



# FinTech and Innovation - NCACPA Symposium 2022

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**GRADUATE OF HARVARD'S FINTECH  
CERTIFICATE PROGRAM (2021)**

**AICPA BLOCKCHAIN AND  
CYBERSECURITY BADGES**

**FINTECH COMMITTEE, BLUE RIDGE  
BANK, NA**

- ▶ “It’s hard to make predictions – especially about the future.”
- ▶ Yogi Berra

# Disruption: Key Concept

Regulation vs. Deregulation

Centralization vs. Decentralization

Intermediation vs. Disintermediation

# Objectives

- ▶ Understand FinTech Basics (I)
- ▶ Understand Blockchain Technology Basics (II)
- ▶ Understand Virtual Currency Basics (III)
- ▶ Understand Non-Fungible Tokens (NFTs) (IV)



# I. FinTech Basics

# Questions:

1. Does North Carolina have a FinTech Sandbox?
2. Does FinTech help the unbanked?
3. Does FinTech use the same AML rules as banks?
4. Do other countries have FinTech sandboxes?

## FinTech Definition in NCGS 169(b)(8)

“Certain innovative products or services that support the provision of banking services”



- ▶ Regulatory Sandbox definition – NCGS 169-(b)11
- ▶ “Program ...permits a person or entity to temporarily test an innovative financial...product or service without being subject to certain licensing or regulatory obligations ...State law.”



# Global Experiences from Regulatory Sandboxes

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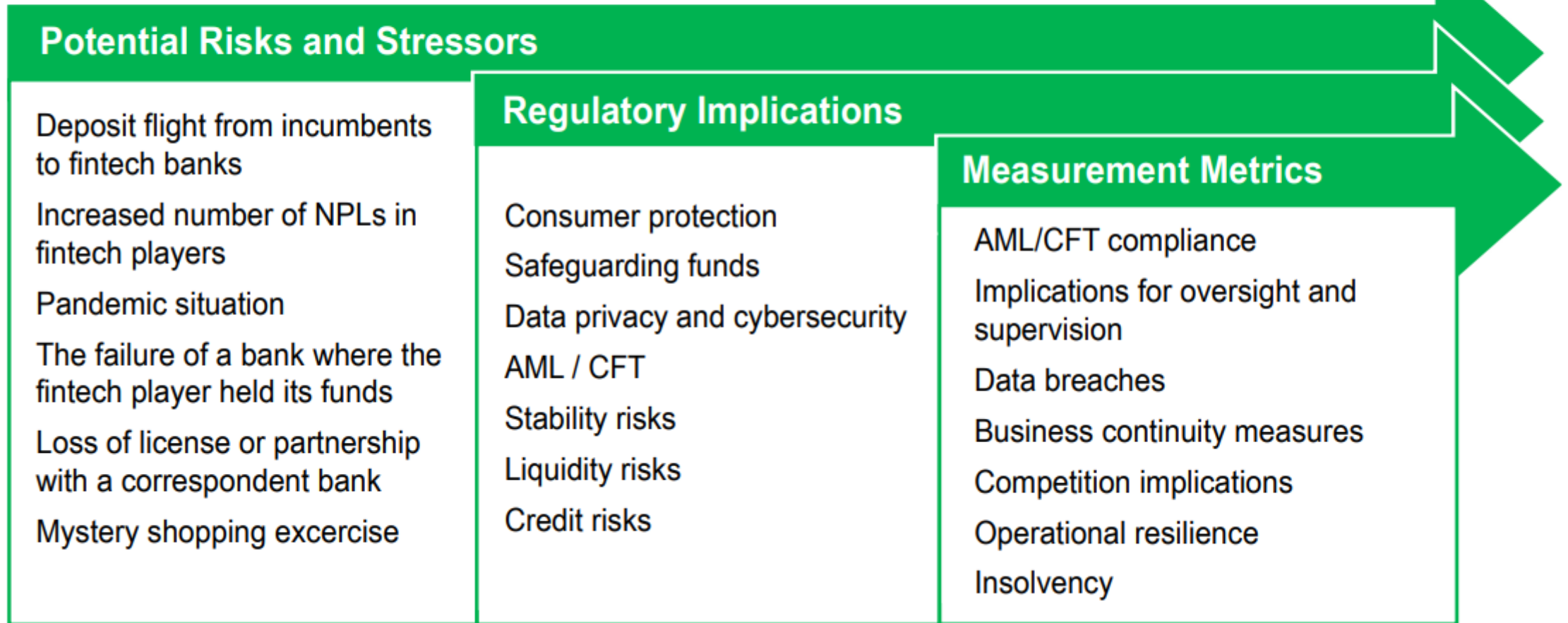
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**FINANCE, COMPETITIVENESS  
& INNOVATION  
GLOBAL PRACTICE**

Fintech Note | No. 8

**Figure 4.2. Sample Stressors, Regulatory Implications, and Their Corresponding Measurement Metrics**



**Table 3.2. Countries with Multiple Fintech-Related Sandboxes and the Authorities Governing Them**

Country	Authority	Fintech-related Sandboxes (#)
Thailand	BoT, SEC, OIC	5 (3 by the BoT)
USA	CFPB, state gov'ts (Arizona, Kentucky, Nevada, Utah)	5
India	RBI, IRDAI, SEBI	3
Brazil	BCB, CVM	2
Hong Kong (SAR)	HKMA & SFC, IA	2
Indonesia	OJK, BI	2
Nigeria	CBN & NIBSS, SEC	2
Singapore	MAS	2
UAE (Abu Dhabi)	ADGM, DFSA	2

Source: WBG analysis; see Appendix 3 for more detail.

