INTRODUCTION TO BLOCKCHAIN AND CRYPTO CURRENCY

A MICRO LENDINGS PLATFORM

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SECTION A

Project Execution

We made a contract that will enable owners (deployers of the contract) to lend small sums to other parties against some collaterals. There will be a trusted third party that can intervene in the cases of disputes.

Making a connection with react.

The steps to execute the code are as follows:

signin

Owner's Desktop

Debtor's Desktop

Trusted Third Party

1. The owner will go to their desktop.

2. Then the owner will set up a Trusted Third Party by calling the '*addTTP(address _addressofTTP)*' function. This will only execute once, so that the party cannot be changed.

```
}
truffle(ganache)> instance.addTTP("0xbC69CCa4fEB1C003A869c93929b74eF88d980516")
{
  tx: '0xbd0ee8be959d341442f7d541bda1506dbecb4060ad9cfa1a3b962022f8006e9d',
  receipt: {
    transactionHash: '0xbd0ee8be959d341442f7d541bda1506dbecb4060ad9cfa1a3b962022f8006e9d',
    transactionIndex: 0,
    blockHash: '0x8841ccb3de59eade4fb603d862f36873d8c3f5fa210a94b1c6cad1cca54198a0',
    blockNumber: 6,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 44543,
    cumulativeGasUsed: 44543,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
    rawLogs: []
  },
  logs: []
}
```

Creditor's Desktop

Add Trusted Third Party

Address

0x8b0442A6447983A097fF54ef45EF4E02cFCa9f5d

Add TTP

Add Loan Plan

Plan Name

3. The owner will then add their desired Loan Plans by calling the '*addLoanPlan(string memory _planName, uint _price, uint _interest)*' function. They will provide the Loan Plan Name, the price (amount they plan on lending) and the interest they will charge on that amount. In addition to that, the loan Plan will maintain the time the money was lent, the debtor the money was offered to and the status (available, expired, disputed, sent, requested etc) of the loan.

```
truffle(ganache)> instance.addLoanPlan("Plan 1", 400, 10)
{
  tx: '0x9dd71f80e81a85054089999b4abc03ed561e0240e1ec9b88936f1963083a630f',
  receipt: {
    transactionHash: '0x9dd71f80e81a85054089999b4abc03ed561e0240e1ec9b88936f1963083a630f',
    transactionIndex: 0,
    blockHash: '0xcd20f7c8638dfbd6f1897d0e12caaef4322afb9e3aff43fce290d0ba3708fb38',
    blockNumber: 5,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 151122,
    cumulativeGasUsed: 151122,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000',
    rawLogs: []
  },
  logs: []
}
```

Add Loan Plan

Plan Name

Plan 1

Price

400

Interest

10

Add Plan

The owner, TTP, and the borrower can view the current list of Loan Plans at any time.

```
[
  'Plan 2',
  '400',
  '10',
  '0x0000000000000000000000000000000000000000',
  'None',
  '0',
  '0x41',
  planName: 'Plan 2',
  price: '400',
  interest: '10',
  debtor: '0x0000000000000000000000000000000000000000',
  collateral: 'None',
  timeSentMoney: '0',
  status: '0x41'
],
[
  'Plan 3',
  '600',
  '40',
  '0x0000000000000000000000000000000000000000',
  'None',
  '0',
  '0x41',
  planName: 'Plan 3',
  price: '600',
  interest: '40',
  debtor: '0x0000000000000000000000000000000000000000',
  collateral: 'None',
  timeSentMoney: '0',
  status: '0x41'
],
[
  'Plan 3',
  '750',
  '90',
  '0x0000000000000000000000000000000000000000',
  'None',
  '0',
  '0x41',
  planName: 'Plan 3',
  price: '750',
  interest: '90',
  debtor: '0x0000000000000000000000000000000000000000',
  collateral: 'None',
  timeSentMoney: '0',
  status: '0x41'
]
]
```

