Group C

Blockchain Technology

By

Faculty Name

Ms P J Hajare

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Assignment No.	1
Title	Installation of MetaMask and study spending Ether per transaction
Subject	Blockchain Technology
Class	BE (CE)
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AssignmentNo: 1

Title: Installation of MetaMask and study spending Ether per transaction

Objective: To understand and explore the working of Blockchain Technology and its applications.

Course Outcome:

CO6: Interpret the basic concepts in Blockchain technology and its applications.

Description:

MetaMask is available as an in-browser application for desktop or laptop computers, as well as a smartphone app available on both major app stores. What makes it so popular is it seamless integration with many different major crypto websites, including NFT marketplace Open Sea, and decentralized exchanges including 1inch, Uniswap, and Quickswap.

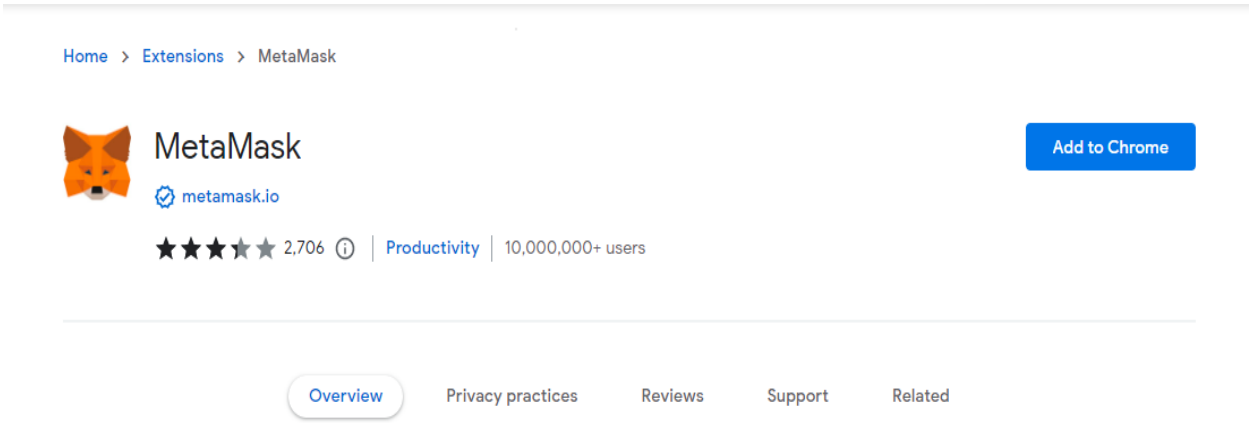
MetaMask also works with hardware cryptocurrency wallets ledger and Trezor, allowing users to transfer crypto and NFTs from the software-based hot wallet to the hardware based cold wallets for secure storage.

It is easy to use MetaMask on a connected website to send, receive, or trade tokens. Before exchanging any tokens, MetaMask will pop up in your browser to confirm the details, including the contracts, price.Before confirming the transaction, user will be able to adjust their gas limits to either pay more to speed it up, or reduce their max price while showing down the confirmation.

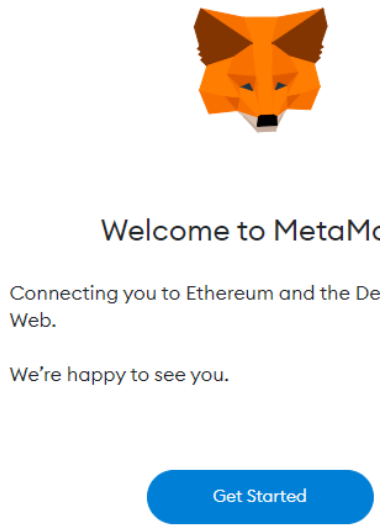
Steps to create MetaMask.

Step 1: Go to Chrome Web Store Extensions Section. Search MetaMask.

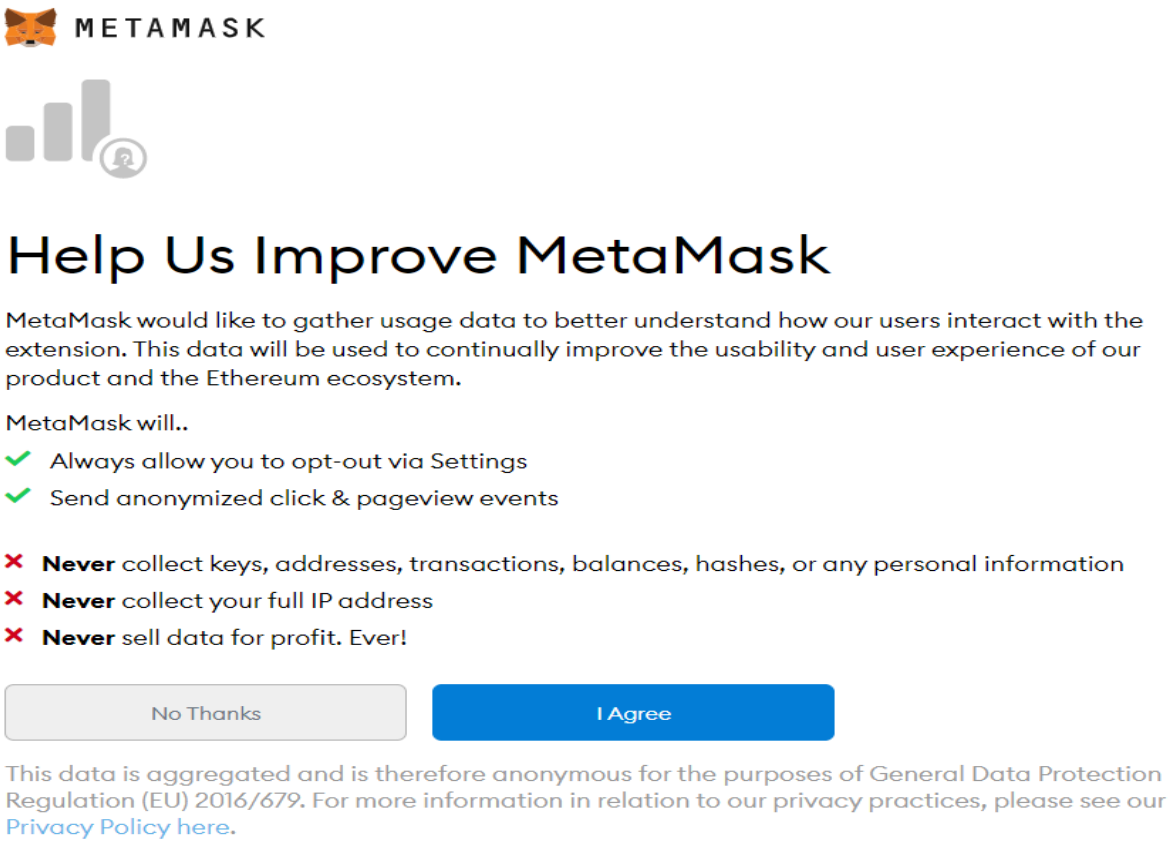
Step 2: Download the METAMASK .Click on the button “Add to Chrome”.



Step 3: MetaMask wallet installation. Click on the MetaMask extension and click on "Get Started".



Step 4: Click on "I Agree."



Conclusion: Hence,wehavestudiedthe installation of MetaMask.

Assignment No.	2
Title	Create your own wallet using MetaMask for crypto transactions.
Subject	Blockchain Technology
Class	BE (CE)
Roll No	
Date	
Signature	

Assignment No. 2

Title: Create your own wallet using MetaMask for crypto transactions.

Objective: Understand and explore the working of Blockchain technology and its applications.

Course Outcome:

CO6:Interpret the basic concepts in Blockchain technology and its application.

Description:

MetaMask is a cryptocurrency wallet used to interact with the Ethereum Blockchain. It can be accessed through an app or through a browser extension.MetaMask is a popular cryptocurrency wallet known for its ease of use, availability on both desktops and mobile devices, the ability to buy, send, and receive cryptocurrency from within the wallet, and collect non-fungible tokens (NFTs) across two block chains. While experienced crypto users will appreciate the simplicity and fast transactions, those new in the space are at a higher risk of losing their tokens from lost secret phrases, malicious websites, and other cryptocurrency scams

Similarly, you'll need a crypto wallet to transact with a Blockchain.

A wallet is your personal key to interact with the cryptographic world. It powers you to buy, sell or transfer assets on the Blockchain.

And MetaMask is a wallet for the most diverse Blockchain in existence–Ethereum. It's your gateway to its DeFi ecosystem, non-fungible tokens (NFTs), ERC-20 tokens, and practically–everything Ethereum.

It's available as an app for iOS and Android. In addition, you can use this as an extension with a few web browsers: Chrome, Firefox, Brave, and Edge.

Let's take a look at some of the prominent features of this wallet:

Ease of use

Starting with MetaMask is easy, quick, and anonymous. You don't even need an email address. Just set up a password and remember (and store) the secret recovery phrase, and you're done.