# FinTech Sandbox Examples U.S.

Non-blockchain  
Non-crypto



Participant	Product Description	Entered Sandbox	Exited Sandbox
WiseTack, Inc.	A consumer lending platform that enables small business partners to provide lending options at the point of sale for consumers seeking to finance household related projects (e.g., home repair, HVAC, electrical, plumbing, landscaping, etc).	July 11, 2019	January 22, 2020
Verdigris Holdings, Inc.	A solution that combines custom technology and industry expertise to deliver simple transactional financial services at a low cost to unbanked people and the companies that serve them.	July 12, 2019	July 17, 2020
Omni Mobile, Inc. ("OM Cash")	A financial service platform implementing an array of avante garde technologies to improve today's payment systems through the utilization of direct ACH payments through OM's centralized wallet infrastructure.	October 11, 2018	October 11, 2020
Sweetbridge NFP, Ltd.	A blockchain-enabled product designed to purchase financing without a credit check and offer affordable, consumer friendly vehicle title loans with an APR cap of	October 29, 2018	October 29, 2020

# Consumer Financial Protection Bureau (CFPB)

## Synchrony Bank

Dual Feature Credit Card – customer opens a secured credit card that graduates to unsecured to build credit.

Payactiv – offers workers each access to their earned but unpaid wages. Called Wage Access transactions



## Sandbox Example - Consumer

Align	A business model for income-sharing agreements that provide qualified consumers with a fixed amount of money in exchange for a percentage of the consumer's future income over a scheduled period of time, subject to contingencies involving periods of unemployment or lowered income.	March 20, 2019	April 29, 2021
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Income Share  
Agreements (ISA)



## Examples of FinTechs

Zillow Group, Inc.

SoFi Technologies, Inc.

PayPal Holdings, Inc.

Square, Inc.

Baron FinTech Fund (BFIXX)

Photo credit: Google  
Images







# II. Blockchain Technology Basics

AN OVERVIEW

# Questions:

5. Does NC have a definition of blockchain?

6. Is a blockchain encrypted?

7. Does Amazon sell blockchain space?

## Sandbox – Blockchain Example

Sweetbridge NFP, Ltd.	A blockchain-enabled product designed to purchase financing without a credit check and offer affordable, consumer-friendly vehicle title loans with an APR cap of 20%.	October 29, 2018	October 29, 2020
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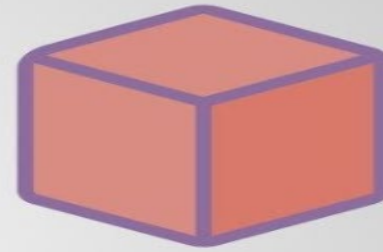
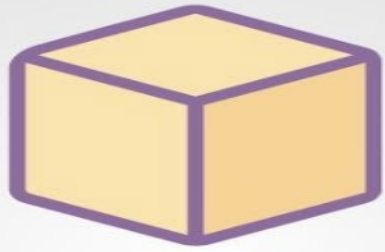
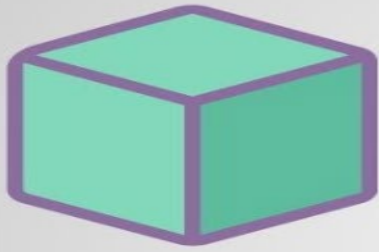


Blockchain – not a tow truck

AN OVERVIEW

## ▶ Origin of Blockchain

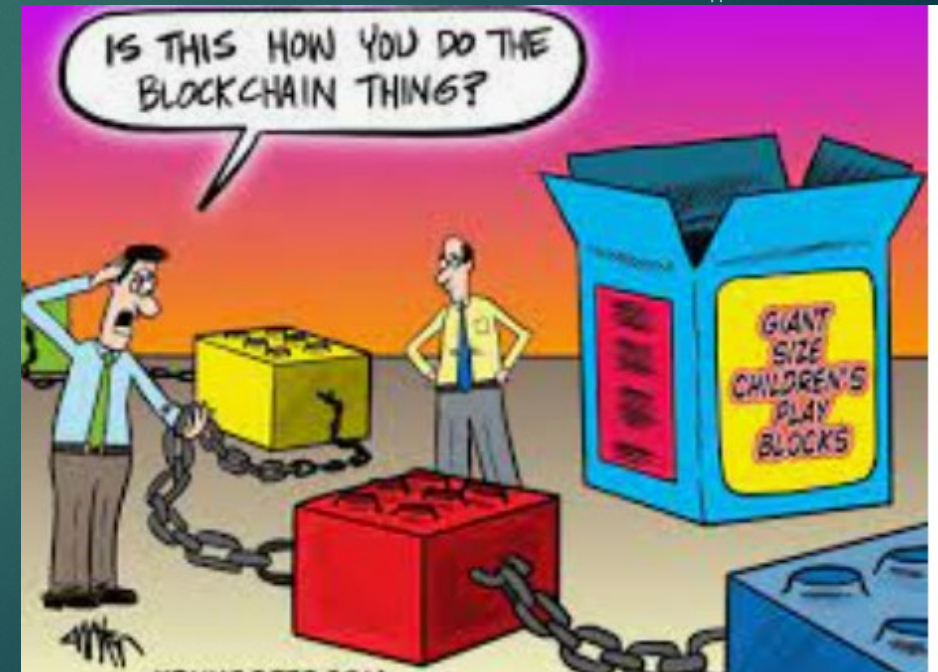
- ▶ Born: October 31, 2008
- ▶ Inventor and Author: Satoshi Nakamoto (pseudonym)
- ▶ “Using digital signatures, hashing, and proof of work to avoid double spending and fraud, the Bitcoin blockchain enables its participants to confidently transfer value using math for validation and verification instead of a trusted third party.”
- ▶ Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, 2008
- ▶ Note “trusted” and disintermediation



# Blockchain

— *Simply explained* —

Photo credit: Google Images 2021



# Blockchain Technology defined – NCGS 169 – 1(b)(2)

- ▶ “An electronic method for storing cryptographically secure data in a database of distributed ledger technology that is decentralized, consensus-based, mathematically verified, and distributed across multiple locations.”

