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.

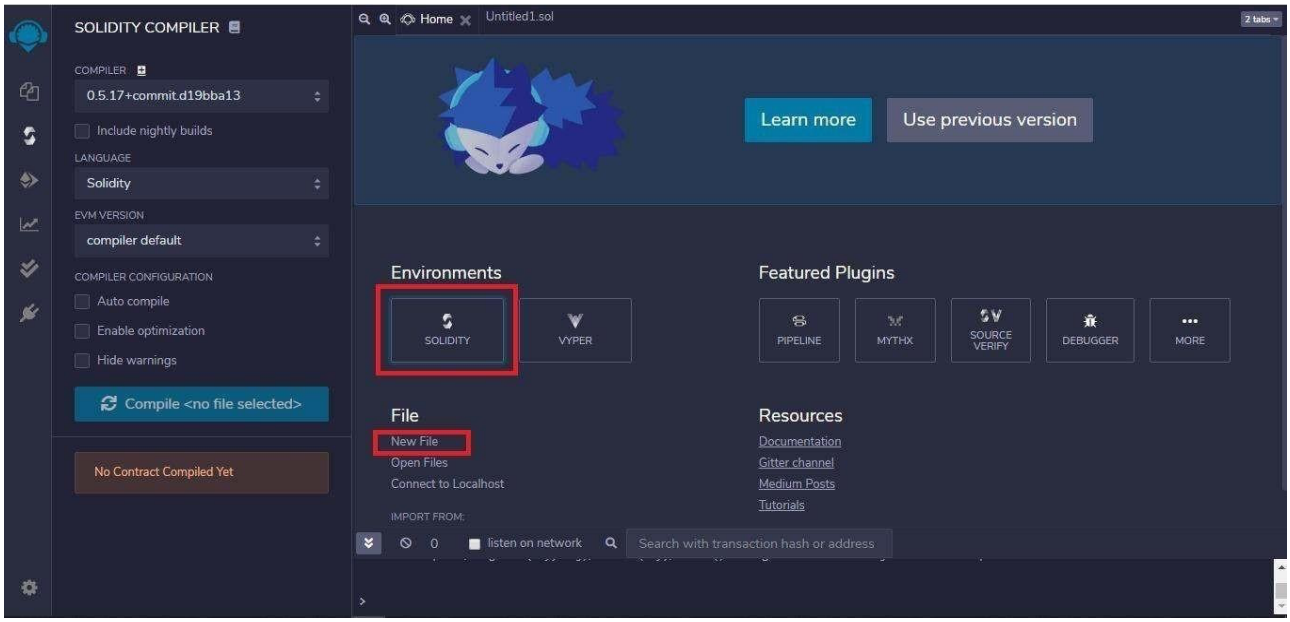
Objective: Understand and explore the working of Blockchain technology and its applications.

Course Outcome:

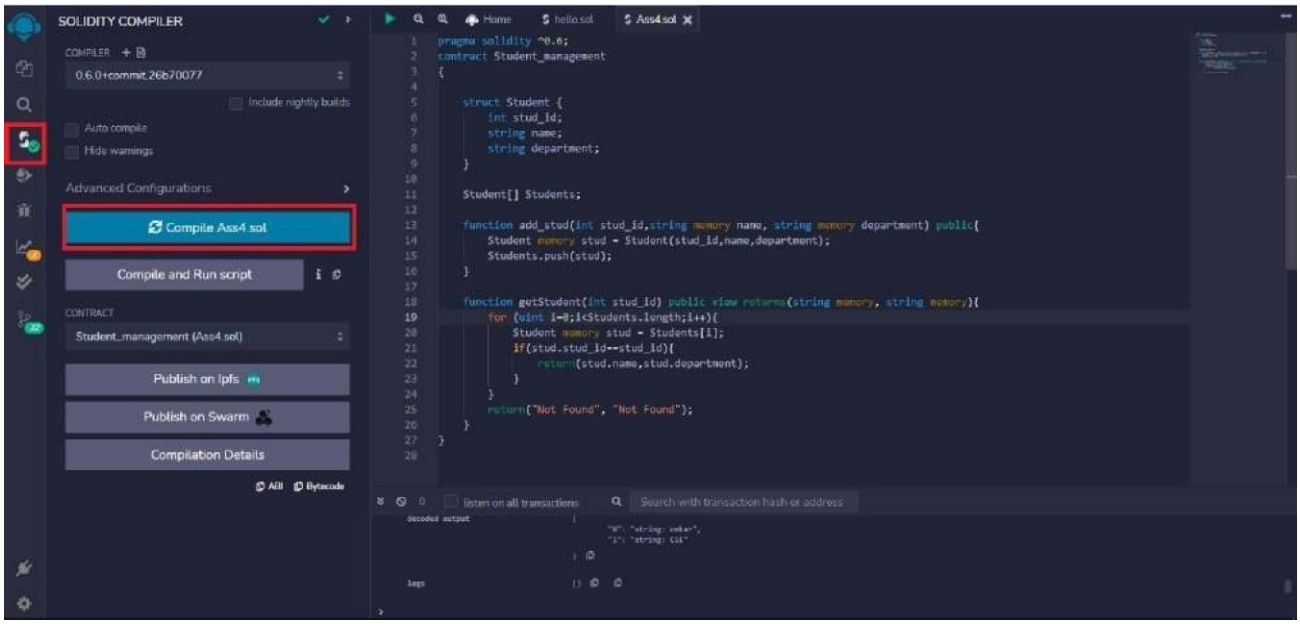
