7CCSMDLC TUTORIAL QUESTIONS and SOLUTIONS
TOPIC 8: DLT Platforms
TUTORIALS WEEK 9

Q1: Look at the web-pages of the company Data Gumbo, here:

https://www.datagumbo.com

(a) What is GumboNet?
(b) What is GumboNet ESG?
(c) What application domains does the company target?
(d) How is a distributed ledger used?
(e) How are smart contracts used?
(f) What programming language are the smart contracts written in?

Solutions:

(a) **What is GumboNet?** A DLT platform connecting devices from the Internet of Things (IoT), and used as a platform for automating business processes between companies along an industrial supply chain.
(b) **What is GumboNet ESG?** The same DLT platform with special features for management of so-called Environment, Social and Governance (ESG) goals (eg, measuring the miles travelled by a shipment in order to estimate the carbon emissions produced by the shipment as it travels along its supply chain).
(c) **What application domains does the company target?** Supply chain applications in heavy industry, construction, mining, and oil & gas industries.
(d) **How is a distributed ledger used?** The DLT platform is used to store information collected from IoT devices, which can then serve as inputs to business processes, including automated processes (ie, smart contracts).
(e) **How are smart contracts used?** For example: To send alerts when shipments change locations or when their ownership or custody changes, or to send alerts when variables being measured by IoT devices change their state (eg, when temperatures change or when GPS measurements indicated that shipments have arrived at their destinations). To automatically issue invoices or to automatically execute payments when certain pre-agreed events occur (eg, when a buyer of a shipment takes possession of the shipment).

(f) **What programming language are the smart contracts written in?** I was not able to find this out. Please let me know if you discover this.

Q2. Read the White paper from Data Gumbo (available on KEATS under Week 8).

(a) What is a Proof-of-Capacity Consensus Protocol

A PoC protocol uses the miner's memory capacity as the basis for assigning to them toe right to upload transactions or blocks. This is in contrast to using their processing power (as in Proof-of-Work) or their stake in the cryptocurrency (Proof-of-Stake) or their position in some hierarchy (Proof-of-Authority). Typically, in a Proof-of-Capacity protocol, each miner downloads a large amount data in which can be found the solution to the next block upload puzzle. The more memory the miner makes available for the data download, the more data that can be downloaded, and hence the greater the chance that the winning answer to the puzzle can be found in the data actually downloaded.

The idea is similar to saying that everyone who enters a lottery is allowed to download potential winning numbers in proportion to how many tickets they buy, and among the numbers downloaded, the winning number may possibly be found. The more potential numbers that are downloaded, the greater the chance that the winning number will be among those that the lottery entrant has downloaded.

Some more information here:

https://www.investopedia.com/terms/p/proof-capacity-cryptocurrency.asp

(b) Describe Data Gumbo's Proof-of-Evidence consensus protocol.

Data Gumbo's platform connects devices from the Internet of Things to a distributed ledger. The Data Gumbo blockchain allows only the parties (nodes) that are involved in a financial transaction to have authority to approve it. (It is therefore similar to the Corda model.) Parties to a transaction agree beforehand (and off-chain) what counts as evidence that a transaction as been completed. For example, what would be the evidence that a shipment of oil has been delivered? Perhaps arrival at the destination? Or both arrival and the oil passing a Quality Test?

When the event has occurred and evidence of it obtained, the proof of evidence is uploaded to the DL (perhaps automatically, if the evidence arises from an IoT device – for example, a device that tracks position of a shipment using GPS signals). The proof of evidence allows the parties to the transaction to then approve the uploading of the relevant transaction. This might be all the parties (buyer and seller) or just one, if that is what the parties had agreed beforehand.