# Blockchain Technology NCGS 169

24

Cryptographically secure

Decentralized

Consensus-based

Mathematically Verified

Distributed across many locations



Firm, PA 2021

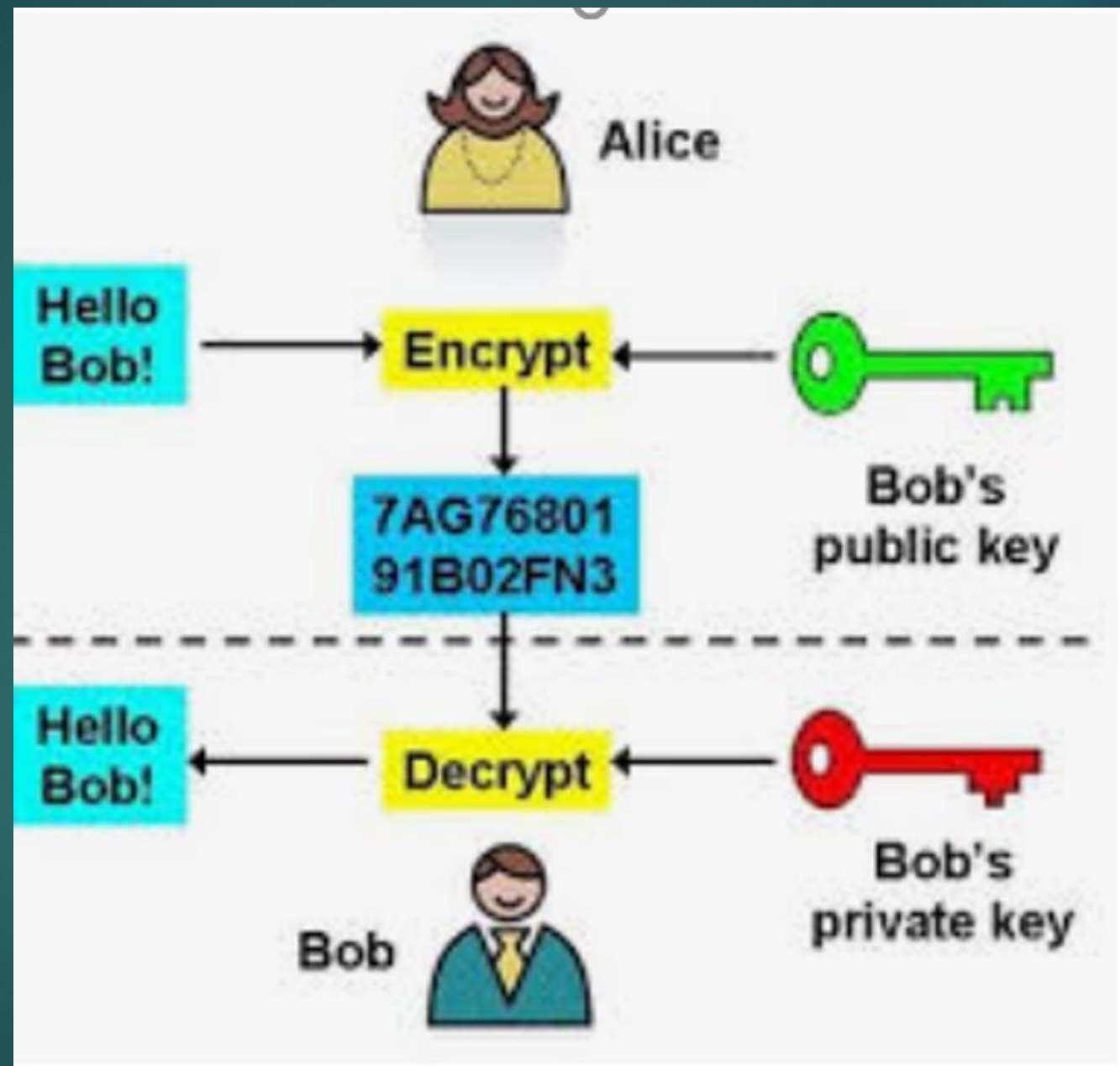


# Cryptography – Element of Blockchain

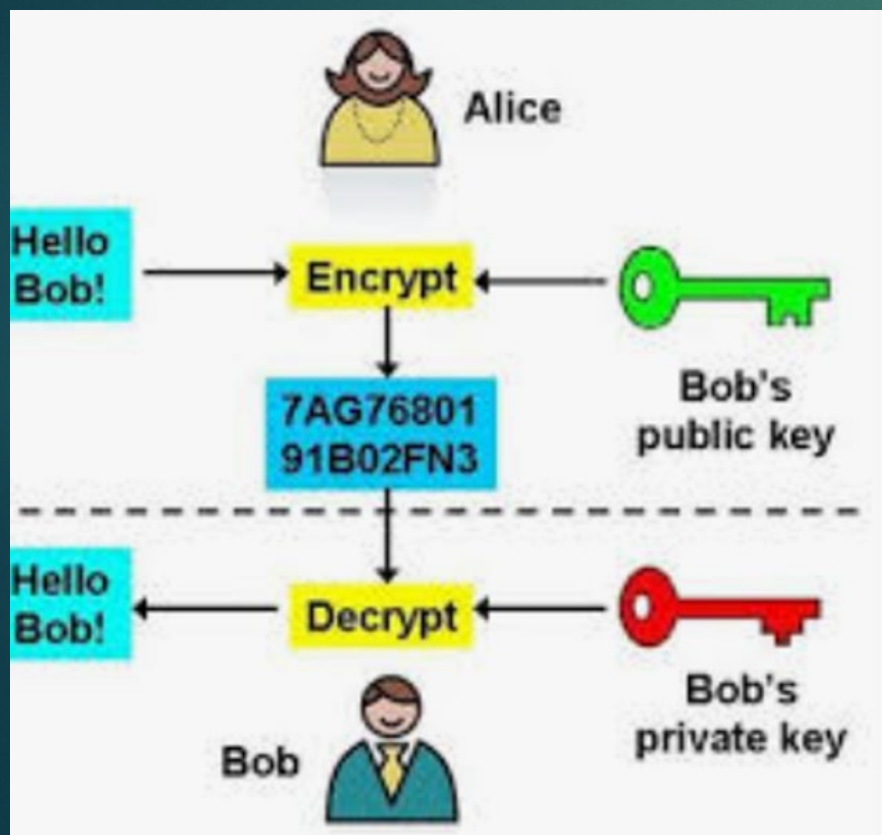
▶ Study of secure communication techniques that allow only the sender and the receiver to view the contents

Photo credit: Google images





# Blockchain Cryptography Continued



Asymmetric cryptography

Public-key cryptography

Public key and private key

Public key distributed commonly

Private key is NOT shared

Q: Which is safer: hash or password?