CO6:Interpret the basic concepts in Blockchain technology and its application.

Description:

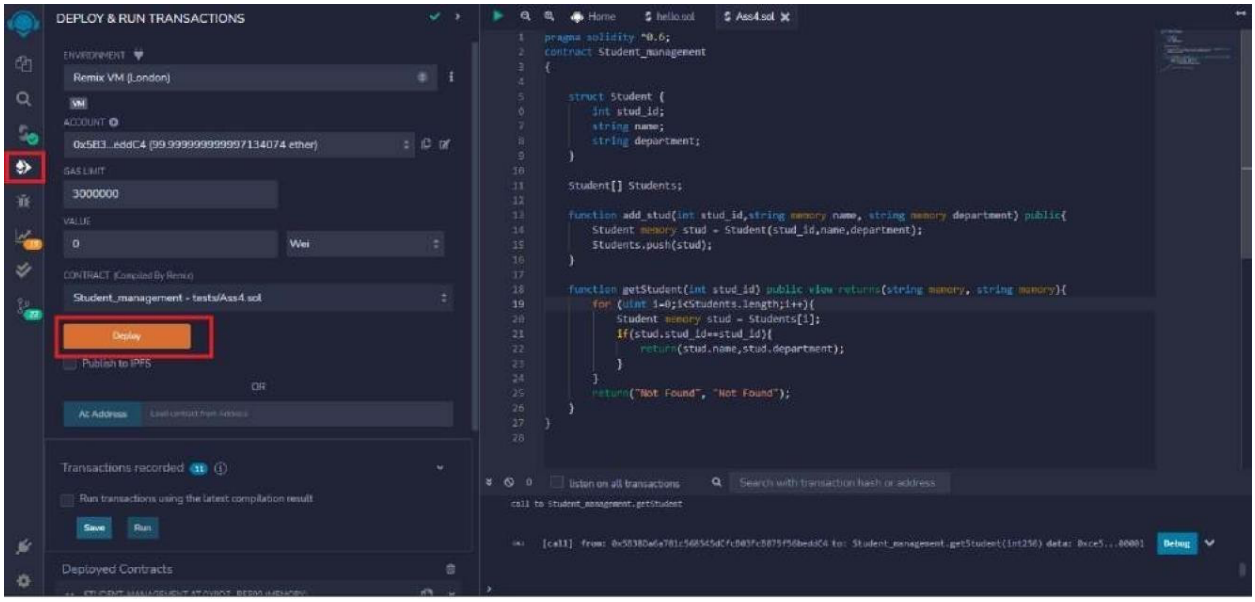
Step 1: Open Remix IDE on any of your browsers, select on the *New File* and click on *Solidity* to choose the environment.