Security

Your information is encrypted in your browser that nobody has access to. In the event of a lost password, you have the 12-word secret recovery phase (also called a seed phrase) for

recovery. Notably, it's essential to keep the seed phrase safe, as even MetaMask has no information about it. Once lost, it can't be retrieved.

Built-In Crypto Store

If you're wondering, no, you can't buy Bitcoin with MetaMask. It only supports Ether and other Ether-related tokens, including the famous ERC-20 tokens. Cryptocurrencies (excluding Ether) on Ethereum are built as ERC-20 tokens.

Backup and Restore

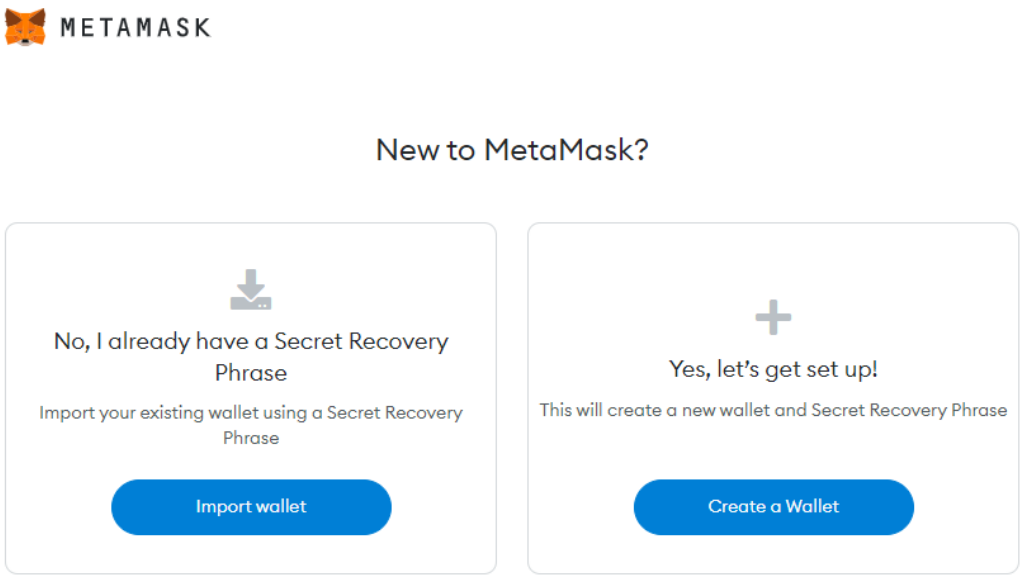
MetaMask stores your information locally. So, in case you switch browsers or machines, you can restore your MetaMask wallet with your secret recovery phrase.

Community Support

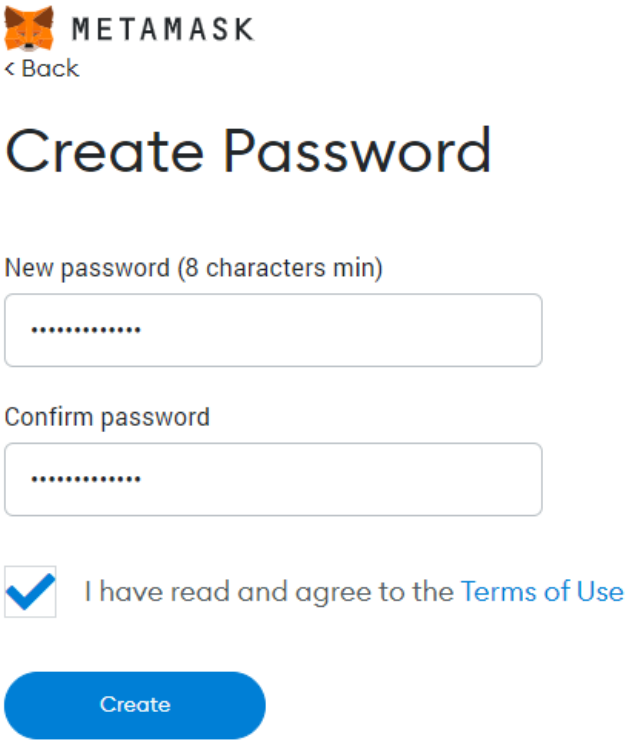
As of August 2021, MetaMask was home to 10 million monthly active users around the world. It's simple and intuitive user interface keeps pushing these numbers with a recorded 1800% increase from July 2020.

Conclusively, try MetaMask if hot wallets are your pick. Let's begin with the installation before moving to its use cases. Further sections entail the illustration for Chrome web browser and Android mobile platform.

Step 1: Click on the "Create a wallet".

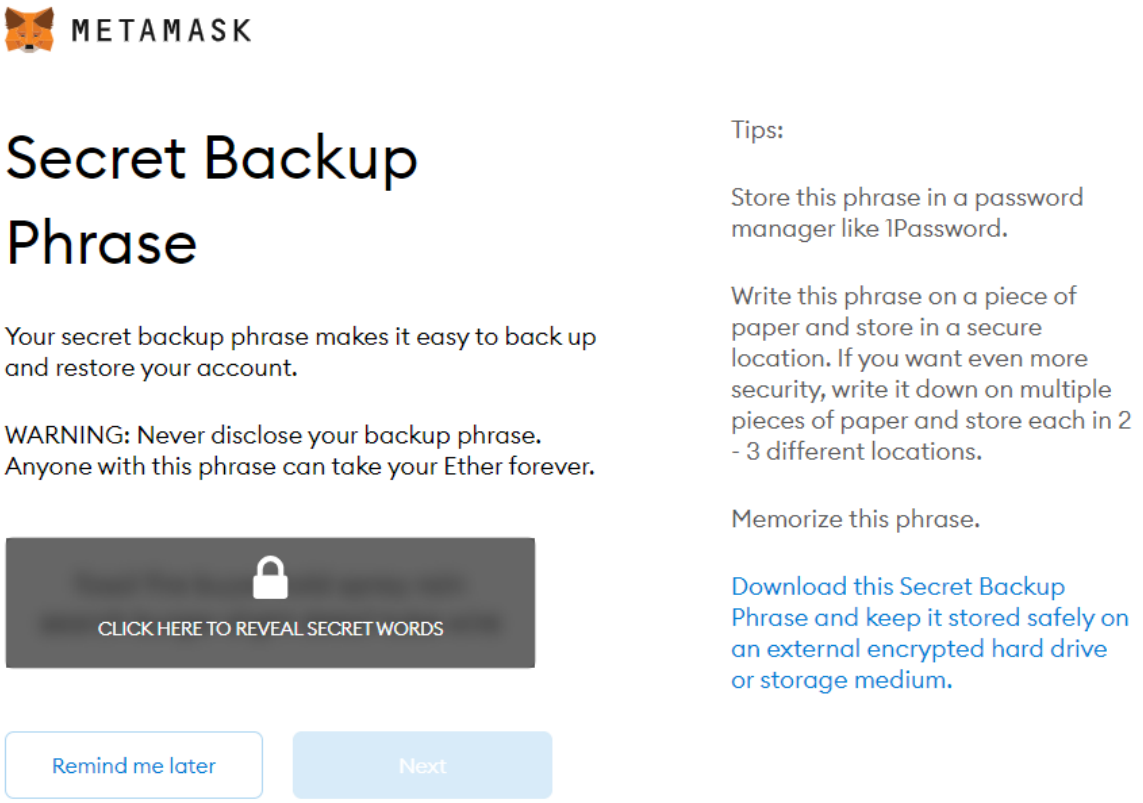


Step 2: Create a password for your wallet. This password is to be entered every time the browser is launched and wants to use MetaMask. A new password needs to be created if chrome is uninstalled or if there is a switching of browsers. In that case, go through the Import Wallet button. This is because MetaMask stores the keys in the browser. Agree to Terms of Use.



Step 3:Click on the dark area which says *Click here to reveal secret words* to get your secret phrase.

Step 4: This is the most important step. Back up your secret phrase properly. Do not store your secret phrase on your computer. Please read everything on this screen until you understand it completely before proceeding. The secret phrase is the only way to access your wallet if you forget your password. Once done click the Next button.

