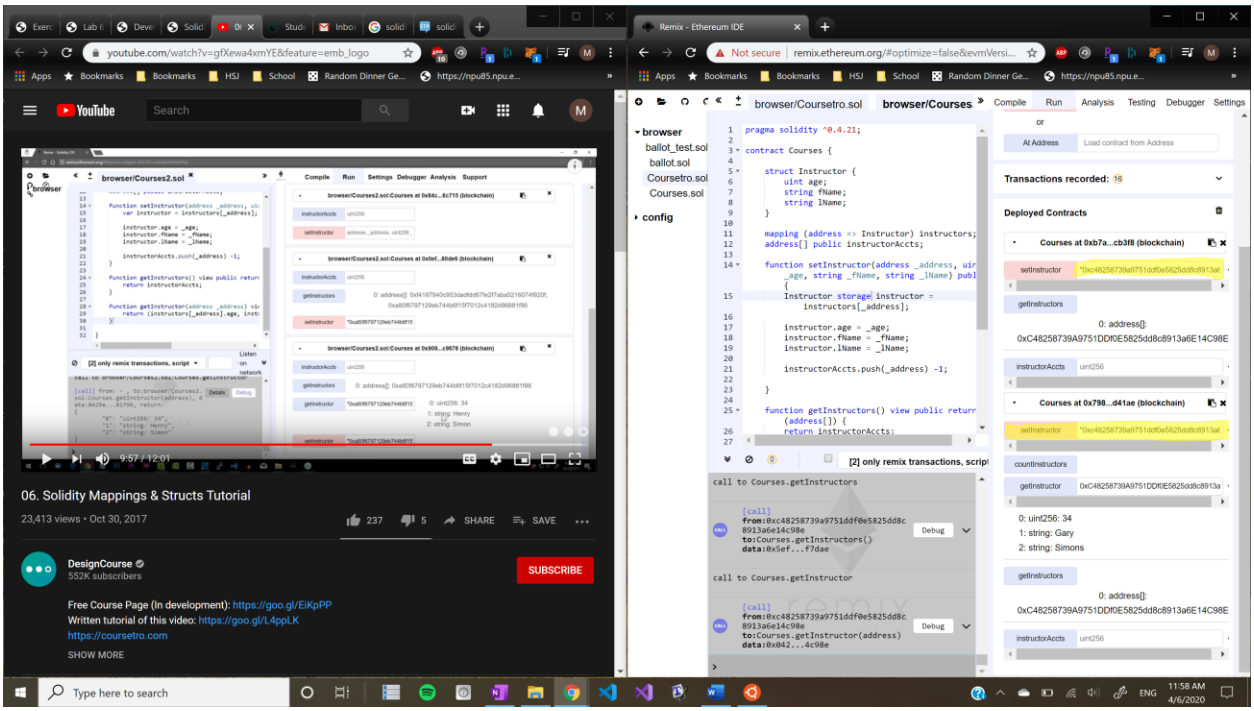
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint _age, string _fName, string _lName) public
{
Instructor storage instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
Gas limit
3000000
Value
0
wei
Courses
Deploy
or
At Address
Load contract from Address
Transactions recorded: 12
Deployed Contracts
Courses at 0xb7a...cb3f8 (blockchain)
setInstructor
getInstructors
0: address[]:
0xC48258739A9751DDf0E5825dd8c8913a6E14C98E
instructorAccts
uint256
Courses at 0x5cf...b9e42 (blockchain)
setInstructor
address _address, uint256 _age, string _lN
countInstructors
getInstructor
address _address
getInstructors
instructorAccts
uint256
[2] only remix transactions, script
call to Courses.getInstructor errored: Error encoding arguments: Error: invalid address (arg="", type="string", value="")
creation of Courses pending...
Type here to search
ENG
11:56 AM
4/6/2020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https://coursetro.com
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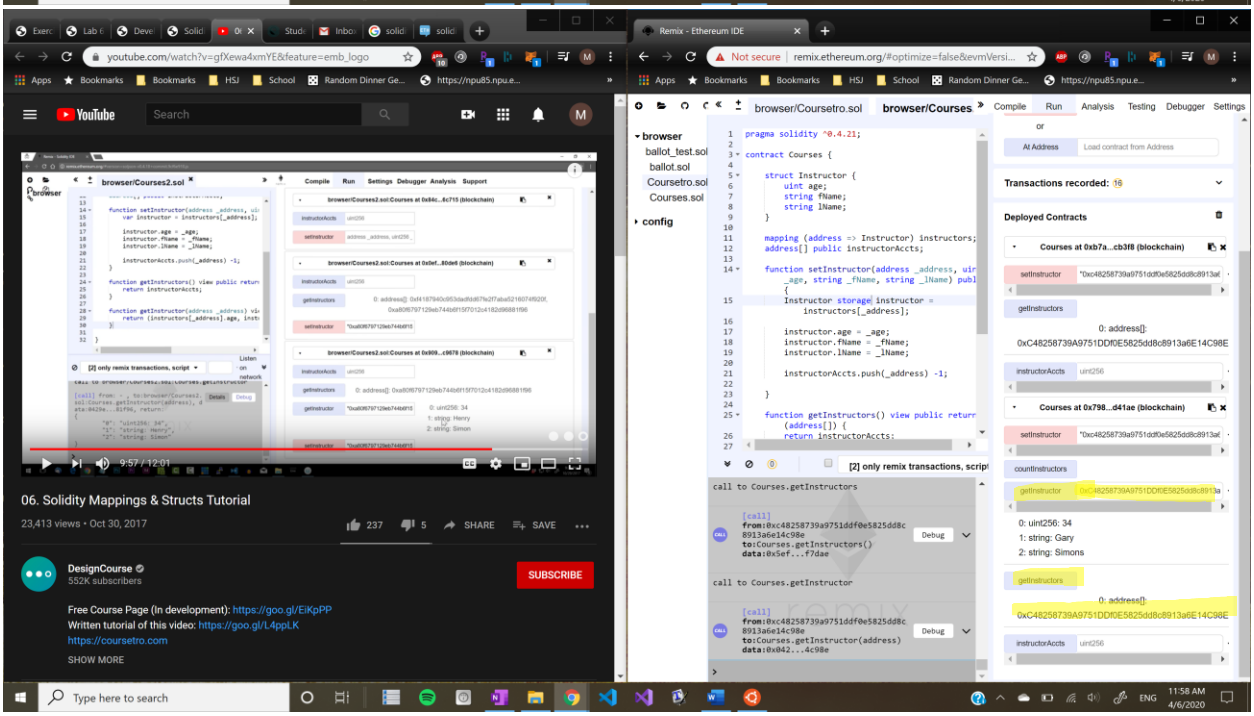
{
Instructor storage instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
Transactions recorded: 16
Deployed Contracts
0: address[]:
0xC48258739A9751DDf0E5825dd8c8913a6E14C98E
0: uint256: 34
1: string: Gary
2: string: Simons
Type here to search
ENG
11:58 AM
4/6/2020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browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