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.



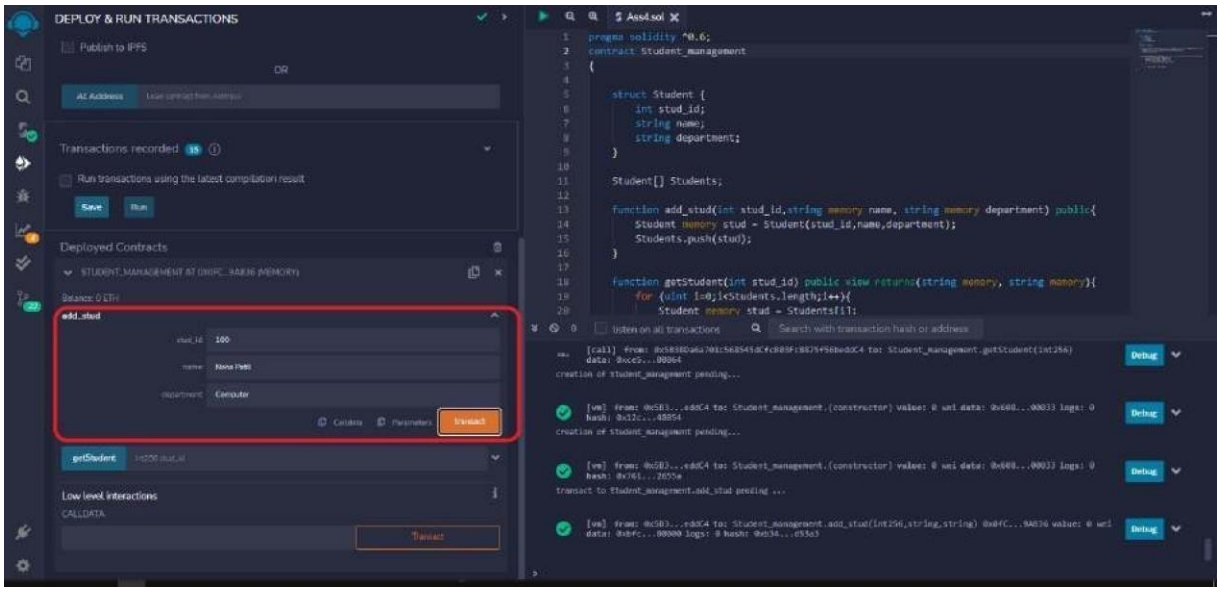
Code

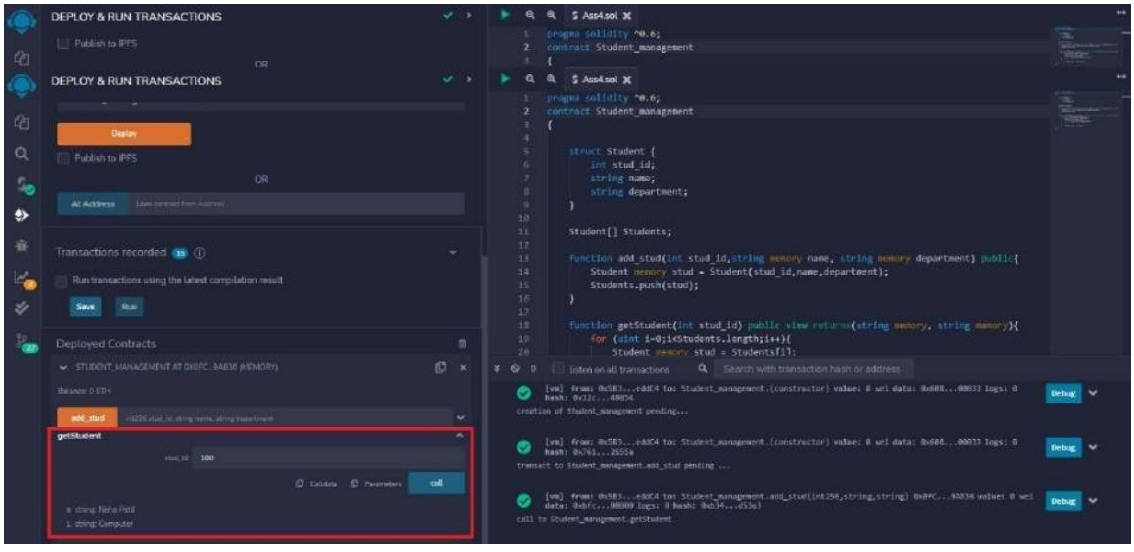
```
pragma solidity ^0.6;
contract Student_management
{

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

Objective of the Assignment: Students should be able to learn new technology such as metamask.Its application and implementations

Prerequisite:

1. Basic knowledge of cryptocurrency
2. Basic knowledge of distributed computing concept
3. Working of blockchain

Contents for Theory:

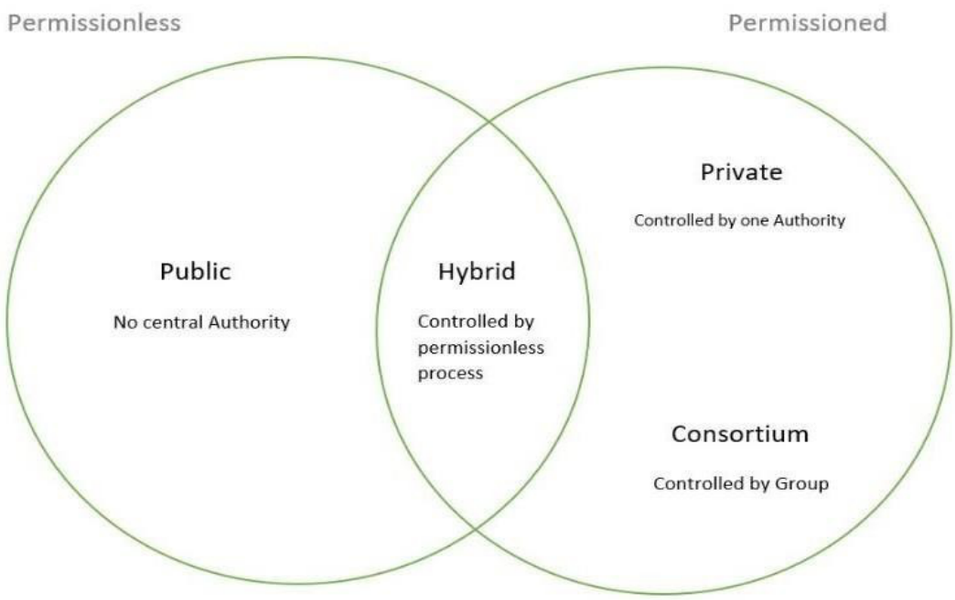
There are 4 types of blockchain:

Public Blockchain.

Private Blockchain.

Hybrid Blockchain.

Consortium Blockchain



1. Public Blockchain

These blockchains are completely open to following the idea of decentralization. They don‘t have any restrictions, anyone having a computer and internet can participate in the network.

As the name is public this blockchain is open to the public, which means it is not owned by anyone. Anyone having internet and a computer with good hardware can participate in this public blockchain. All the computer in the network hold the copy of other nodes or block present in the network
In this public blockchain, we can also perform verification of transactions or records Advantages:

Trustable: There are algorithms to detect no fraud. Participants need not worry about the other nodes in the network
Secure: This blockchain is large in size as it is open to the public. In a large size, there is greater distribution of records
Anonymous Nature: It is a secure platform to make your transaction properly at the same time, you are not required to reveal your name and identity in order to participate.
Decentralized: There is no single platform that maintains the network, instead every user has a copy of the ledger.
Disadvantages:

Processing: The rate of the transaction process is very slow, due to its large size. Verification of each node is a very time-consuming process.
Energy Consumption: Proof of work is high energy-consuming. It requires good computer hardware to participate in the network
Acceptance: No central authority is there so governments are facing the issue to implement the technology faster.
