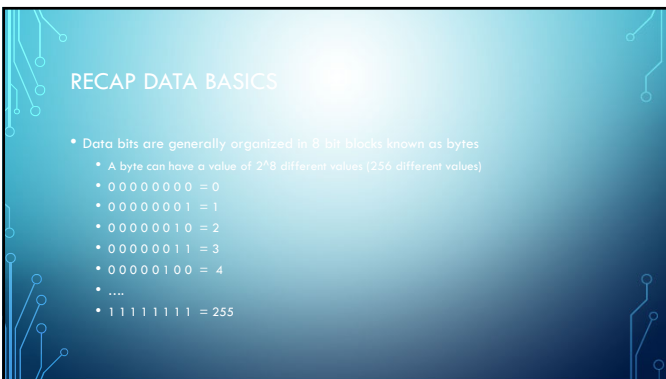


RECAP DATA BASICS

- All digital computers operate on a binary basis
- Essentially, the most basic form of information is either:
 - On or Off
 - 1 or 0
- This basic piece of information is called a bit



RECAP DATA BASICS

- Data bits are generally organized in 8 bit blocks known as bytes
 - A byte can have a value of 2^8 different values (256 different values)
 - 00000000 = 0
 - 00000001 = 1
 - 00000010 = 2
 - 00000011 = 3
 - 00000100 = 4
 -
 - 11111111 = 255

DATA BASICS

- Data bits are generally organized in 8 bit blocks known as bytes
 - While we learn in base 10, computers operate in base 16
 - 11111111=255=FF

Decimal (Base 10)	Binary (Base 2)	Hexadecimal (Base 16)
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

DATA BASICS

- Data bits are generally organized in 8 bit blocks known as bytes
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HASH

- A hash is generally an algorithm or function that converts data into a specific length of data using a common formula or algorithm.
- It essentially maps any size of data down to a fixed length of data
- It does so exactly the same way every time
- Therefore, the resulting fixed length string of data is unique, but reproducible for each set of data it is run against

HASH

- If even one number is out of place or changed, the HASH function will return a different Hash value

HASH



The screenshot displays the Nevada Gaming Control Board website. The main content area is titled "Hash Verifier" and includes the following text:

RVSGCB Hash Verifier

The RVSGCB hash verifier is a simple program that provides the user the ability to determine the approval status of a gaming device program on the basis of Nevada. The program will look up device based upon user input to get hash information and look up the corresponding database.

This tool is provided as a courtesy to the Nevada Gaming Control Board for the use of licensees. Every effort is made to ensure that the information provided by the tool is accurate and up to date.

The Nevada State Gaming Control Board grants licensees for this software to be used by the agents of any entity which is licensed by the Board. No other party is permitted to use this tool and any distribution of this software, the redistribution of this software or its accompanying data files are prohibited. No alteration, modification, copying, replication or otherwise under any license is permitted under any of the program files or data files are permitted.


Hash Verifier: Download of an installation program that will include the database available at the time of 10/29/2024. After on screen installation, this file is 10,000 KB. It will take 1 minute to download.

Current Database (11/06/2023): Download of an installation program that will install the latest database and update the application. The data database will be copied to the data folder. Every effort is made to ensure that the information provided by the tool is accurate and up to date. The hash verifier application must be installed since the user database has been installed. The database build date will be displayed by the hash verifier application. Download of an installation program that will install the latest database and update the application. The data database will be copied to the data folder. Every effort is made to ensure that the information provided by the tool is accurate and up to date. The hash verifier application must be installed since the user database has been installed. The database build date will be displayed by the hash verifier application.

HASH

- The value of a Hash function is that it can tell you if a file has been altered from its form when the initial hash function was run

HASH – QUICK SUMMARY



<https://youtu.be/gTFNtop9vzM&si=ESnffitr-UZJQuS0>

ENCRYPTION

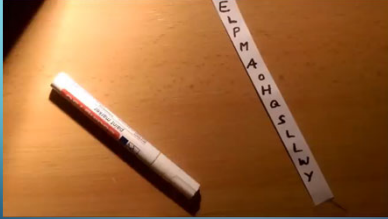
- A hash function can let you know if a file or data have been altered or corrupted, but it doesn't actually protect the data or information
- Encryption provides such protection