# One way encryption

CRYPTOGRAPHY OF BLOCKCHAIN



# Blockchain Technology Hash



A cryptographic hash function is **an algorithm that takes an arbitrary amount of data input—a credential**—and produces a fixed-size output of enciphered text called a hash value, or just “hash.” That enciphered text can then be stored instead of the password itself, and later used to verify the user. Dec 10, 2015

(Google, 2021)

# Hash Function and Secure Hash Algorithm (SHA)-256

Hash ID 256-character string  
derived as a reduction of any string of  
input

Hashing: Encrypting data  
as of now cannot be reverse engineered  
because of available computing power

Hashing algorithm: Takes any length input  
and makes the string a uniform length

Example on next slide

Photo credit: Google  
Images



# Blockchain Technology NCGS 169

Cryptographically secure

Decentralized

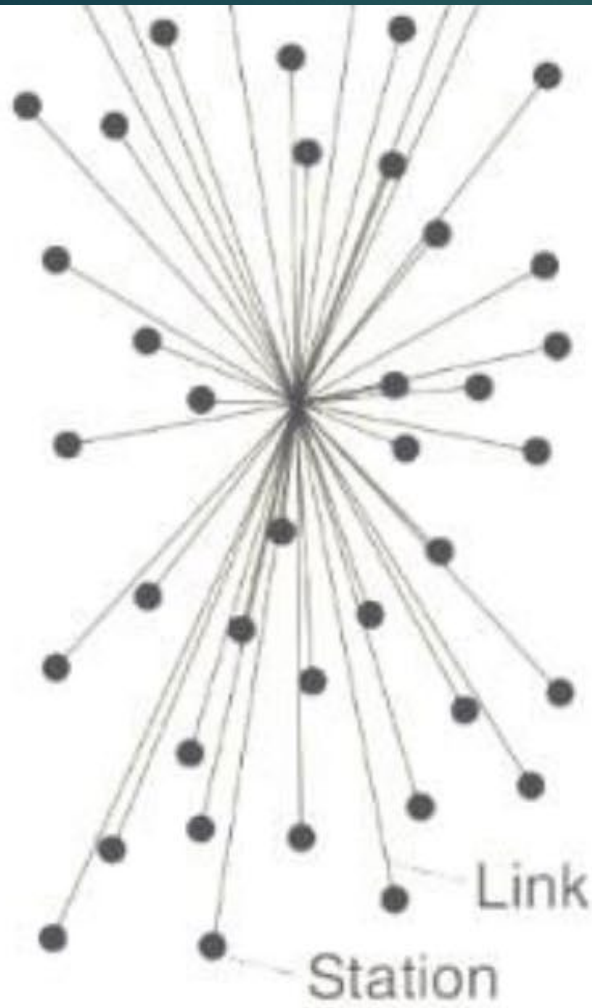
Consensus-based

Mathematically Verified

Distributed across many locations



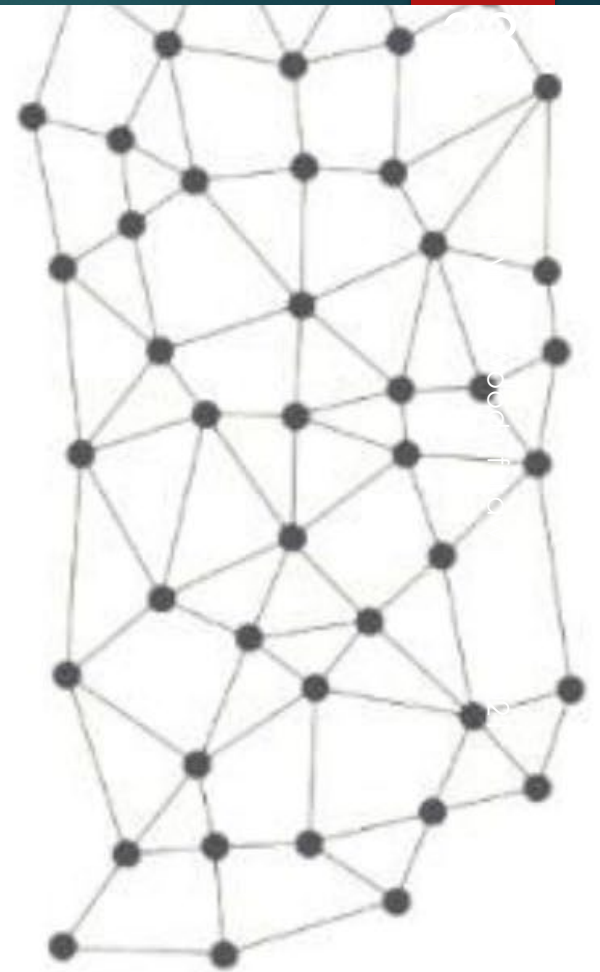




Centralised (A)



Decentralised (B)



Distributed (C)

# Blockchain Technology NCGS 169

Cryptographically secure

Decentralized

Consensus-based

Mathematically Verified

Distributed across many locations



# Three Main Blockchain Consensus Algorithms

- ▶ Proof of Work
- ▶ Proof of Stake
- ▶ Practical Byzantine Fault Tolerance

## ▶ Blockchain Types

### Public

Permissionless

Free for Anyone  
access

Decentralized

Currency is native  
currency

Ex: Bitcoin, Ethereum, Litecoin

### Private

Permissioned

Permissioned

Centralized

Typically no native  
currency

Ex: Hyperledger



## ▶ III. Virtual Currency

# Questions:

8. Does the US have a CBDC?
9. Does China have a CBDC?
10. Does NC have a definition of Virtual Currency?

## Sandbox Participants

Since the program was launched in 2018, [ten companies](#) have participated.

