硅谷live以太坊智能合约 第三课作业

这里是同学提交作业的目录

第三课：课后作业

- 第一题：完成今天所开发的合约产品化内容，使用Remix调用每一个函数，提交函数调用截图

create payroll

```
creation of PayRoll pending...

[vm] from:0xca3...a733c, to:PayRoll.(constructor), value:0 wei, data:0x606...a733c, 0 logs, hash:0xce5...5567b        Details  Debug
```

addFund

```
transact to PayRoll.addFund pending ...

[vm] from:0xca3...a733c, to:PayRoll.addFund() 0x987...04485, value:100000000000000000000 wei, data:0xa2f...09dfa, 0 logs, hash:0xe73...4455a        Details  Debug
```

status	0x1 Transaction mined and execution succeed
from	0xca35b7d915458ef540ade6068dfe2f44e8fa733c
to	PayRoll.addFund() 0x9876e235a87f520c827317a8987c9e1fde804485
gas	3000000 gas
transaction cost	21578 gas
execution cost	306 gas
hash	0xe733b2362ddea0676c2f98c13c26f11b7a32d3d4b5dc11929d5c5a7c6444455a
input	0xa2f09dfa
decoded input	{}

decoded output	{
	      "0": "uint256: 100000000000000000000"
	}

logs	[]
value	100000000000000000000 wei

addEmployee

```
transact to PayRoll.bossAddEmployee pending ...

[vm] from:0xca3...a733c, to:PayRoll.bossAddEmployee(address,uint256,uint256,uint256) 0x987...04485, value:0 wei, data:0xf0f...00014, 0 logs, hash:0xa96...61a0f        Details  Debug
```

status	0x1 Transaction mined and execution succeed
from	0xca35b7d915458ef540ade6068dfe2f44e8fa733c
to	PayRoll.bossAddEmployee(address,uint256,uint256,uint256) 0x9876e235a87f520c827317a8987c9e1fde804485
gas	3000000 gas
transaction cost	125136 gas
execution cost	101880 gas
hash	0xa96ad6b552ad30d86834280988b1a5f559da4af719c8a22a719d8fd717b61a0f
input	0xf0fad3210000000000000000000000014723a09acff6d2a60dcdf7aa4aff308fddc160c0000000000000000000000000000000000000000000000000000000000000001000000000000000000000000000000000000000000000000000000000000001e00000000000000000000000000000000000000000000000000000000000000000014

decoded input	{
	      "address employeeAddr": "0x14723a09acff6d2a60dcdf7aa4aff308fddc160c",
	      "uint256 paymentDuration": "30",
	      "uint256 salary": "1",
	      "uint256 salaryUpdateWindow": "20"
	}

decoded output	{}
logs	[]
value	0 wei

getSalary

```
transact to PayRoll.getSalary pending ...

[vm] from:0x147...c160c, to:PayRoll.getSalary() 0x987...04485, value:0 wei, data:0x58b...08d2e, 0 logs, hash:0x303...a2910          [Details] [Debug]

  status             0x1 Transaction mined and execution succeed
  from               0x14723a09acff6d2a60dcdf7aa4aff308fddc160c 📋
  to                 PayRoll.getSalary() 0x9876e235a87f520c827317a8987c9e1fde804485 📋
  gas                3000000 gas
                     📋
  transaction cost   29958 gas 📋
  execution cost     8686 gas 📋
  hash               0x303fcee21e1eeea7a4f665c08341c859a86afc320138f394cdcfa18d7114a2910 📋
  input              0x58b08d2e 📋
  decoded input      {} 📋
  decoded output     {}
  logs               [] 📋 📋
  value              0 wei
                     📋
```

updateSalary

```
transact to PayRoll.updateSalary pending ...

[vm] from:0xca3...a733c, to:PayRoll.updateSalary(address,uint256) 0x987...04485, value:0 wei, data:0x220...00002, 0 logs, hash:0xcf5...8f947          [Details] [Debug]

  status             0x1 Transaction mined and execution succeed
  from               0xca35b7d915458ef540ade6068dfe2f44e8fa733c 📋
  to                 PayRoll.updateSalary(address,uint256) 0x9876e235a87f520c827317a8987c9e1fde804485 📋
  gas                3000000 gas
                     📋
  transaction cost   40290 gas 📋
  execution cost     32482 gas 📋
  hash               0xcf54237df9434641f0573b6f7e624a107dbcd6f88f47b267b265da88a7d8f947 📋
  input              0x22003f10000000000000000000000014723a09acff6d2a60dcdf7aa4aff308fddc160c0000000000000000000000000000000000000000000000000000000000000002 📋
  decoded input      {
                         "address employeeAddr": "0x14723a09acff6d2a60dcdf7aa4aff308fddc160c",
                         "uint256 amount": "2"
                     } 📋
  decoded output     {}
  logs               [] 📋 📋
  value              0 wei
                     📋
```