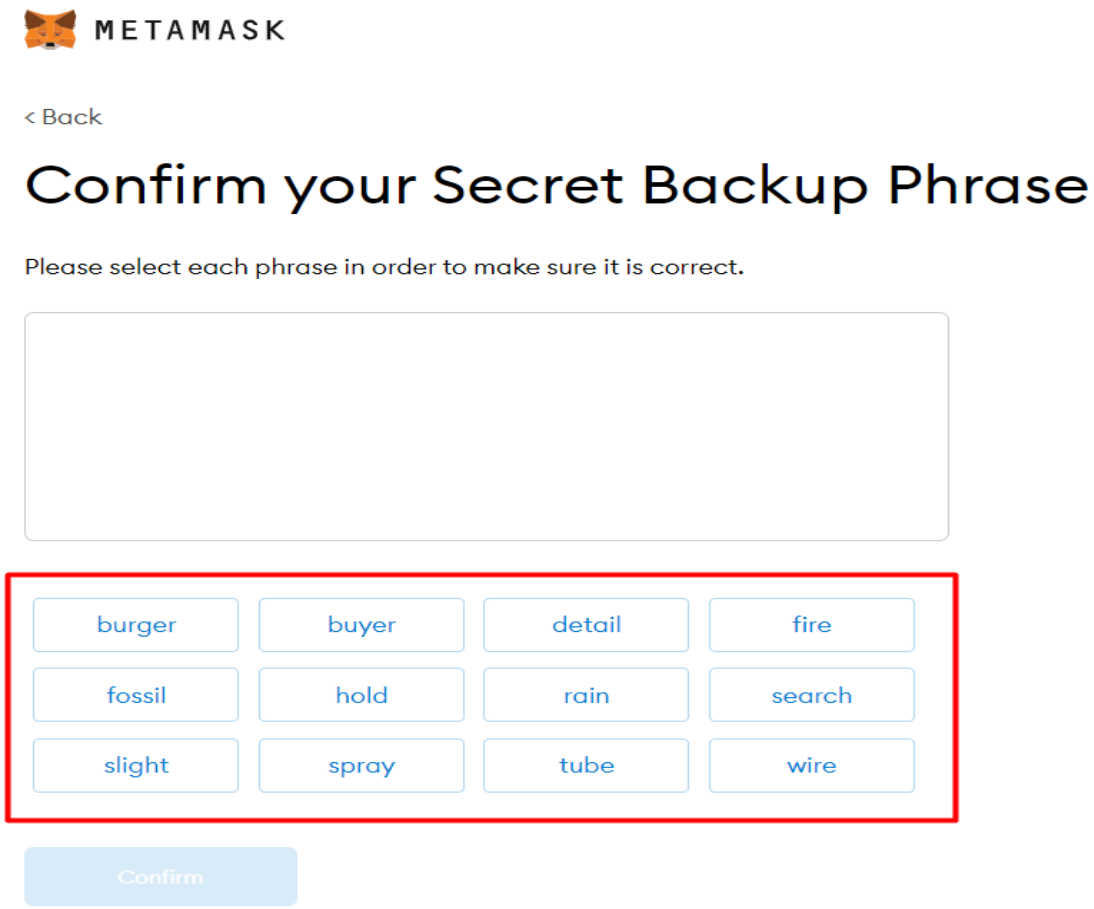


Step 5:

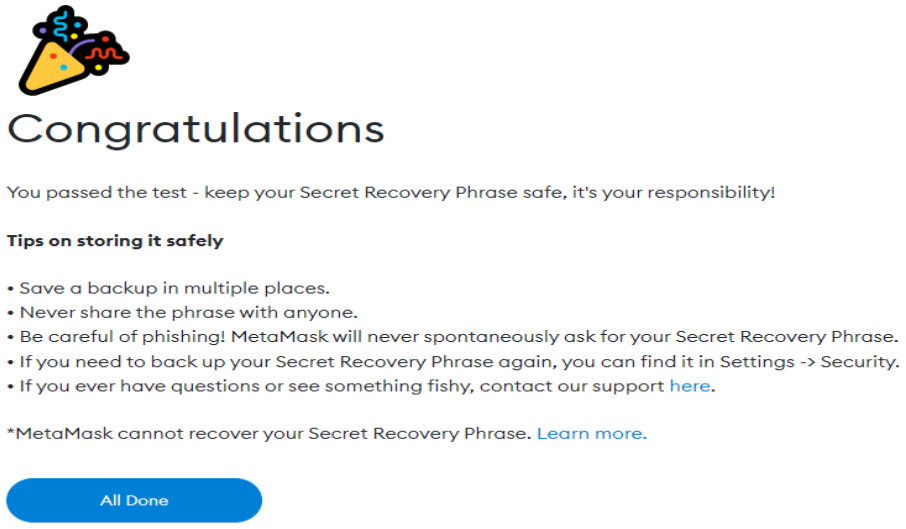
Securely store the seed phrase for your wallet
Click on “Click here to reveal secret words” to show the seed phrase.

MetaMask requires that you store your seed phrase in a safe place. It is the only way to recover your funds should your device crash or your browser reset. We recommend you write it down. The most common method is to write your 12-word phrase on a piece of paper and store it safely in a place where only you have access. Note: if you lose your seed phrase, MetaMask can’t help you recover your wallet and your funds will be lost forever.

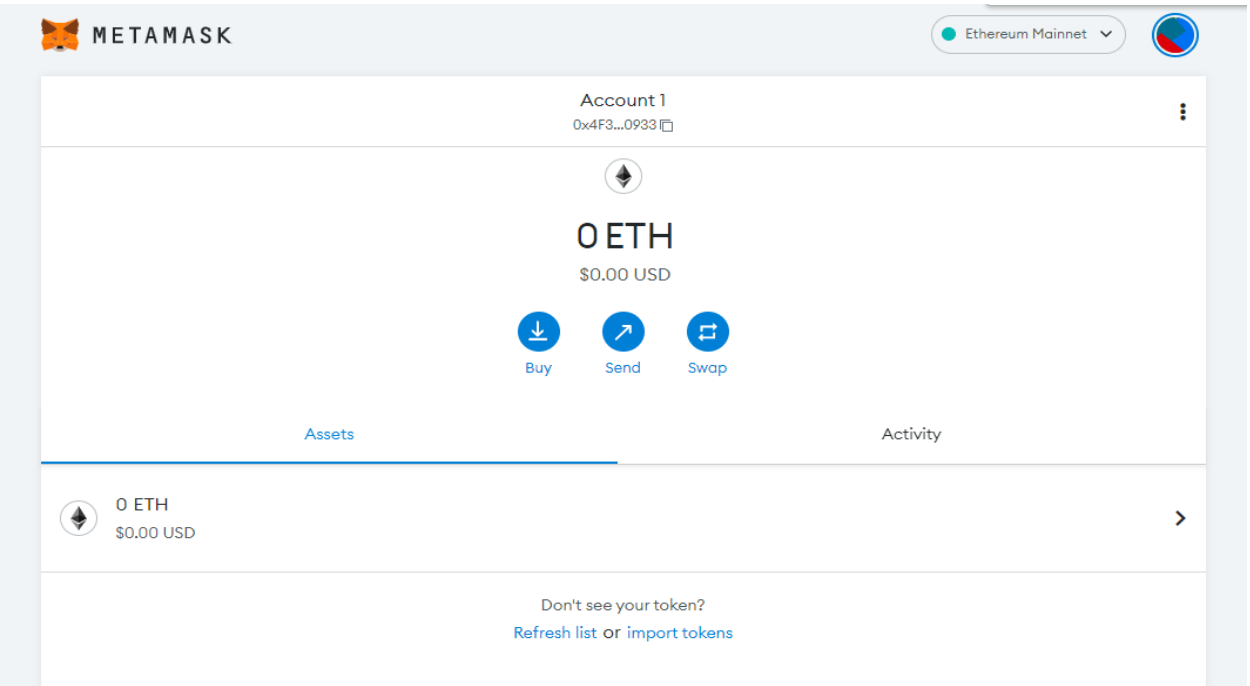
Never share your seed phrase or your private key to anyone or any site, unless you want them to have full control over your funds.



Step 6: Click the *Confirm* button. Please follow the tips mentioned.



Step 7: One can see the balance and copy the address of the account by clicking on the *Account 1* area.



Conclusion: Hence,wehavestudiedto create a wallet using MetaMask.

Assignment No.	3
Title	Write a smart contract on a test network for Bank account of a customer for following operations. • Deposit Money • Withdraw Money • Show Balance
Subject	Blockchain Technology
Class	BE (CE)
Roll No	
Date	
Signature	

Assignment No. 3

Title: Write a smart contract on a test network for Bank account of a customer for following operations.

- Deposit Money
- Withdraw Money
- Show Balance

Objective: Understand and explore the working of Blockchain technology and its applications.

Course Outcome:

CO6:Interpret the basic concepts in Blockchain technology and its application.

Description:

First of all, we need to understand the differences between a paper contract and a smart contract and the reason why smart contracts become increasingly popular and important in recent years. A contract, by definition, is a written or spoken (mostly written) law-enforced agreement containing the rights and duties of the parties. Because most of business contracts are complicated and tricky, the parties need to hire professional agents or lawyers for protecting their own rights. However, if we hire those professionals every time we sign contracts, it is going to be extremely costly and inefficient. Smart contracts perfectly solve this by working on 'If-Then' principle and also as escrow services. All participants need to put their money, ownership right or other tradable assets into smart contracts before any successful transaction. As long as all participating parties meet the requirement, smart contracts will simultaneously distribute stored assets to recipients and the distribution process will be witnessed and verified by the nodes on Ethereum network.