4. The Debtor will request a loan from the creditor against a collateral

   '*requestLoan(string memory _planname, string memory _collateral)*'. The status of

   the loan plan will be changed to requested and the address of the debtor will be

   updated.

```
truffle(ganache)> instance.requestLoan('Plan 2', 'Item 1', {from:accounts[0],value:web3.utils.toWei("40","ether")})
{
  tx: '0x507034ef60dcded3b93a4d72ee3522548594ebc7e172df9b01716f17f2d871b1',
  receipt: {
    transactionHash: '0x507034ef60dcded3b93a4d72ee3522548594ebc7e172df9b01716f17f2d871b1',
    transactionIndex: 0,
    blockHash: '0x412a944b18401fb264f952399a30868647b2ae7334aa5351d57697267ca0523c',
    blockNumber: 10,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 68297,
    cumulativeGasUsed: 68297,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x00000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000',
    rawLogs: []
  },
  logs: []
}
```

The following image shows the updated list of loans after a request for a Loan Plan is made (status changed from 'A' available to 'R' requested):

```
  ],
  [
    'Plan 2',
    '400',
    '10',
    '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
    'Item 1',
    '0',
    '0x52',
    planName: 'Plan 2',
    price: '400',
    interest: '10',
    debtor: '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
    collateral: 'Item 1',
    timeSentMoney: '0',
    status: '0x52'
  ],
  [
```

5. The creditor can either approve the loan in which case the money will be sent and the status of the loan will be changed to 'S' (sent), or he can reject it, in which case the debtors address is reset along with the status of the Loan Plan. Function called is '*confirmLoan(string memory _planname, bool _status).*' The following two screenshots show the case where the loan request is accepted.

```
undefined
truffle(ganache)> instance.confirmLoan("Plan 2", true)
{
  tx: '0x50b9e45725825c478ace8665cd4b4666388ca6d50a103dbe8ddc510c16be79e3',
  receipt: {
    transactionHash: '0x50b9e45725825c478ace8665cd4b4666388ca6d50a103dbe8ddc510c16be79e3',
    transactionIndex: 0,
    blockHash: '0xf20d337d350fb72391ae531cc0087af7a5b5dec3c3789181dd2d7e71f90c259a',
    blockNumber: 11,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 68833,
    cumulativeGasUsed: 68833,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000',
    rawLogs: []
  },
  logs: []
}
```

```
[
  'Plan 2',
  '400',
  '10',
  '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
  'Item 1',
  '141688594828800',
  '0x53',
  planName: 'Plan 2',
  price: '400',
  interest: '10',
  debtor: '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
  collateral: 'Item 1',
  timeSentMoney: '141688594828800',
  status: '0x53'
],
[
  'Plan 3',
  '600',
  '40',
  '0x0000000000000000000000000000000000000000',
  'None',
  '0',
  '0x41',
  planName: 'Plan 3'
```
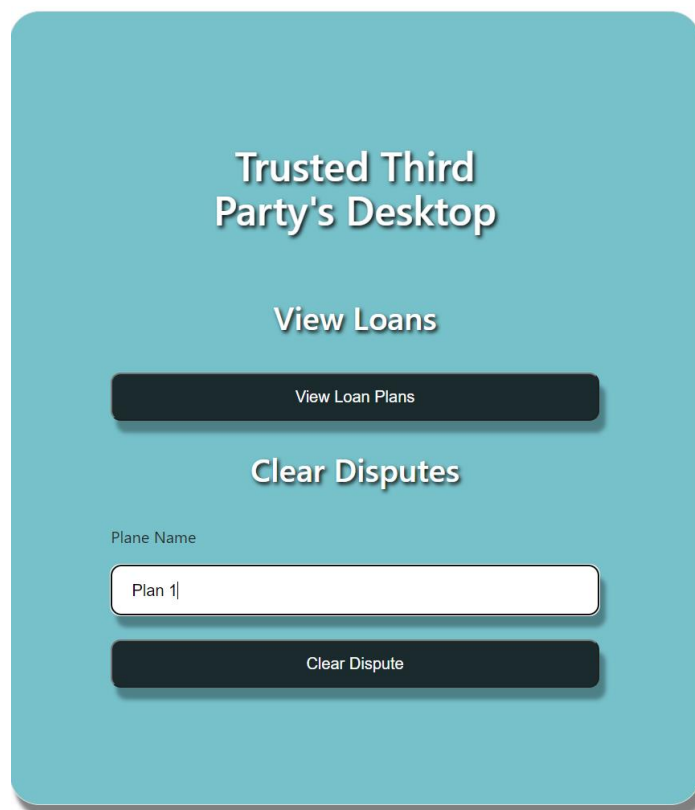
The following two screenshots show the case where the loan request is rejected.

```
truffle(ganache)> instance.confirmLoan("Plan 2", false)
{
  tx: '0x90c27776f698bf2ab63d036e72fc6629f7998ecd47efccb888897e4d49f9940a',
  receipt: {
    transactionHash: '0x90c27776f698bf2ab63d036e72fc6629f7998ecd47efccb888897e4d49f9940a',
    transactionIndex: 0,
    blockHash: '0xf4ce60ef6b7e961990dea477822e6d16abfb54bfbd91853f2d28ea2a16180d1b',
    blockNumber: 12,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 36556,
    cumulativeGasUsed: 36556,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000000000000000
    rawLogs: []
  },
  logs: []
}
```

```
],
[
  'Plan 2',
  '400',
  '10',
  '0x0000000000000000000000000000000000000000',
  'None',
  '141688594828800',
  '0x41',
  planName: 'Plan 2',
  price: '400',
  interest: '10',
  debtor: '0x0000000000000000000000000000000000000000',
  collateral: 'None',
  timeSentMoney: '141688594828800',
  status: '0x41'
],
[
  'Plan 3',
  '600',
  '40',
  '0x0000000000000000000000000000000000000000',
```