updatePaymentDuration

```
transact to PayRoll.updatePaymentDuration pending ...

[vm] from:0xca3...a733c, to:PayRoll.updatePaymentDuration(address,uint256) 0x987...04485, value:0 wei, data:0x6db...00032, 0 logs, hash:0x0f3...b1356          [Details] [Debug]

  status             0x1 Transaction mined and execution succeed
  from               0xca35b7d915458ef540ade6068dfe2f44e8fa733c 📋
  to                 PayRoll.updatePaymentDuration(address,uint256) 0x9876e235a87f520c827317a8987c9e1fde804485 📋
  gas                3000000 gas
                     📋
  transaction cost   29339 gas 📋
  execution cost     6467 gas 📋
  hash               0x0f362c694cbba54240479f946776344876c72f470bbc56f093e3a844245b1356 📋
  input              0x6db7dd9b0000000000000000000000014723a09acff6d2a60dcdf7aa4aff308fddc160c0000000000000000000000000000000000000000000000000000000000000032 📋
  decoded input      {
                         "address employeeAddr": "0x14723a09acff6d2a60dcdf7aa4aff308fddc160c",
                         "uint256 duration": "50"
                     } 📋
  decoded output     {}
  logs               [] 📋 📋
  value              0 wei
                     📋
```

hasEnoughFund

```
call to PayRoll.hasEnoughFund
[call] from:0x14723a09acff6d2a60dcdf7aa4aff308fddc160c, to:PayRoll.hasEnoughFund(), data:23fed...ed09e, return:
{
        "0": "bool: true"
}
```

from	0x14723a09acff6d2a60dcdf7aa4aff308fddc160c
to	PayRoll.hasEnoughFund() 0x9876e235a87f520c827317a8987c9e1fde804485
transaction cost	22560 gas (Cost only applies when called by a contract)
execution cost	1288 gas (Cost only applies when called by a contract)
input	23fed09e
decoded input	{}
decoded output	{ "0": "bool: true" }
logs	[]

calculateRunaway

```
call to PayRoll.calculateRunaway
[call] from:0x14723a09acff6d2a60dcdf7aa4aff308fddc160c, to:PayRoll.calculateRunaway(), data:0ef76...76b35, return:
{
        "0": "uint256: 49"
}
```

from	0x14723a09acff6d2a60dcdf7aa4aff308fddc160c
to	PayRoll.calculateRunaway() 0x9876e235a87f520c827317a8987c9e1fde804485
transaction cost	22660 gas (Cost only applies when called by a contract)
execution cost	1388 gas (Cost only applies when called by a contract)
input	0ef76b35
decoded input	{}
decoded output	{ "0": "uint256: 49" }
logs	[]

updateEmployeeAddress

```
transact to PayRoll.updateEmployeeAddress pending ...
[vm] from:0x147...c160c, to:PayRoll.updateEmployeeAddress(address) 0x987...04485, value:0 wei, data:0x88b...4d2db, 0 logs, ha
sh:0x399...36853
```

status	0x1 Transaction mined and execution succeed
from	0x14723a09acff6d2a60dcdf7aa4aff308fddc160c
to	PayRoll.updateEmployeeAddress(address) 0x9876e235a87f520c827317a8987c9e1fde804485
gas	3000000 gas
transaction cost	64630 gas
execution cost	101950 gas
hash	0x3998b554406445c9fabc0d58f6fccfe3caa86fac3a035fdf27da5c1585836853
input	0x88b789cb00000000000000000000000004b0897b0513fdc7c541b6d9d7e929c4e5364d2db
decoded input	{ "address _employee": "0x4b0897b0513fdc7c541b6d9d7e929c4e5364d2db" }
decoded output	{}
logs	[]
value	0 wei

