

# Lab 6-6-2023

1. Generate a Merkle tree of the given text using an online hash calculator:
  - a. Copy the text in four parts as given below.

**Part 1:**

And now the end is here  
And so I face that final curtain  
My friend I'll make it clear  
I'll state my case, of which I'm certain  
I've lived a life that's full  
I traveled each and every highway  
And more, much more  
I did it, I did it my way

**Part 2:**

Regrets, I've had a few  
But then again too few to mention  
I did what I had to do  
I saw it through without exemption  
I planned each charted course  
Each careful step along the byway  
And more, much, much more  
I did it, I did it my way

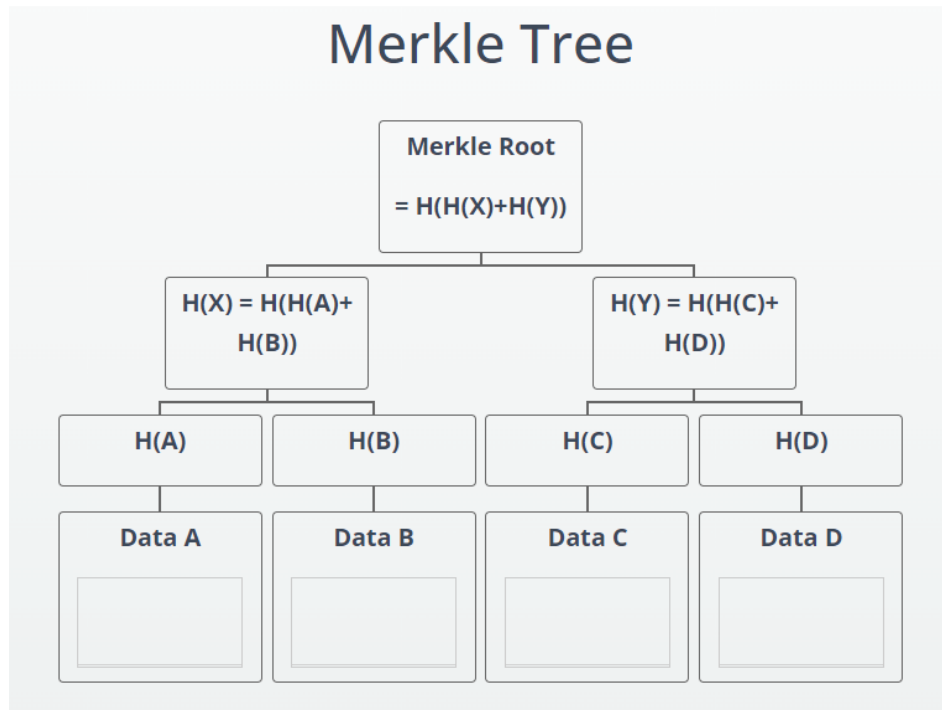
**Part 3:**

Yes, there were times I'm sure you knew  
When I bit off more than I could chew  
But through it all, when there was doubt  
I ate it up and spit it out  
I faced it all and I stood tall and did it my way

**Part 4:**

For what is a man, what has he got?  
If not himself then he has naught  
Not to say the things that he truly feels  
And not the words of someone who kneels  
Let the record shows I took all the blows and did it my way

- b. Use this image to visualize the node and root hashes and then answer the questions at this link: <https://forms.gle/wRJzAmYqi43zzMm8>



2. Write a program which does the following
- Takes eight random strings of your choice
  - Calculates their block and nodal hashes to construct a Merkle tree
  - Prints out the Merkle root of the tree
3. Write a program which does the following
- Imports a file (use a file of the lecture slides from LMS for this)
  - Parses the file into eight blocks
- For the purpose of parsing you can use the following line of code

```
# Determining and splitting the file as per block size
blockSize = len(content) // 8
dataBlocks = [content[i:i+blockSize] for i in range(0, len(content), blockSize)]
```

- Calculates the SHA-256 hashes of each data block
- Concatenates these hashes to generate a Merkle tree
- Prints out the Merkle root of the tree

4. Repeat hands on exercise number 3,
  - a. by using a function that takes two inputs, concatenates them and returns the hash value.
  - b. by dividing the file into 1024 blocks of data