Participant	Start Date	Product Description
Cryptoenter Corp.	July 19, 2021	A blockchain-based platform that integrates with banks to provide bank customers with cryptocurrency exchange and transfer services.

# Digital or Virtual Currency Framework

## Central Bank Digital Currency – CBDC

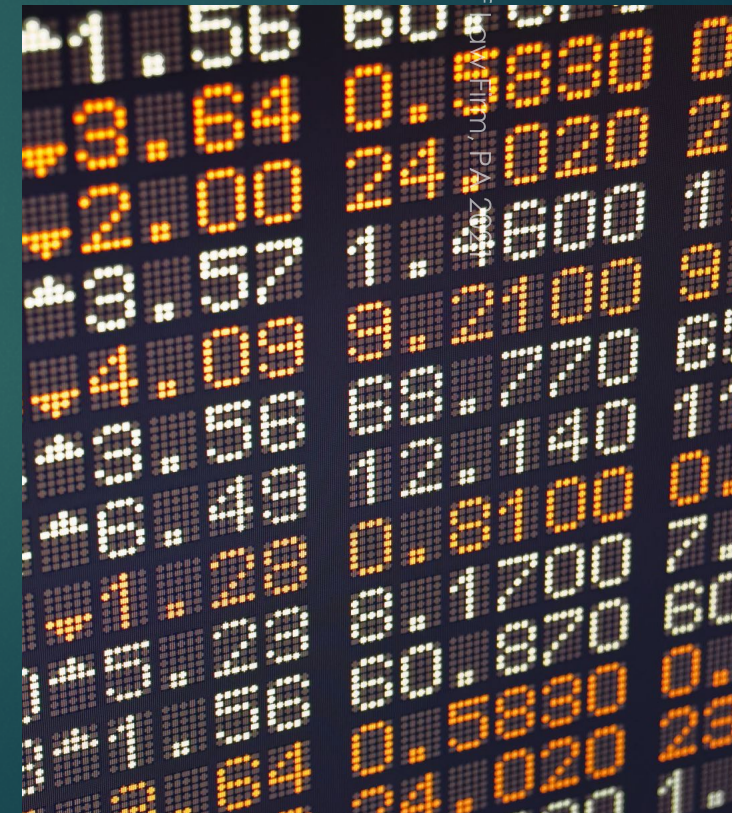
legal tender of a Central Bank – a government

## Cryptocurrency

not legal tender of a government

## Stablecoins – variation of cryptocurrency

not legal tender but linked to a fiat currency, such as the U.S. dollar





NC  
Definition  
does not  
include  
CBDC -  
Virtual  
Currency

▶ “A digital representation of value that can be digitally traded and functions as a medium of exchange, a unit of account, or a store of value...but does not have legal tender status as recognized by the United States Government.”  
NCGS 53-208.42(20) (NC Money Transmitters Act).

“Virtual currency is a digital representation of value that functions as a medium of exchange, unit of account, and/or a store of value.” IRS Notice 2014-21

NOTE: IRS DEFINITION INCLUDES BOTH LEGAL TENDER AND NON-LEGAL TENDER VIRTUAL CURRENCY. NC DEFINITION EXCLUDES LEGAL US CURRENCY (TENDER).

**Filing Status**

Single  Married filing jointly  Married filing separately (MFS)  Head of household (HOH)  Qualifying widow(er) (QW)

Check only one box. If you checked the MFS box, enter the name of your spouse. If you checked the HOH or QW box, enter the child's name if the qualifying person is a child but not your dependent ▶

Your first name and middle initial		Last name		Your social security number	
If joint return, spouse's first name and middle initial		Last name		Spouse's social security number	
Home address (number and street). If you have a P.O. box, see instructions.				Apt. no.	
City, town, or post office. If you have a foreign address, also complete spaces below.			State	ZIP code	
Foreign country name		Foreign province/state/county		Foreign postal code	
<input type="checkbox"/> You <input type="checkbox"/> Spouse					

At any time during 2020, did you receive, sell, send, exchange, or otherwise acquire any financial interest in any virtual currency?  Yes  No

**Standard Deduction**

Someone can claim:  You as a dependent  Your spouse as a dependent  
 Spouse itemizes on a separate return or you were a dual-status alien

**Age/Blindness**

**You:**  Were born before January 2, 1956  Are blind **Spouse:**  Was born before January 2, 1956  Is blind

**Dependents**

(see instructions):

(1) First name	Last name	(2) Social security number	(3) Relationship to you	(4) <input checked="" type="checkbox"/> if qualifies for (see instructions): Child tax credit	Credit for other dependents
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>

If more than four dependents, see instructions and check

# Virtual Currency – Cryptocurrency – Not Legal Government Tender

More than 6500 virtual currencies exist

Virtual currency exists typically on a  
blockchain ledger that is  
distributed  
decentralized, generally

# Illustrative Virtual Currencies – Not Legal Government Tender

**Bitcoin** (BTC) and Bitcoin Cash (BCH), a hard fork of BTC (2017)

**Ethereum** (ETH) – a blockchain with virtual token Ether. Ethereum enables *smart contracts*.

**Tether** (USDT) stablecoin  
Blockchain-enabled platform designed to facilitate the use of fiat currencies in a digital manner – per token value \$1

# What a Bitcoin Address Looks Like

blockchain.com/btc/address/bc1qxy2kgdygjrsqtzq2n0yrf2493p83kkfjhx0wlh

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Blockchain.com

Wallet

Exchange

Explorer

Buy Bitcoin

Trade

## Address ⓘ

USD

BTC

This address has transacted 462 times on the Bitcoin blockchain. It has received a total of 12.91843242 BTC (\$614,295.88) and has sent a total of 12.87005839 BTC (\$611,995.60). The current value of this address is 0.04837403 BTC (\$2,300.28).