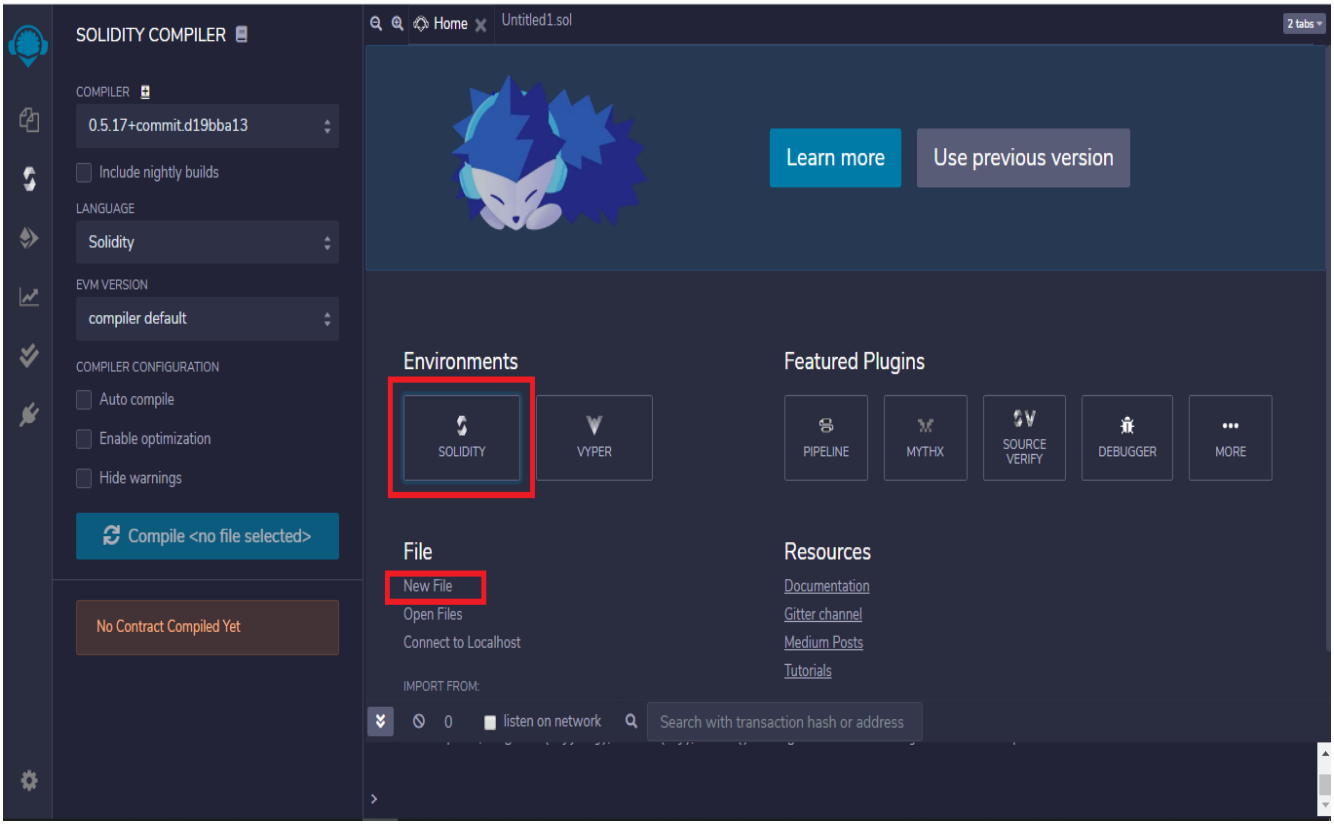
There are a couple of languages we can use to program smart contract. Solidity, an object-oriented and high-level language, is by far the most famous and well maintained one. We can use Solidity to create various smart contracts which can be used in different scenarios, including voting, blind auctions and safe remote purchase. In this lab, we will discuss the semantics and syntax of Solidity with specific explanation, examples and practices.

After deciding the coding language, we need to pick an appropriate compiler. Among various compilers like Visual Code Studio, we will use Remix IDE in this and following labs because it can be directly accessed from browser where we can test, debug and deploy smart contracts without any installation.

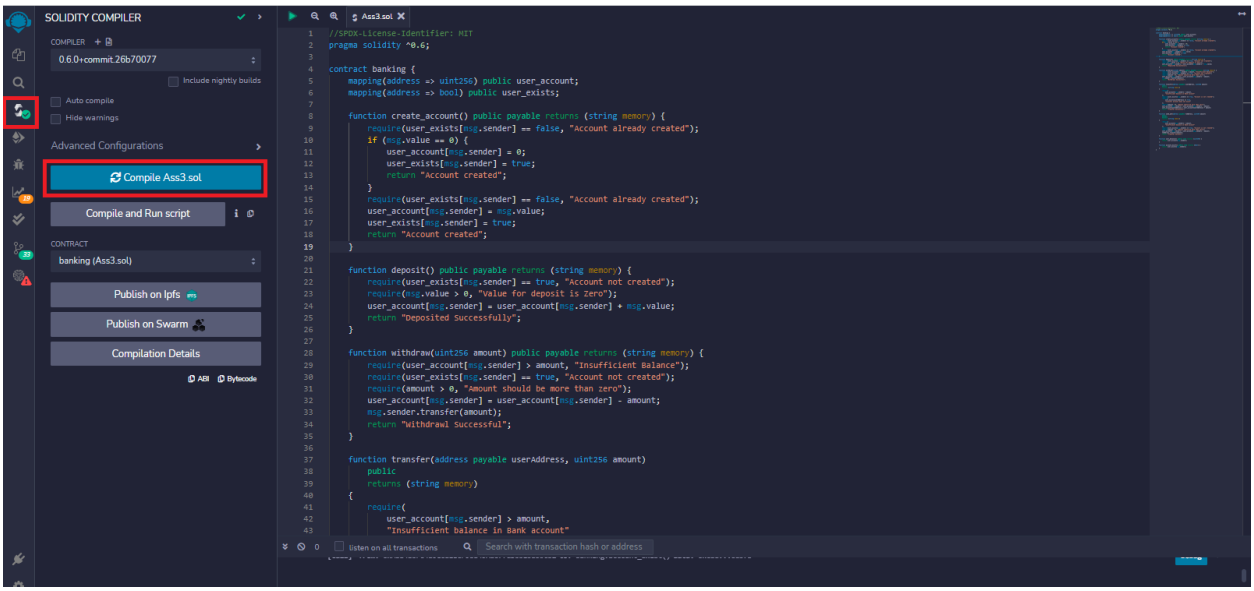
Steps to Execute Solidity Smart Contract using Remix IDE

Remix IDE is generally used to compile and run Solidity smart contracts. Below are the steps for the compilation, execution, and debugging of the smart contract.

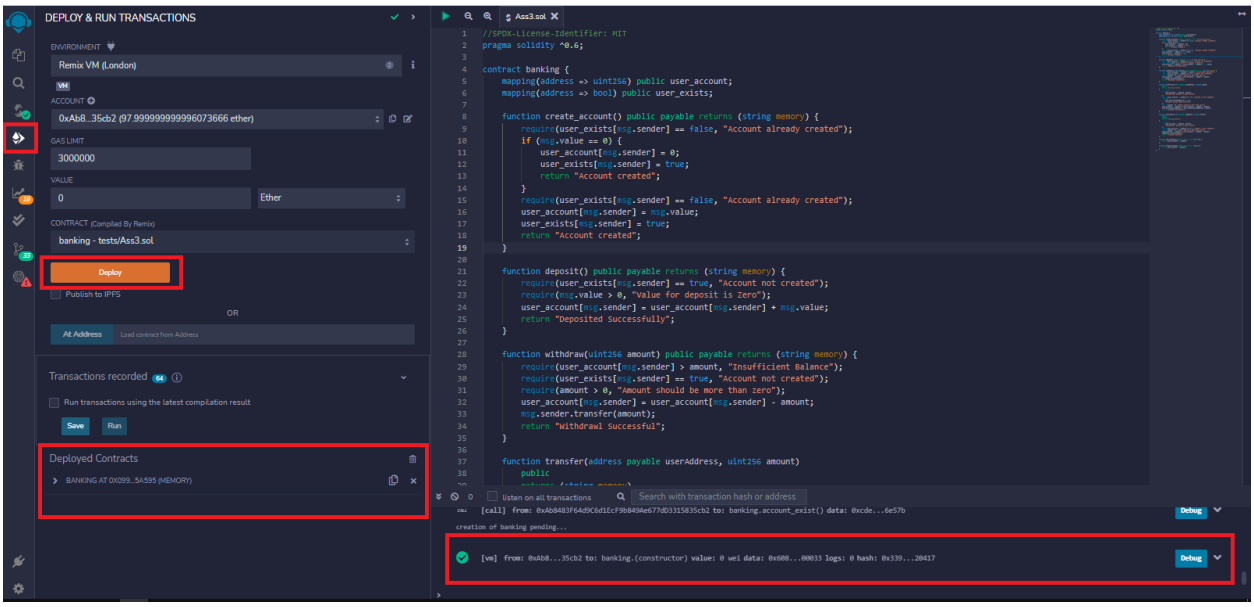
Step 1: Open Remix IDE on any of your browsers, select on the *New File* and click on *Solidity* to choose the environment.



