SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY

COURSE NAME: 19CS622-Blockchain Technology

III YEAR /VI SEMESTER

Unit 3- ETHEREUM

Topic : Solidity Programming Language

Solidity

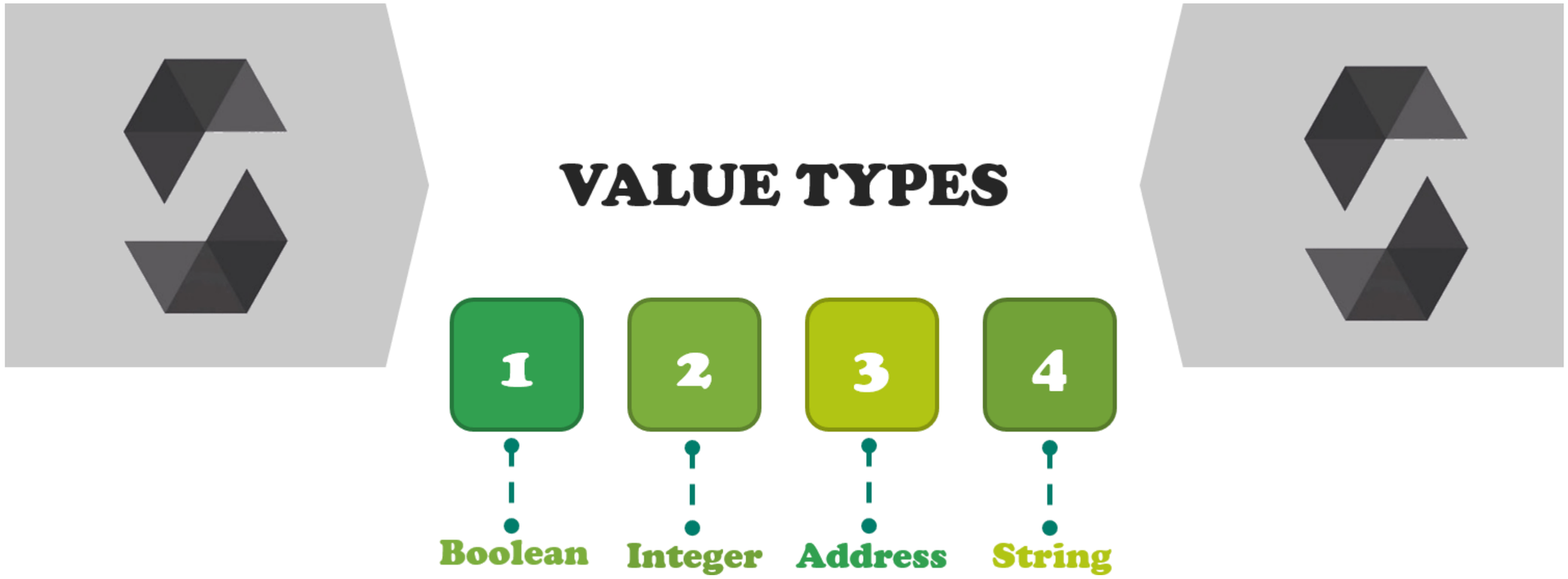
Ethereum Solidity is a contract-oriented, high-level language with syntax like that of JavaScript.

A solidity is a tool used to generate a machine-level code to execute on EVM.