ENCRYPTION

- Encryption has been used to protect sensitive information for eons



ENCRYPTION




- <https://youtu.be/KJpYA7pyFwQ>

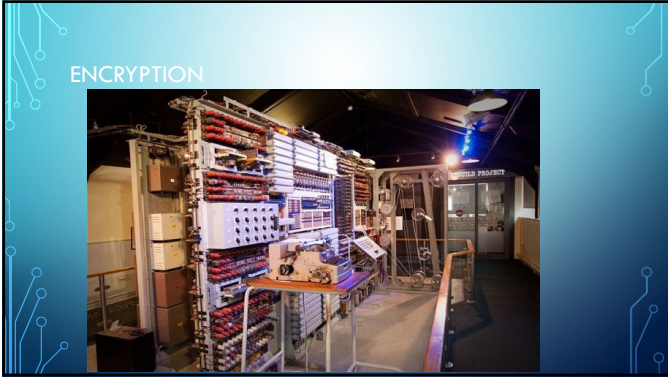
ENCRYPTION

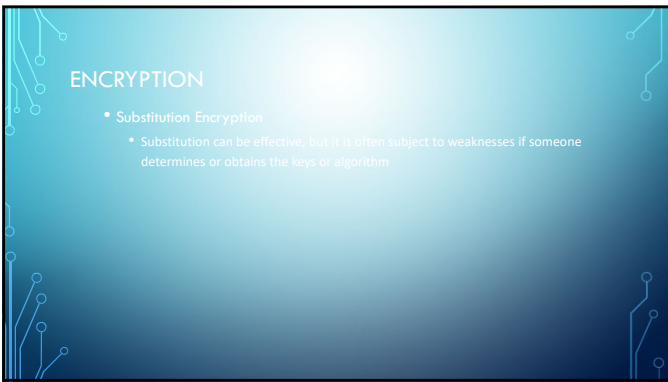
- Substitution Encryption
 - Substituting one value for another
 - For example changing each letter in a message to a character that is 4 numbers higher in the ascii table than the original character
 - "THIS CLASS IS BORING" becomes XLMWGPEWWMWF5VMRK. The "T" in this is transformed to the character 4 characters higher which is "X", the "H" in this text is transformed to the character 4 characters higher which is "L", and so on.
 - The famed "enigma machines of WWII worked this way.

ENCRYPTION



- <https://youtu.be/QwQVMqfoB2E>







ENCRYPTION

Asymmetric encryption

Simply explained

• <https://youtu.be/AQDCe585Lnc>

BLOCK CHAIN

- Using Hash and Encryption
 - Transactions are encrypted and stored on a ledger
 - Each transaction has a hash to fingerprint the original information in the transaction
 - When a determined number of transactions and hashes are recorded, the block of those transactions also receives a hash, which is then incorporated into the next block
 - If any block is tampered with, the hash will no longer pass verification
 - In this way, blocks are chained together and, once recorded, may not be altered without immediate detection of corruption


BLOCK CHAIN

- Using Hash and Encryption

```
graph LR; B1227[Block 1227 Hash] --- B1228[Block 1228 Hash]; B1228 --- B1229[Block 1229 Hash]; B1227 --- T1227[Transaction Data]; B1228 --- T1228[Transaction Data]; B1229 --- T1229[Transaction Data]; T1227 --- H1227[Block 1227 Hash]; T1228 --- H1228[Block 1228 Hash]; T1229 --- H1229[Block 1229 Hash]; H1227 --- H1228; H1228 --- H1229;
```


BLOCK CHAIN

- Distributed ledgers
 - To add additional integrity, some block chain implementations use multiple ledgers to keep duplicate data in remote locations to further enhance the security of the information
 - If a solution is found to alter a transaction within a block without initial detection, it will still fail to match the hashes in duplicate blocks distributed through the network and thus be exposed as corrupted or altered



BLOCK CHAIN

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BLOCK CHAIN

Centre for International Governance Innovation

- <https://youtu.be/3xGLc-zz9cA>

BLOCK CHAIN

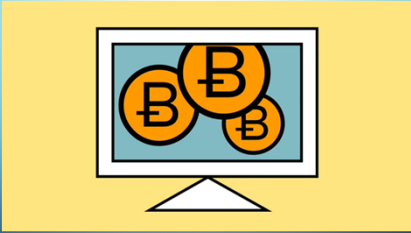


- <https://youtu.be/ID9KAnkZUjU>

BLOCK CHAIN - CRYPTOCURRENCY

- Because Block Chain can be distributed and is immutable, it is a format for record keeping of financial transactions
- BITCOIN is the most popular Block Chain Crypto Currency

BLOCK CHAIN – BITCOIN



- https://youtu.be/M_zCjy59cg

BLOCK CHAIN – BITCOIN

- Do cryptocurrencies, like Bitcoin change the gambling analysis of any of the following:
 - Lotteries
 - Games of Chance
 - Sports Wagers
 - Bookmaking


CLOUD COMPUTING

- In short, using someone else's computers to store, process, collect or report data or data processing functions

CLOUD COMPUTING

- Cloud computing allows businesses to outsource the core IT functions of a company
 - By using shared resources, a company can reduce IT budgets, enhance security, and scale as needs require
 - There are many different forms of cloud computing

CLOUD COMPUTING



• <https://youtu.be/uroryFU7BgM>

CLOUD COMPUTING

- Cloud computing leverages the scale of large scale cloud computing providers to allow flexible sharing of resources
 - AMAZON
 - GOOGLE
 - IBM
 - MICROSOFT
 - ORACLE
 - ... and others

CLOUD COMPUTING




• <https://youtu.be/p7MqvJAKLoM>

CLOUD COMPUTING

- One key element of cloud computing is load balancing
- Load balancing is the seamless use of multiple global data centers to provide services to cloud computing customers

CLOUD COMPUTING



@pvergadia

- <https://youtu.be/h8EqM6Xt3MA>

CLOUD COMPUTING

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