Step 2: Write the Smart contract in the code section, and click the *Compile button* under the Compiler window to compile the contract.



Step 3: To execute the code, click on the *Deploy button* under Deploy and Run Transactions window. After deploying the code click on the drop-down on the console.



Code

```
//SPDX-License-Identifier: MIT
pragma solidity ^0.6;
```

```
contract banking
{
   mapping(address=>uint) public user_account;
   mapping(address=>bool) public user_exists;

   function create_account() public payable returns(string memory)
   {
      require(user_exists[msg.sender]==false,'Account already created');
      if(msg.value==0)
      {
user_account[msg.sender]=0;
user_exists[msg.sender]=true;
         return "Account created";
      }
      require(user_exists[msg.sender]==false,"Account already created");
user_account[msg.sender]=msg.value;
user_exists[msg.sender]=true;
      return "Account created";
   }

   function deposit() public payable returns(string memory)
   {
      require(user_exists[msg.sender]==true,"Account not created");
      require(msg.value>0,"Value for deposit is Zero");
user_account[msg.sender]=user_account[msg.sender]+msg.value;
      return "Deposited Successfully";
   }

   function withdraw(uint amount) public payable returns(string memory)
   {
```

```
        require(user_account[msg.sender]>amount,"Insufficient Balance");
        require(user_exists[msg.sender]==true,"Account not created");
        require(amount>0,"Amount should be more than zero");
user_account[msg.sender]=user_account[msg.sender]-amount;
msg.sender.transfer(amount);
        return "Withdrawl Successful";
    }

    function transfer(address payable userAddress, uint amount) public returns(string memory)
    {
        require(user_account[msg.sender]>amount,"Insufficient balance in Bank account");
        require(user_exists[msg.sender]==true,"Account is not created");
        require(user_exists[userAddress]==true,"Transfer account does not exist");
        require(amount>0,"Amount should be more than zero");
user_account[msg.sender]=user_account[msg.sender]-amount;
user_account[userAddress]=user_account[userAddress]+amount;
        return "Transfer Successful";
    }

    function send_amt(address payable toAddress, uint256 amount) public payable returns(string
memory)
    {
        require(user_account[msg.sender]>amount,"Insufficeint balance in Bank account");
        require(user_exists[msg.sender]==true,"Account is not created");
        require(amount>0,"Amount should be more than zero");
user_account[msg.sender]=user_account[msg.sender]-amount;
toAddress.transfer(amount);
        return "Transfer Success";
    }

    function user_balance() public view returns(uint)
```

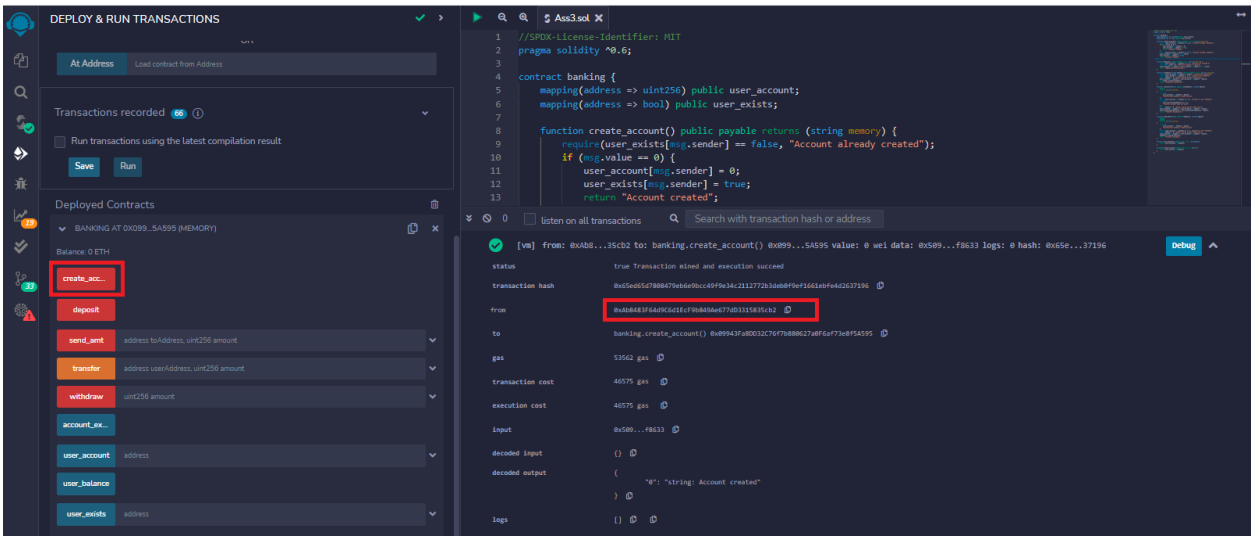
```
    {
        return user_account[msg.sender];
    }

    function account_exist() public view returns(bool)
    {
        return user_exists[msg.sender];
    }
}
```

Sample Output

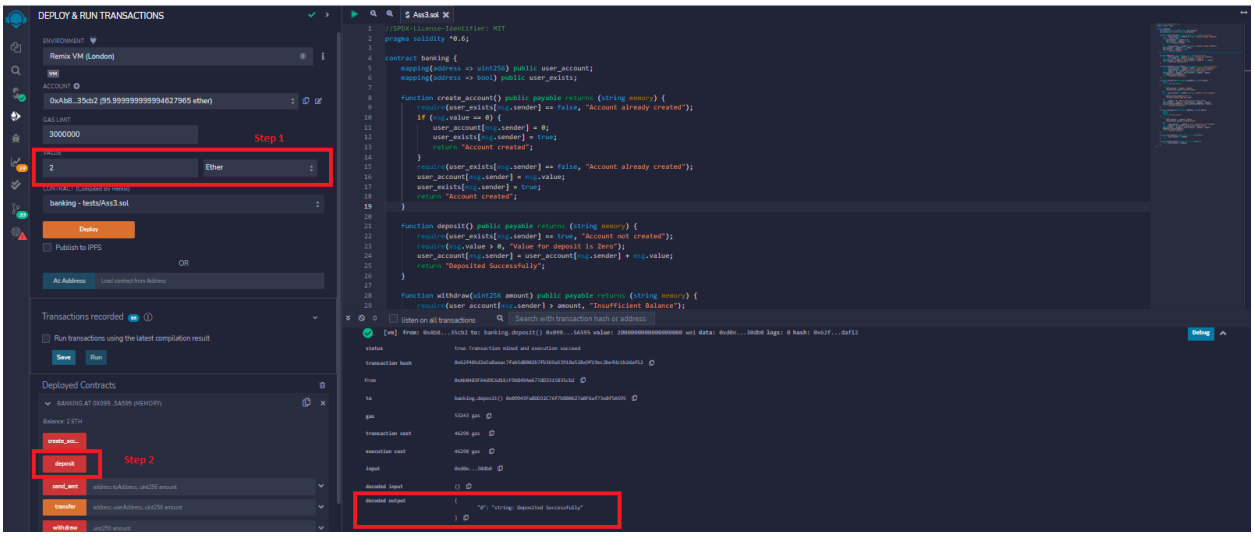
After deploying the contact successful you can observe following buttonscreate_account, deposit, send_amt, transfer, account_exist, user_account, user_balance and user_exists.