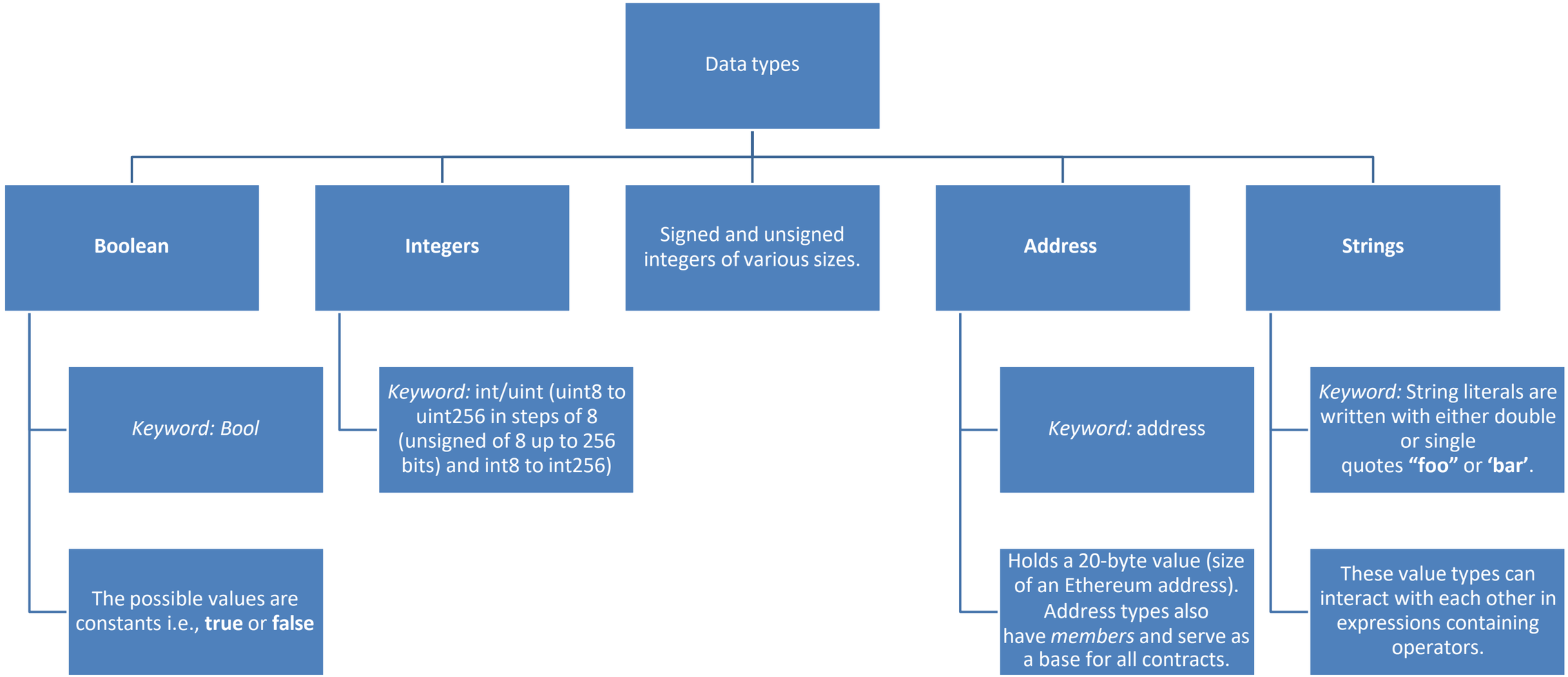
The solidity compiler takes the high-level code and breaks it down into simpler instructions.

Solidity code is encapsulated in ***Contracts***

Value Types in Solidity



Value Types in Solidity



Value Types in Solidity - Boolean

Keyword: Bool

The possible values are constants i.e., **true** or **false**

Value Types in Solidity - Integers

Keyword: int/uint

(uint8 to uint256 in steps of 8 (unsigned of 8 up to 256 bits) and int8 to int256)

Signed and unsigned integers of various sizes.

Example:

```
contract MySample
{
uint UnsignedInt =50;
}
```

Value Types in Solidity - Address

Strings:
Keyword: String literals are written with either double or single-quotes **“foo”** or **‘bar’**.

Used for arbitrary-length UTF-data.

```
address x = 0x123;
address myAddress = this;
if  (x.balance < 10 && myAddress.balance > = 10)
x.transfer(10);
```

Operators in Solidity

Operators in Solidity -Arithmetic Operators

Solidity has pretty straightforward Math operations.

Addition: x + y
Subtraction: x - y
Multiplication: x * y
Division: x / y
Modulus / remainder: x % y

Operators in Solidity -Incremental Operators

Incremental operators in solidity: a++, a–, ++a, –a, a+=1, a=a+1

Rules applicable to other programming languages are similar in solidity also.

Operators in Solidity -Bitwise Operators

Following are the operators:

(Bitwise OR) ‘|’, (Bitwise XOR), (Bitwise negation) ‘~’ , (Bitwise right shift) ‘>>’, (Bitwise left shift) ‘<<‘

Operators in Solidity –Logical Operators

Logical operators in Solidity: ! (logical negation), && (logical and), || (logical or), ==(equality), != (not equal)

Operators in Solidity – Operators example

```
contract operators
{
// Arithmetic Operators
// +,-,*,/, %, **
// Incremental Operators
// a++, a--, a+=1, a=a+1,++a,--a;
a=10;
a= a++; //here, output will be 10, because the value is first returned and then then increment is done
a=++a;
//Logical Operators !, &&, ||, ==, !=
isOwner = true && false;
var orValue= 0x02 | 0x01; // output would be 0x03
//Bitwise Operators~,>>, <<;
function Operators() {
// Initialize state variables here
}
}
```

References

TEXT BOOKS

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas M Antonopoulos 2018
2. Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained”, Second Edition, Packt Publishing, 2018.
3. https://101blockchains.com/blockchain-vs-database-the-difference/

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1. William Mougayar, “Business Blockchain Promise, Practice and Application of the Next Internet Technology, John Wiley & Sons 2016.
2. Josh Thompson, ‘Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming’, Create Space Independent Publishing Platform, 2017.
3. Arvind Narayanan, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press, July 19, 2016.
4. Henning Diedrich, Ethereum: Block chains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations-2016

Thank You