pragma solidity ^0.4.21;
contract Courses {
struct Instructor {
uint age;
string fName;
string lName;
}
mapping (address => Instructor) instructors;
address[] public instructorAccts;
function setInstructor(address _address, uint _age, string _fName, string _lName) public
{
Instructor storage instructor = instructors[_address];
instructor.age = _age;
instructor.fName = _fName;
instructor.lName = _lName;
instructorAccts.push(_address) -1;
}
function getInstructors() view public returns (address[]) {
return instructorAccts;
}
Transactions recorded: 16
Deployed Contracts
0: address[]:
0xC48258739A9751DDf0E5825dd8c8913a6E14C98E
0: uint256: 34
1: string: Gary
2: string: Simons
Type here to search
ENG
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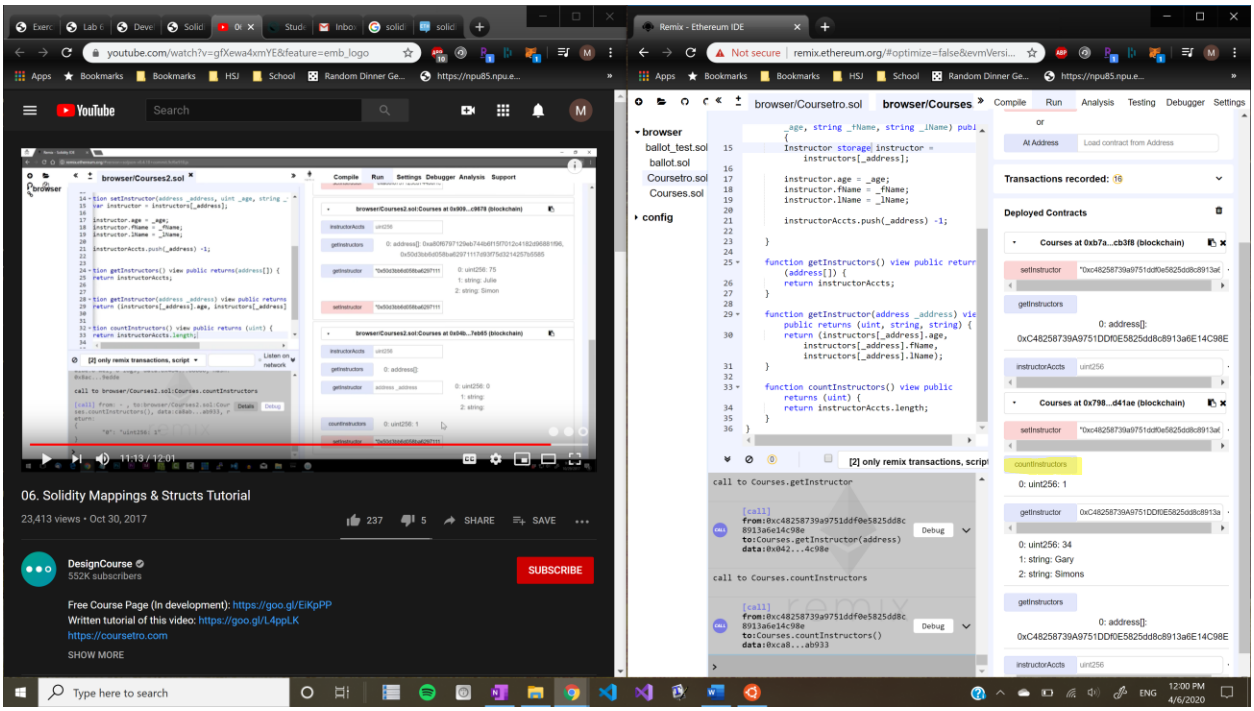
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browser/Coursetro.sol
browser/Courses
Compile
Run
Analysis
Testing
Debugger
Settings
browser
ballot_test.sol
ballot.sol
Coursetro.sol
Courses.sol
config
Transactions recorded: 16
Deployed Contracts
Courses at 0xb7a...cb3f8 (blockchain)
Courses at 0x798...d41ae (blockchain)
setInstructor
getInstructors
instructorAccts
countInstructors
getInstructor
0: address[]:
0xC48258739A9751DDf0E5825dd8c8913a6E14C98E
0: uint256: 1
0: uint256: 34
1: string: Gary
2: string: Simons
call to Courses.getInstructor
call to Courses.countInstructors
Debug
ENG
12:00 PM
4/6/2020