Refer the following output

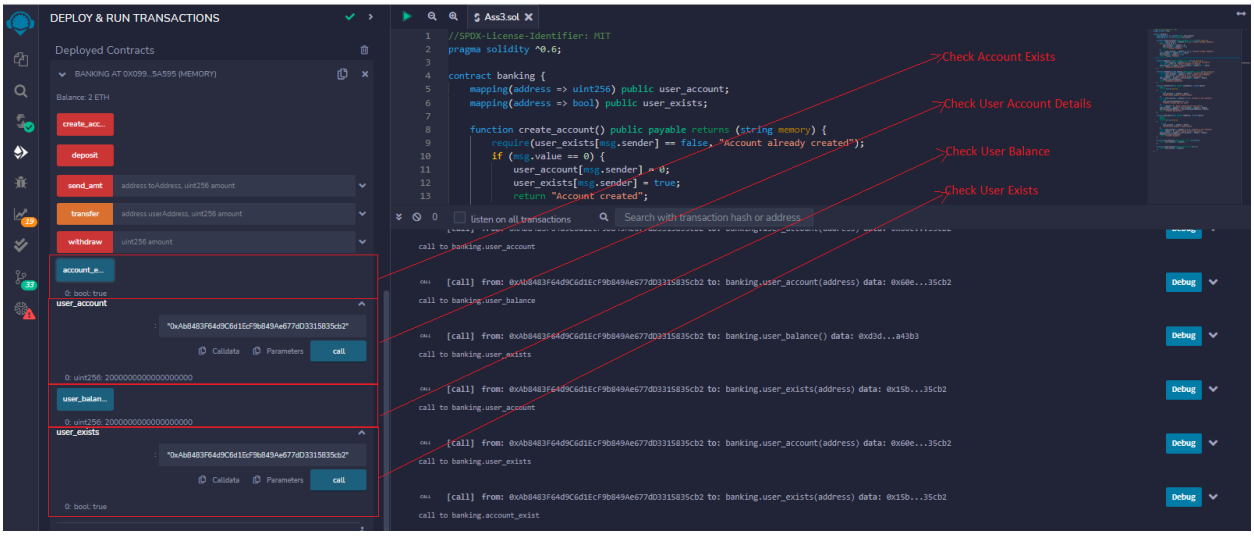
- Create account



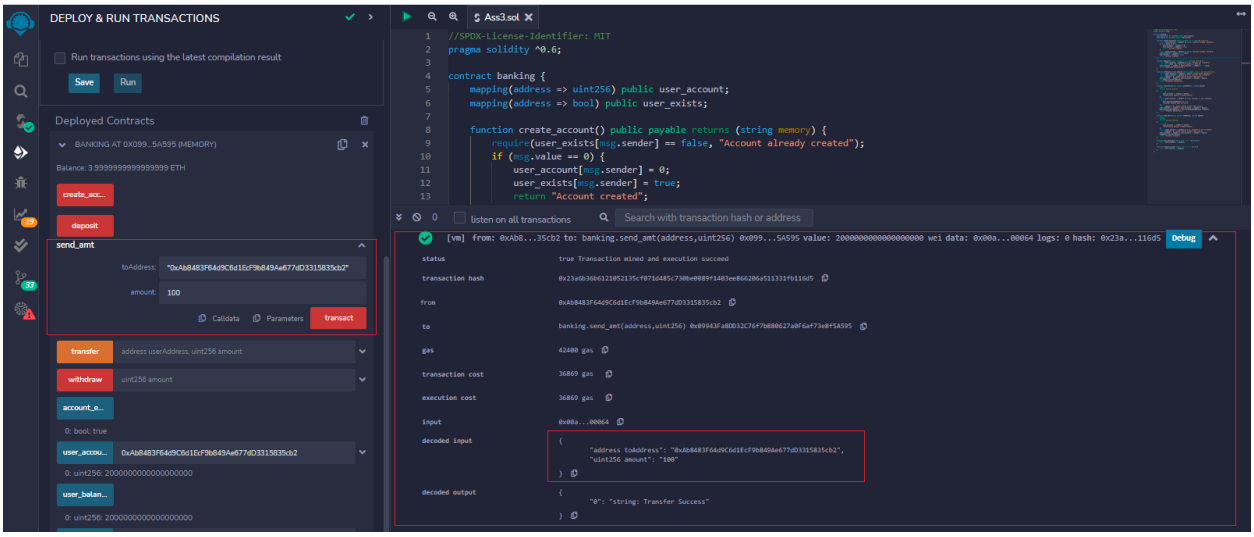
- Deposit Amount



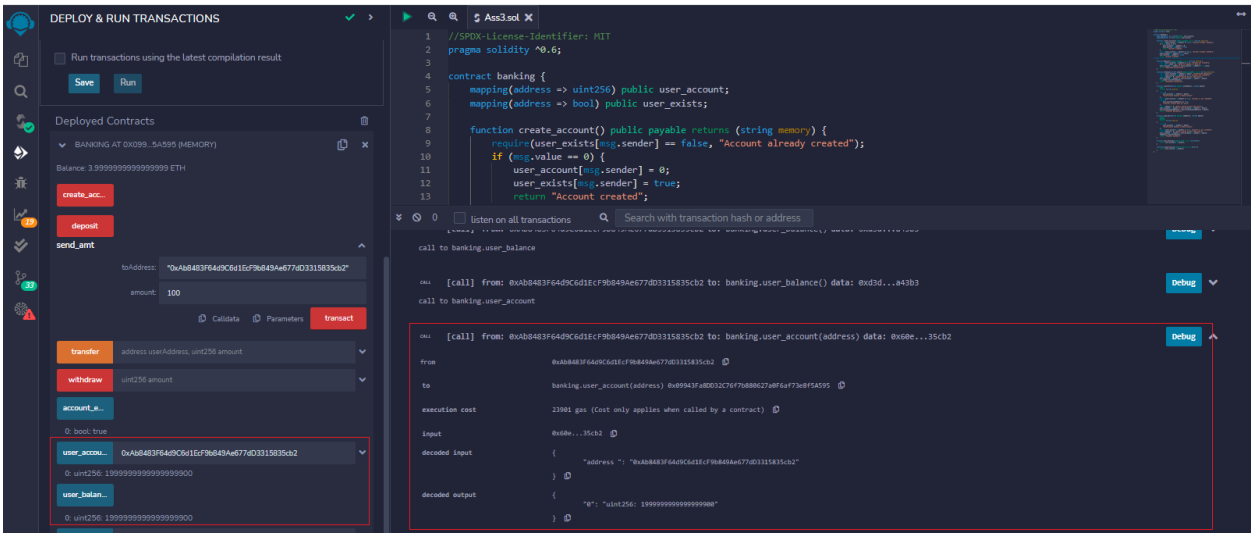
- Check Account Exists
- Check User Account Exists
- Check User Balance
- Check User Exists



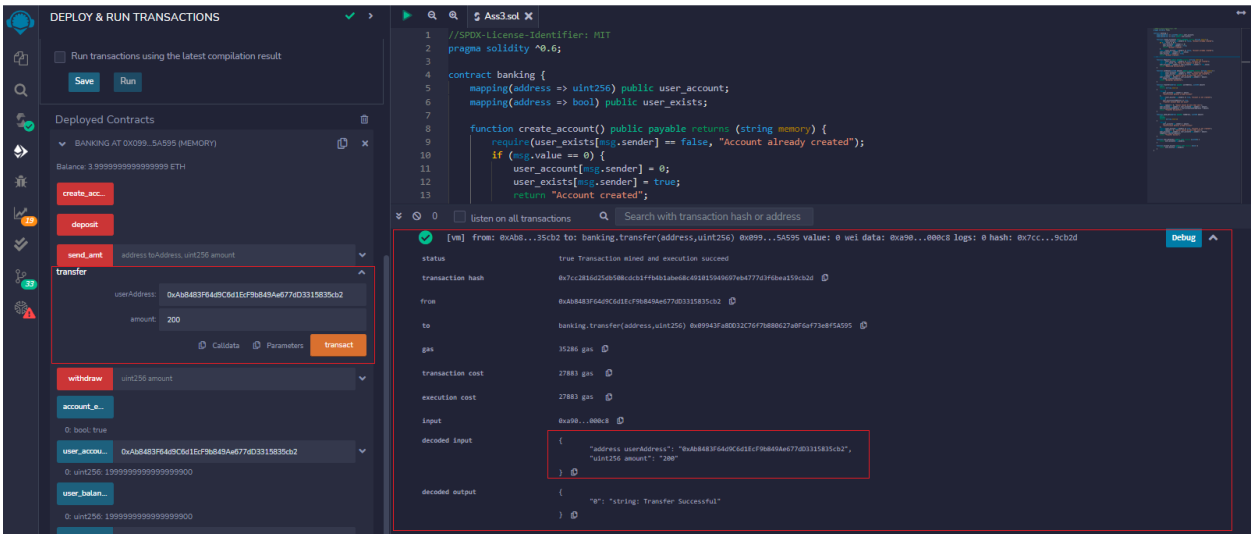
- Send Amount



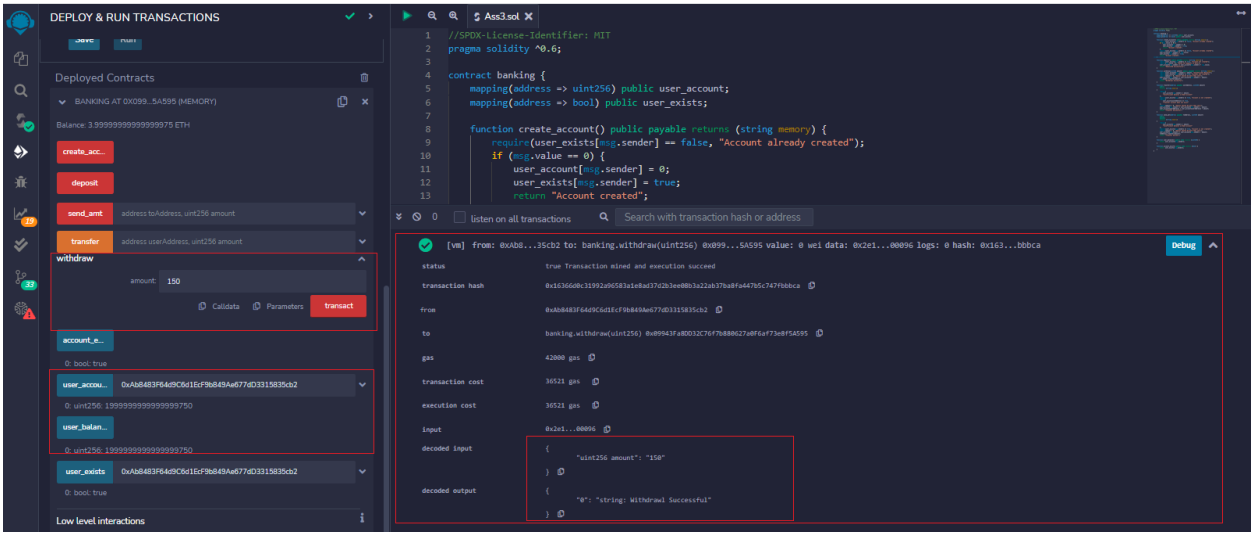
- Check User Account Balance



- Transfer Amount and Check User Account Balance



- Withdraw Amount and Check User Account Balance



Conclusion: Hence,wehave studied a smart contract on a test network for Bank account of a customer

Assignment No.	4
Title	Write a program in solidity to create Student data. Use the following constructs: • Structures • Arrays • Fallback
Subject	Blockchain Technology
Class	BE (CE)
Roll No	
Date	
Signature	

Assignment No. 4

Title: Write a program in solidity to create Student data. Use the following constructs:

- Structures
- Arrays
- Fallback

Deploy this as smart contract on Ethereum and Observe the transaction fee and Gas value.