Address

bc1qxy2kgdygjrsqtzq2n0yrf2493p83kkfjhx0wlh 

Format

BECH32 (P2WPKH)

Transactions

462

Total Received

12.91843242 BTC

Total Sent

12.87005839 BTC

Final Balance

0.04837403 BTC

# Bitcoin

Symbol: BTC

8 decimal places

1.89544323

21 million maximum

18.638 million mined as of February 2021

19,171,087.5 as of October 6, 2022

Each new block currently adds 6.25  
bitcoins.



As of October 6, 2022



# Bitcoin (BTC) and Bitcoin Cash (BCH) – a hard fork (August 2017)

Hard fork definition: Drastic, fundamental change to a blockchain protocol resulting in two branches

## Why? Bitcoin Slow

Visa can process 1700 transactions per second

Bitcoin could only process 7 transactions per second

Bitcoin Cash had a faster processing speed

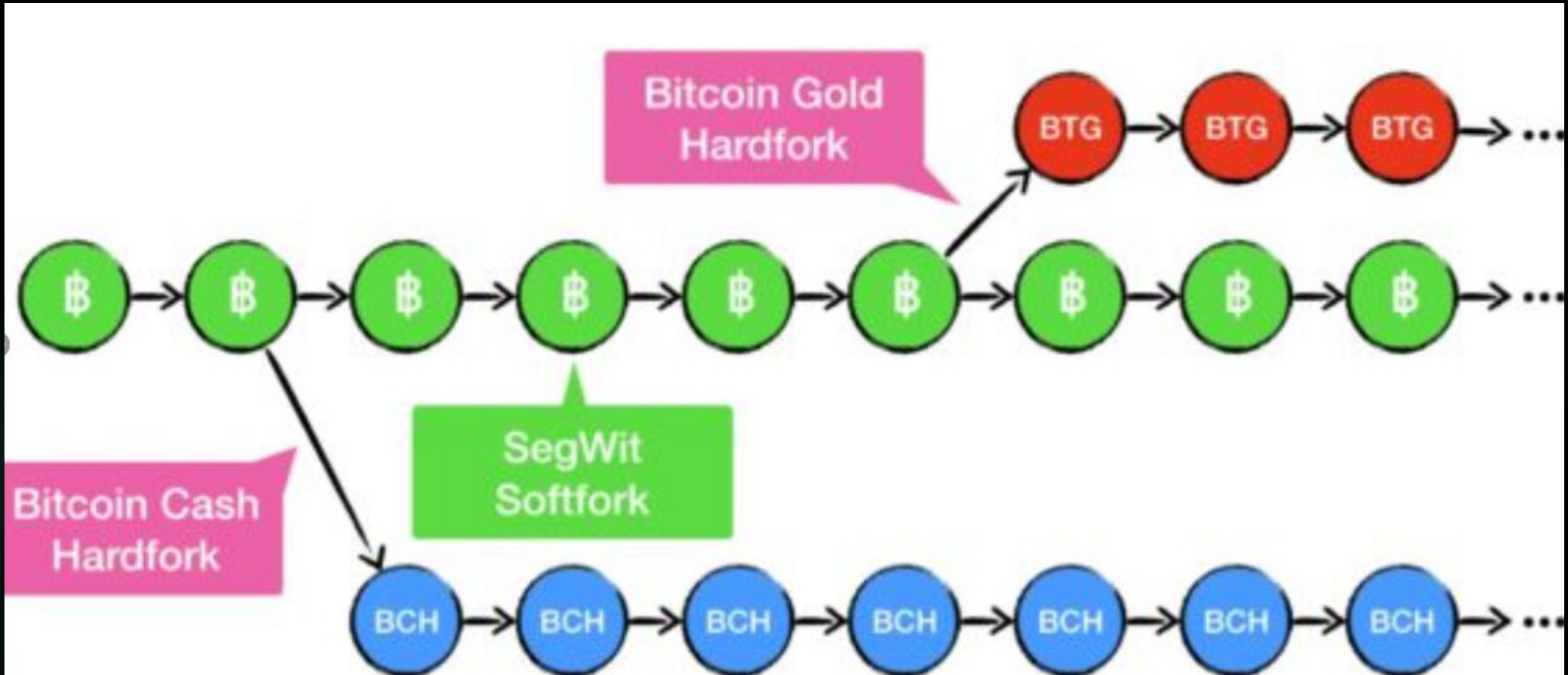


Photo credit: Google Images

# Ethereum (ETH)

Smart Contracts are

Self-executing contracts with the terms of agreement between seller and buyer written into the lines of the code

Programmable blockchain logic





# Smart Contract Examples

# Ethereum (ETH) – Smart Contracts

Vending Machine (VeeDo)

Insurance payment on death

Supply Chain Smart Containers that measure  
temperature





## Amazon and Smart Contracts

Amazon Managed Blockchain launched to create and manage scalable Blockchain networks using

Ethereum

Hyperledger Fabric

Metered Pay As You Go

Look at [aws.amazon.com](https://aws.amazon.com)

A 3D rendering of a white puzzle with one red piece in the center. The puzzle pieces are arranged in a grid, and the red piece is the only one of its color. The text "Stablecoin Example Tether (USDT)" is overlaid on the puzzle in a red, serif font.