After call updateEmployeeAddress

```
call to PayRoll.employees
[call] from:0xca35b7d915458ef540ade6068dfe2f44e8fa733c, to:PayRoll.employees(address), data:d0678...c160c, return:
{
        "0": "uint256: salary 0",
        "1": "uint256: lastPayDay 0",
        "2": "uint256: paymentDuration 0",
        "3": "uint256: salaryUpdateWindow 0"
}

call to PayRoll.employees
[call] from:0x4b0897b0513fdc7c541b6d9d7e929c4e5364d2db, to:PayRoll.employees(address), data:d0678...4d2db, return:
{
        "0": "uint256: salary 2000000000000000000",
        "1": "uint256: lastPayDay 1516162905",
        "2": "uint256: paymentDuration 50",
        "3": "uint256: salaryUpdateWindow 20"
}
```

removeEmployee

```
transact to PayRoll.removeEmployee pending ...

[vm] from:0xca3...a733c, to:PayRoll.removeEmployee(address) 0x987...04485, value:0 wei, data:0xd10...4d2db, 0 logs, hash:0x13
0...52cfe
```

status	0x1 Transaction mined and execution succeed
from	0xca35b7d915458ef540ade6068dfe2f44e8fa733c
to	PayRoll.removeEmployee(address) 0x9876e235a87f520c827317a8987c9e1fde804485
gas	3000000 gas
transaction cost	28906 gas
execution cost	35132 gas
hash	0x130c3d5c16188267184f12be6791c76706423375c00b3e57dc9a1a696c752cfe
input	0xd108177a000000000000000000000000004b0897b0513fdc7c541b6d9d7e929c4e5364d2db
decoded input	{ "address employeeAddr": "0x4b0897b0513fdc7c541b6d9d7e929c4e5364d2db" }
decoded output	{}
logs	[]
value	0 wei

After call removeEmployee

```
call to PayRoll.employees

[call] from:0xca35b7d915458ef540ade6068dfe2f44e8fa733c, to:PayRoll.employees(address), data:d0678...4d2db, return:
{
        "0": "uint256: salary 0",
        "1": "uint256: lastPayDay 0",
        "2": "uint256: paymentDuration 0",
        "3": "uint256: salaryUpdateWindow 0"
}
```

updateBossAddress

```
transact to PayRoll.updateBossAddress pending ...

[vm] from:0xca3...a733c, to:PayRoll.updateBossAddress(address) 0x987...04485, value:0 wei, data:0xeae...40225, 0 logs, hash:0
x710...3e493
```

status	0x1 Transaction mined and execution succeed
from	0xca35b7d915458ef540ade6068dfe2f44e8fa733c
to	PayRoll.updateBossAddress(address) 0x9876e235a87f520c827317a8987c9e1fde804485
gas	3000000 gas
transaction cost	28591 gas
execution cost	5911 gas
hash	0x7103708a5040642b439dde795e6c291ed87dcae3f2fe2aeaccd016d4e883e493
input	0xeae1e1e900000000000000000000000000583031d1113ad414f02576bd6afabfb302140225
decoded input	{ "address _boss": "0x583031d1113ad414f02576bd6afabfb302140225" }
decoded output	{}
logs	[]
value	0 wei

- 第二题：增加 changePaymentAddress 函数，更改员工的薪水支付地址，思考一下能否使用 modifier整合某个功能
- 第三题（加分题）：自学C3 Linearization, 求以下 contract Z 的继承线
- contract O
- contract A is O
- contract B is O
- contract C is O
- contract K1 is A, B
- contract K2 is A, C
- contract Z is K1, K2

最后的继承顺序是 Z, K_2, K_1, C, B, A, O.

$$L(Z) = [Z, MERGE(L(K_2), L(K_1), [K_2, K_1])]$$

$$L(K_1) = [K_1, MERGE(L(B), L(A), [B, A])] = [K_1, MERGE([B, O], [A, O], [B, A])]$$

$$= [K_1, B, MERGE([O], [A, O], [A])] = [K_1, B, A, O]$$

$$L(K_2) = [K_2, MERGE(L(C), L(A), [C, A])] = [K_2, MERGE([C, O], [A, O], [C, A])]$$

$$= [K_2, C, MERGE([O], [A, O], [A])] = [K_2, C, A, O]$$

$$\therefore L(Z) = [Z, MERGE([K_2, C, A, O], [K_1, B, A, O], [K_2, K_1])]$$

$$= [Z, K_2, MERGE([C, A, O], [K_1, B, A, O], [K_1])] = [Z, K_2, K_1, C, B, A, O]$$