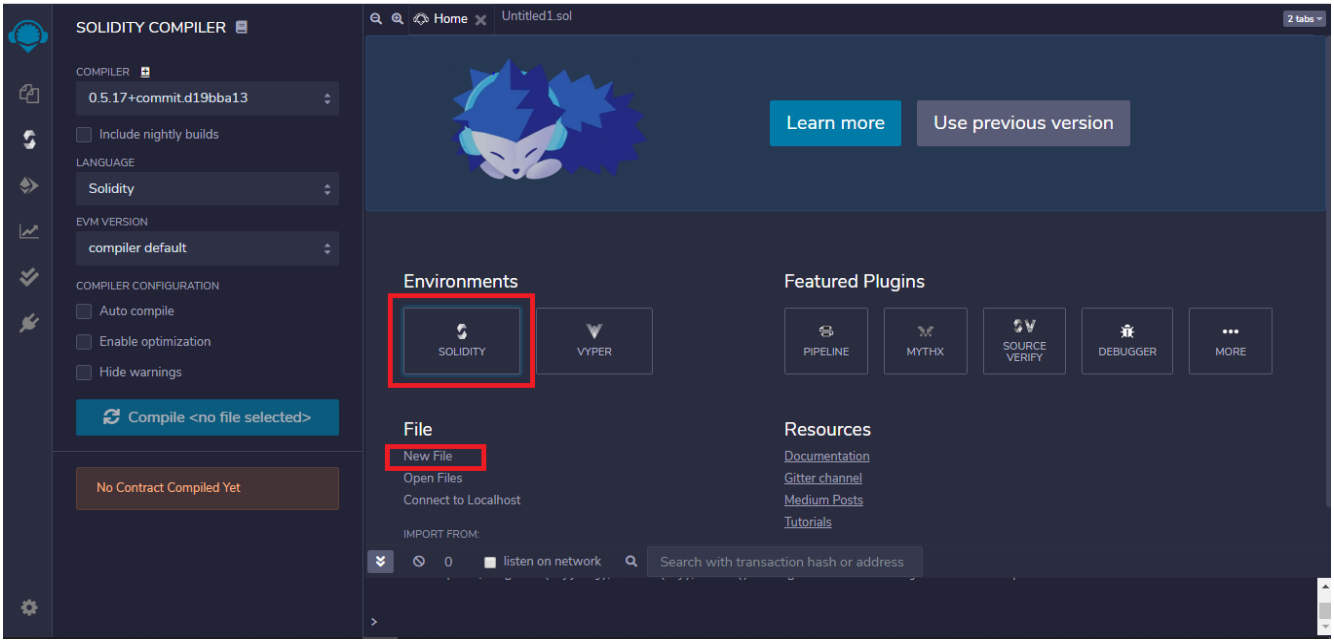
Objective: Understand and explore the working of Blockchain technology and its applications.

Course Outcome:

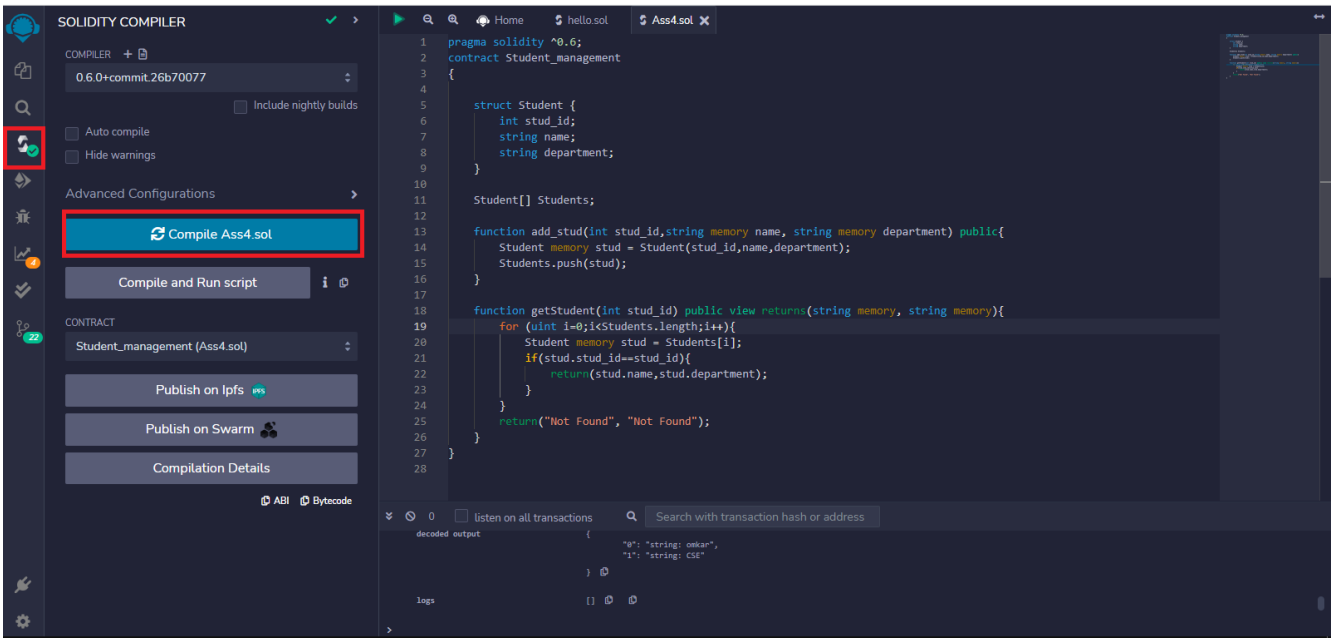
CO6:Interpret the basic concepts in Blockchain technology and its application.

Description:

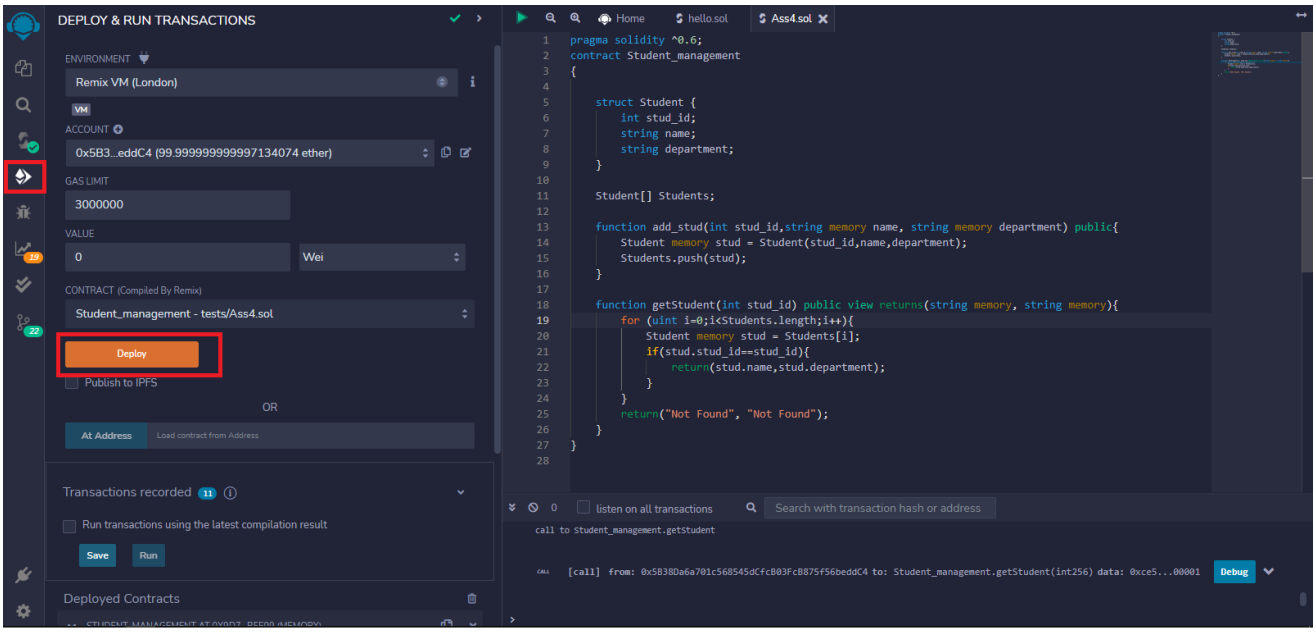
Step 1: Open Remix IDE on any of your browsers, select on the *New File* and click on *Solidity* to choose the environment.