# Stablecoin Example Tether (USDT)

## Tether Stablecoin (USDT)

Virtual currency

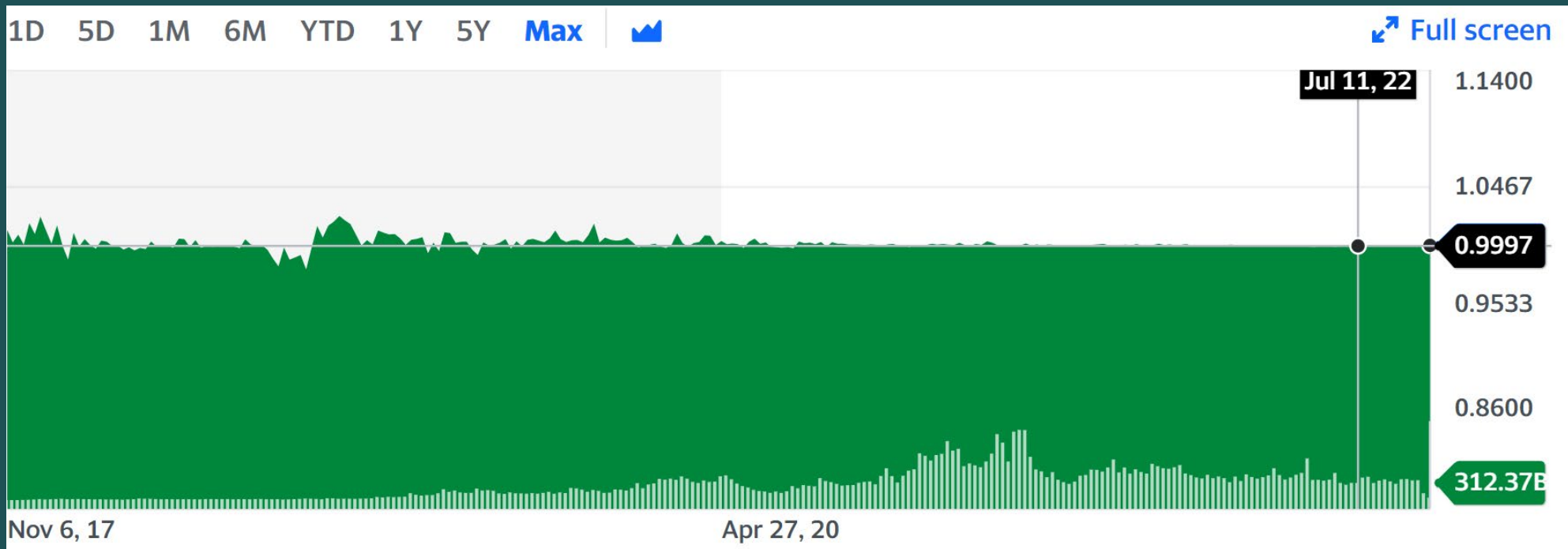
Pegged to U.S. Dollar

Parking place for high frequency traders

Vulnerability: Loses its Peg







October 6, 2022



## IV. Non-Fungible Tokens (NFTs)

# Questions:

11. Is it easy for an individual to own an NFT?
12. Did a Christie's Auction House NFT sell for \$69 million dollars in 2021?
13. Can a movie ticket be a NFT?
14. Should I get a Web3 wallet if I want to purchase an NFT?