Use Cases: Public Blockchain is secured with proof of work or proof of stake they can be used to displace traditional financial systems. The more advanced side of this blockchain is the smart contract that enabled this blockchain to support decentralization. Examples of public blockchain are Bitcoin, Ethereum.

2. Private Blockchain
These blockchains are not as decentralized as the public blockchain only selected nodes can participate in the process, making it more secure than the others.

These are not as open as a public blockchain. They are
open to some authorized users only.
These blockchains are operated in a closed network.
In this few people are allowed to participate in a network within a company/organization.
Advantages:

Speed: The rate of the transaction is high, due to its small size. Verification of each node is less time- consuming.
Scalability: We can modify the scalability. The size of the network can be decided manually. Privacy: It has increased the level of privacy for confidentiality reasons as the businesses required.
Balanced: It is more balanced as only some user has the access to the transaction which improves the performance of the network.
Disadvantages:

Security- The number of nodes in this type is limited so chances of manipulation are there. These blockchains are more vulnerable.
Centralized- Trust building is one of the main disadvantages due to its central nature. Organizations can use this for malpractices.
Count- Since there are few nodes if nodes go offline the entire system of blockchain can be endangered. Use Cases: With proper security and maintenance, this blockchain is a great asset to secure information without exposing it to the public eye. Therefore companies use them for internal auditing, voting, and asset management. An example of private blockchains is Hyperledger, Corda.

3. Hybrid Blockchain
It is the mixed content of the private and public blockchain, where some part is controlled by some organization and other makes are made visible as a public blockchain.

It is a combination of both public and private blockchain.
Permission-based and permissionless systems are used. User
access information via smart contracts
Even a primary entity owns a hybrid blockchain it cannot alter the transaction Advantages:

Ecosystem: Most advantageous thing about this blockchain is its hybrid nature. It cannot be hacked as 51% of users don‘t have access to the network
Cost: Transactions are cheap as only a few nodes verify the transaction. All the nodes don‘t carry the verification hence less computational cost.
Architecture: It is highly customizable and still maintains integrity, security, and transparency. Operations: It can choose the participants in the blockchain and decide which transaction can be made public.
Disadvantages:

Efficiency: Not everyone is in the position to implement a hybrid Blockchain. The organization also faces

some difficulty in terms of efficiency in maintenance.
Transparency: There is a possibility that someone can hide information from the user. If someone wants to get access through a hybrid blockchain it depends on the organization whether they will give or not. Ecosystem: Due to its closed ecosystem this blockchain lacks the incentives for network participation. Use Case: It provides a greater solution to the health care industry, government, real estate, and financial companies. It provides a remedy where data is to be accessed publicly but needs to be shielded privately. Examples of Hybrid Blockchain are Ripple network and XRP token.

4. Consortium Blockchain
It is a creative approach that solves the needs of the organization. This blockchain validates the transaction and also initiates or receives transactions.

Also known as Federated Blockchain.
This is an innovative method to solve the organization‘s needs. Some part
is public and some part is private.
In this type, more than one organization manages the blockchain.
Advantages:

Speed: A limited number of users make verification fast. The high speed makes this more usable for organizations.
Authority: Multiple organizations can take part and make it decentralized at every level. Decentralized authority, makes it more secure.
Privacy: The information of the checked blocks is unknown to the public view. but any member belonging to the blockchain can access it.
Flexible: There is much divergence in the flexibility of the blockchain. Since it is not a very large decision can be taken faster.
Disadvantages:

Approval: All the members approve the protocol making it less flexible. Since one or more organizations are involved there can be differences in the vision of interest.
Transparency: It can be hacked if the organization becomes corrupt. Organizations may hide information from the users.
Vulnerability: If few nodes are getting compromised there is a greater chance of vulnerability in this blockchain
Use Cases: It has high potential in businesses, banks, and other payment processors. Food tracking of the organizations frequently collaborates with their sectors making it a federated solution ideal for their use. Examples of consortium Blockchain are Tendermint and Multichain.

Conclusion-In this way we have explored types of blockchain and its applications in real time

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