Step 2: Write the Student Management code in the code section, and click the *Compile button* under the Compiler window to compile the contract.



Step 3: To execute the code, click on the *Deploy button* under Deploy and Run Transactions window. After deploying the code click on the drop-down on the console.



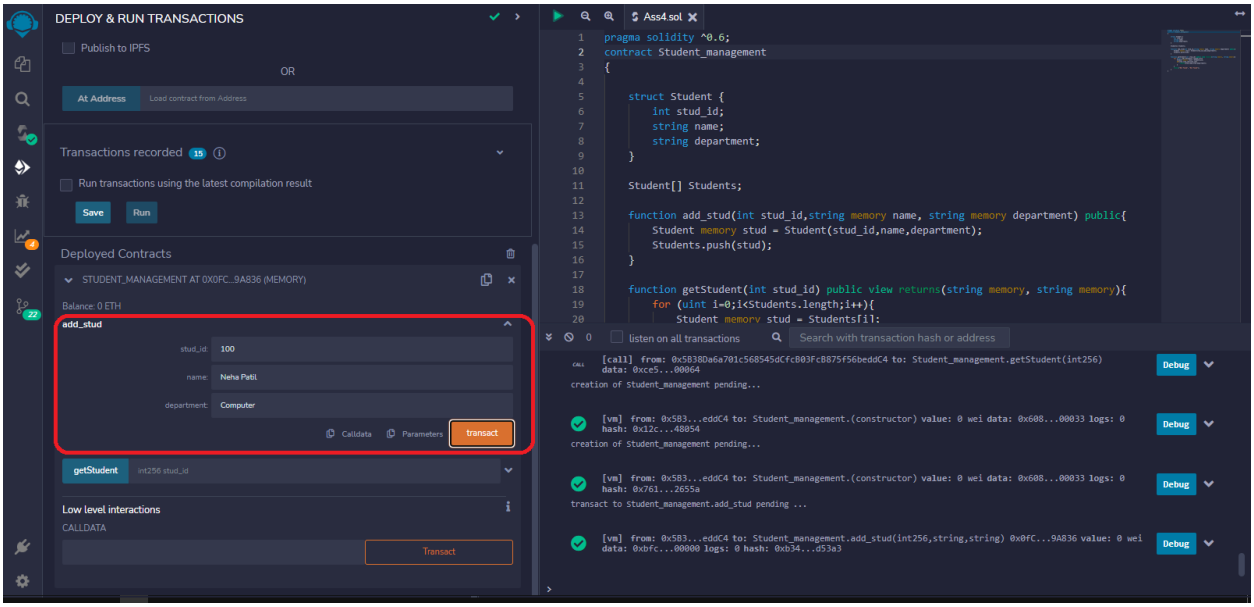
Code

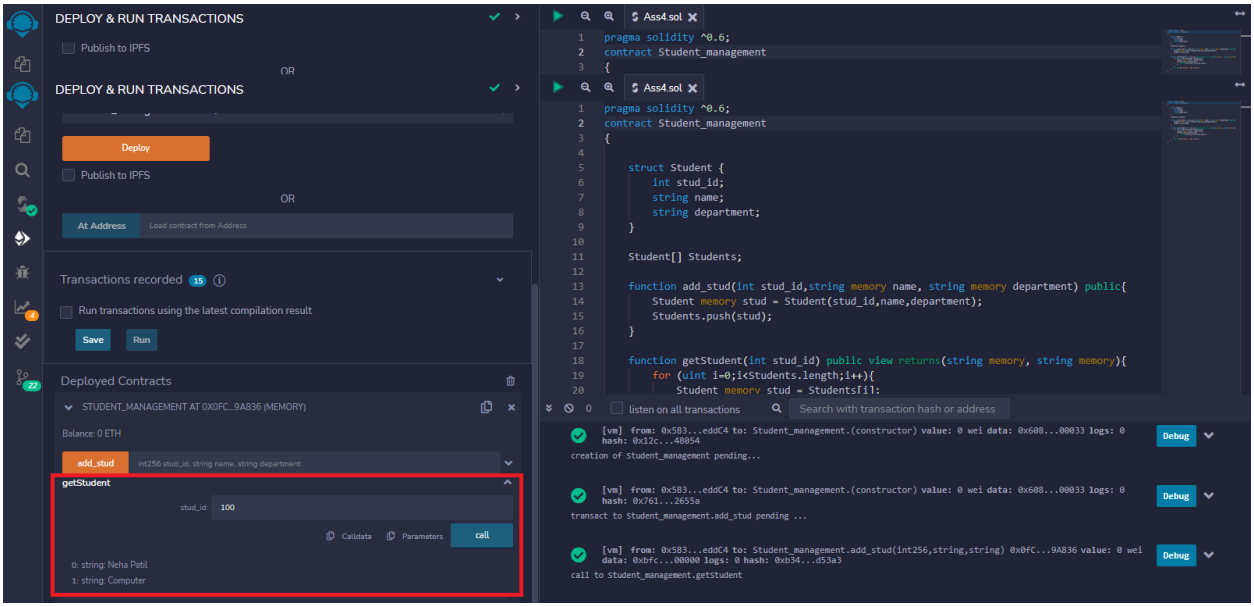
```
pragma solidity ^0.6;
contract Student_management
{

struct Student {
intstud_id;
        string name;
        string department;
    }

    Student[] Students;

    function add_stud(intstud_id,string memory name, string memory department) public{
        Student memory stud = Student(stud_id,name,department);
Students.push(stud);
    }

    function getStudent(intstud_id) public view returns(string memory, string memory){
        for (uinti=0;i<Students.length;i++){
            Student memory stud = Students[i];
            if(stud.stud_id==stud_id){
                return(stud.name,stud.department);
            }
        }
        return("Not Found", "Not Found");
    }
}
```

Sample Output

After deploying the contact successful you can observe two button add_stud and getStudents.Give the input stud_id, name dept and click on getStudents button, enter the stud_id which you have given as an Input and get the information of Students name and department

Refer the following output





Conclusion: Hence,wehave studieda program in solidity to create Student data.

Assignment No.	5
Title	Write a survey report on types of Blockchain and its real time use cases.
Subject	Blockchain Technology
Class	BE (CE)
Roll No	
Date	
Signature	

Assignment No. 5

Title: Write a survey report on types of Blockchains and its real time use cases.

Objective: Understand and the types of Blockchain technology and its real time applications.

Course Outcome:

CO6:Interpret the basic concepts in Blockchain technology and its application.

Description:

A blockchain is a digital ledger of all cryptocurrency transactions. It is constantly growing as "completed" blocks are added to it with a new set of recordings. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Bitcoin nodes use the block chain to differentiate legitimate Bitcoin transactions from attempts to re-spend coins that have already been spent elsewhere.

Types of Blockchain

There are three types of blockchains- public, private and consortium.

1. **Public Blockchain:** A public blockchain has absolutely no access restrictions. Anyone with an internet connection can send transactions to it as well as become a validator (i.e. participate in the consensus process). Bitcoin is the best example of a public blockchain.
2. **Private Blockchain:** A private blockchain is a little more centralized. Here, a central authority controls who can access the network and who can become a validator. Validators on a private blockchain are typically vetted by the central authority. Permissioned blockchains are often used in enterprise settings where centralized control is necessary. An example of a private blockchain is Hyperledger Fabric.
3. **Consortium Blockchain:** A consortium blockchain is a hybrid of the public and private blockchain. Here, a group of companies or organizations control who can access the

network and who can become a validator. The selection of validators is typically done through a voting process. Consortium blockchains are often used in cases where multiple parties need to collaborate but no party is fully trusted. An example of a consortium blockchain is the R3 Corda platform.

Real-Time Use Cases of Blockchain

1. **Supply Chain Management** Blockchain can be used to create an immutable record of all the transactions in a supply chain. This can help to increase transparency and traceability in the supply chain.
2. **Identity Management** Blockchain can be used to create a digital identity for individuals, organizations, and devices. This can be used for KYC (know your customer) and AML (anti-money laundering) compliance.
3. **Payments** Blockchain can be used to process payments. This can be done using cryptocurrencies or fiat currencies.
4. **Data Management** Blockchain can be used to store data in a tamper-proof and decentralized manner. This can be used for data sharing and data security.
5. **IoT** Blockchain can be used to create a decentralized network of IoT devices. This can be used for data sharing and data security.
6. **Predictive Analytics** Blockchain can be used to create a decentralized network of predictive analytics models. This can be used for data sharing and data security.

Conclusion: Hence,wehave studiedto write a survey report on types of Blockchains and its real time use cases.