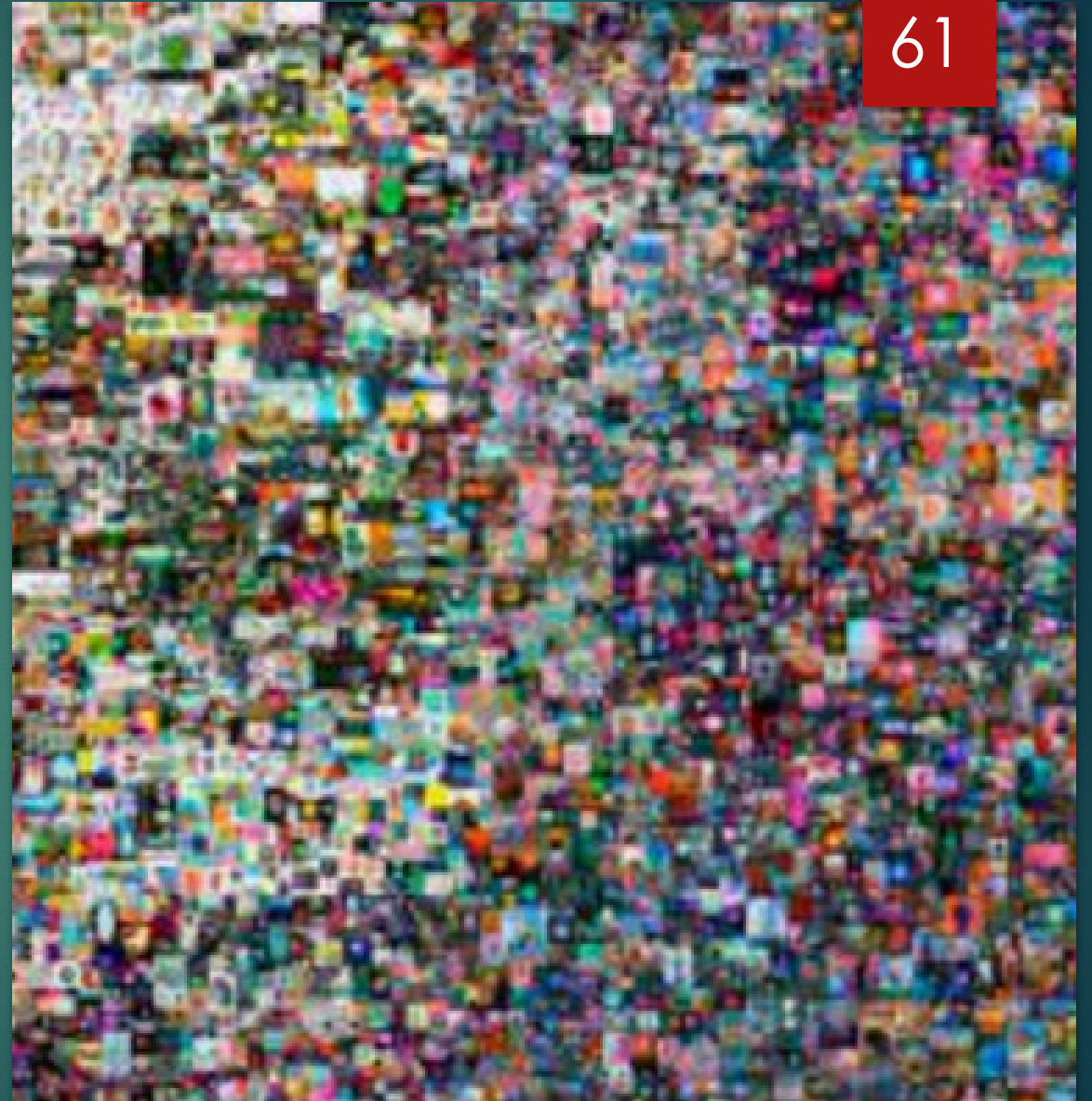
# NFT Definition

60

Cryptographic Assets  
On a Blockchain  
Unique Codes and Metadata

# NFT Examples

- ▶ Unique Digital Artwork
- ▶ A unique ticket coupon



# Fungible vs. Non-Fungible

62

Fungible

Non-Fungible

Interchangeable

Unique/not  
interchangeable

Divisible

Not Divisible



# EMERGING - FRACTIONALIZATION

63

Splits the NFT

Usually into ERC-20 Tokens so multiple buyers can claim a percentage of ownership – uses Ethereum blockchain

Example – Doge meme sold for 4 million

# How to Get Started with Your NFT Collection

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Create

- Create a Web3 Wallet

Connect

- Connect you MetaMast Wallet to OpenSea

Fund

- Fund your MetaMask Wallet with Ethereum

Search

- Search an NFT on OpenSea

Buy

- Buy NFTs



# Conclusion

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FinTech may be anything that defies traditional banking and its regulations. But at the end of the day FinTechs need traditional banks

Blockchain is typically distributed ledger technology  
Problems – KYC and Money Laundering

Cryptocurrency – Emerging and much depends on positions on CBDC globally

Fun with NFTs - Experiment

Thank you for your participation in this presentation. If you have questions, I can be reached at 336 272 9122, extension 3004 or [cwoodruff@woodrufflawfirm.com](mailto:cwoodruff@woodrufflawfirm.com).

My best, Carolyn Woodruff, JD, CPA, CVA



# Answers to Questions

1. Yes
2. Yes, so they say.
3. No
4. Yes
5. Yes, NCGS 169
6. Yes, SHA 256
7. Yes, Ethereum

# Answers to Questions, continued

8. No

9. Yes, digital yuan

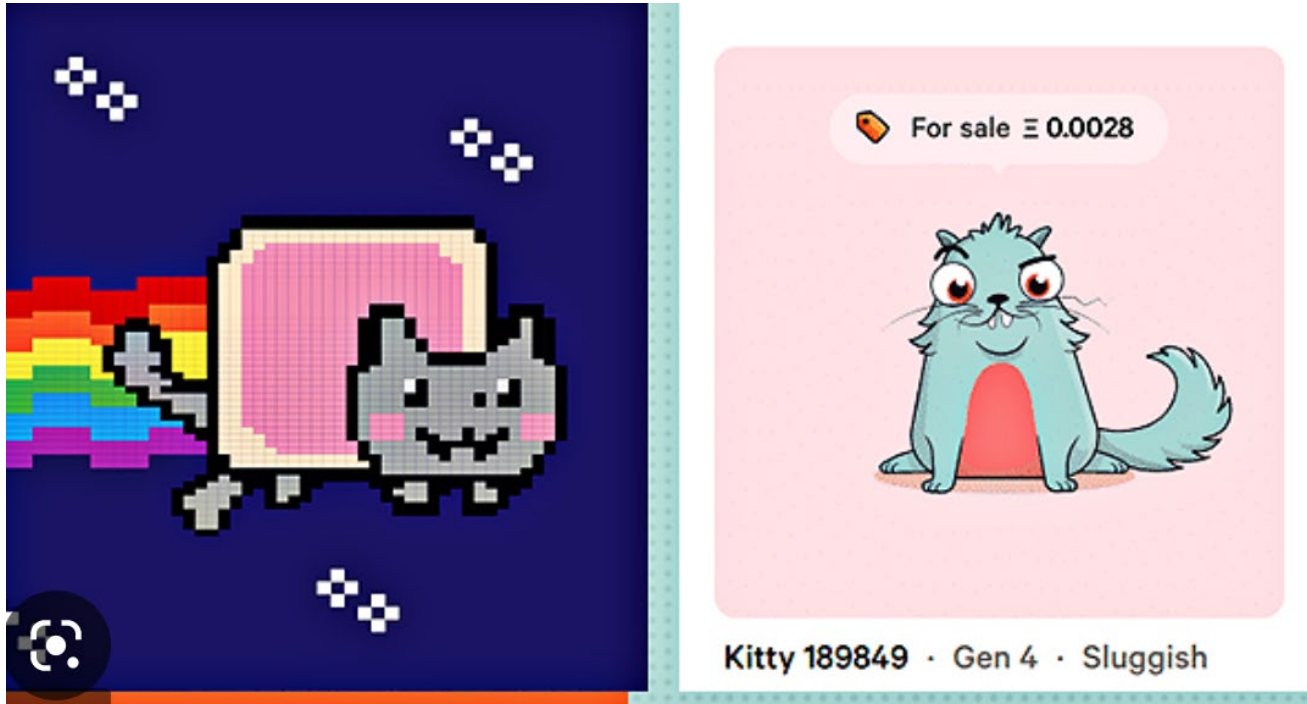
10. Yes, NCGS 53-208.42(20)

11. Yes

12. Yes

13. Yes

14. No



Until next  
time. See  
you.  
Carolyn