6. The debtor will confirm if he gets the loan.

```
truffle(ganache)> instance.confirmTransferLoanAmount('Plan 2', true)
{
  tx: '0xd4699169e6bf708ea6c21a88ef0779f1001ac52ef8ac7dc43314dae36832e976',
  receipt: {
    transactionHash: '0xd4699169e6bf708ea6c21a88ef0779f1001ac52ef8ac7dc43314dae36832e976',
    transactionIndex: 0,
    blockHash: '0xd3f74dc04657f3e922aa843af7b6e19085b8484054ee5b6829fa5d269e687fcf',
    blockNumber: 15,
    from: '0x441233d8abd0a8523f8ee79733f299dfe475e7f4',
    to: '0x8bbc8d6b65b1f536995f7082394b56501a9f5bd8',
    gasUsed: 37702,
    cumulativeGasUsed: 37702,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x00000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
    rawLogs: []
  },
  logs: []
}
```

```
],
[
  'Plan 2',
  '400',
  '10',
  '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
  'Item 1',
  '141688623772800',
  '0x50',
  planName: 'Plan 2',
  price: '400',
  interest: '10',
  debtor: '0x441233d8Abd0A8523F8ee79733f299dFE475E7f4',
  collateral: 'Item 1',
  timeSentMoney: '141688623772800',
  status: '0x50'
],
[
```

Confirm Loan Received

Plane Name

Plan 2

Confirm Payment

Open Dispute

The debtor can refute the transfer of the loan amount from the creditor by setting the status of the loan plan from 'S' sent to 'D' disputed. In this case the trusted third party can set the status to 'P' pending (awaiting payment), confirming that the money was actually sent to the debtor through the 'handleDispute(string memory _planname, bool _status)' function.

7. Once the debtor makes the payment, the respective Loan Plan will expire 'makePayment(string memory _planname)'. The Loan Plan price with the calculated total interest will be transferred to the owner. The extra currency transferred will be transferred back to the debtor.

```
truffle(ganache)> instance.makePayment('Plan 1', {from:accounts[0],value:web3.utils.toWei("30","ether")})
{
  tx: '0xaff64927d2b5784656d239c2095cc48d2de262006773c939eccd15090adce591',
truffle(ganache)>
    transactionHash: '0xaff64927d2b5784656d239c2095cc48d2de262006773c939eccd15090adce591',
    transactionIndex: 0,
    blockHash: '0xc232d739e1a232b1e67fa49f9ca874a39aec60ed9cf681e8a9cbc3dbb1347302',
    blockNumber: 20,
    from: '0x09618e01ef71bc853ce1ce9a13491a3fdaa08642',
    to: '0x12b26f4b99df38976124ea18c94c74ac0e35a991',
    gasUsed: 35129,
    cumulativeGasUsed: 35129,
    contractAddress: null,
    logs: [],
    status: true,
    logsBloom: '0x00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000',
    rawLogs: []
  },
  logs: []
}
```

Make Payment

Plan Name

Plan 2

Amount

100

Pay

ADDRESS	BALANCE		TX COUNT	INDEX	
0×09618e01eF71bc853CE1ce9A13491a3FdAA08642	67.94 ETH		19	0	

Successful Payment was made back to the owner will the interest.