BLOCKCHAIN TECHNOLOGY
Assignment 1

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Class: FDE C6 (Afternoon)

Read and summarize the 3 files:

Your summary should explain the problem Bitcoin solves, how blockchain works, and why it matters.

Imagine trying to send digital cash directly to someone online, like a $5 tip to your favourite gamer halfway across the world. Before Bitcoin, this was nearly impossible without a middleman like a bank at a higher cost. These intermediaries exist because of a problem encountered with how we could stop someone from copying and pasting the digital money to spend twice or more. This is known as the “double-spending” problem that was addressed and solved by Satoshi Nakamoto [1].

Bitcoin solves the problem of creating digital money that doesn’t require a trusted central authority, like a government or a bank, to prevent fraud and double-spending. But the core problem would be how we can have a purely digital system where no one is in charge, and participants who don’t trust each other can still agree on a single, truthful transaction history without this central referee? Bitcoin is known to eliminate the problems through a decentralized, peer-to-peer network secured by cryptographic proof (consensus mechanism) rather than trust [2].

At its core, Bitcoin relies on blockchain technology; the records of all transactions are kept in a series of blocks that can’t be changed. Each block contains a set of transactions, a timestamp, and a cryptographic hash of the previous block, creating a secure and tamper-resistant sequence. Nodes in the network have to solve a proof-of-work puzzle that

takes a lot of computing power in order to add a block. This makes sure that everyone agrees on what should happen and stops users from changing the chain. The agreed-upon transaction history is shown by the longest valid chain. The system is safe as long as honest nodes have most of the computing power.

Blockchain's significance extends beyond cryptocurrencies. As highlighted by Weking et al. (2019), it enables new business models by fostering disintermediation, enhancing security, and improving transparency. Applications range from supply chain tracking and decentralized marketplaces to secure data sharing and automated smart contracts. By decentralizing trust and reducing dependency on intermediaries, blockchain technology has the potential to transform industries, lower costs, and empower users with greater control over their digital interactions.