Sekilas linked list & Python + blockchain

https://github.com/dudung/sk5003-02-2022-2

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Silakan berdiskusi untuk kuliah hari ini di
https://github.com/dudung/sk5003-02-2022-2/issues/7

Kerangka

SAP dan referensi

Minggu 6

Minggu	Topik	Subtopik	Capaian Belajar
6	Struktur data, orientasi objek, rekursi dalam Python	List yang terhubung (linked list)	Kemampuan untuk memahami dan menguasai list yang terhubung (linked list) dalam Python

Referensi utama

- Jose M. Garrido, "Introduction to Computational Models with Python", Routledge, 1st edition, 2020,

  url https://isbnsearch.org/isbn/9780367575533.

R1

C10

- Nodes
- Class for linked lists
- Create a linked list
- Manipulate a linked list
- Linked lists with two ends
- Double-linked lists

- Stacks and queues data stractures

Refs from internet

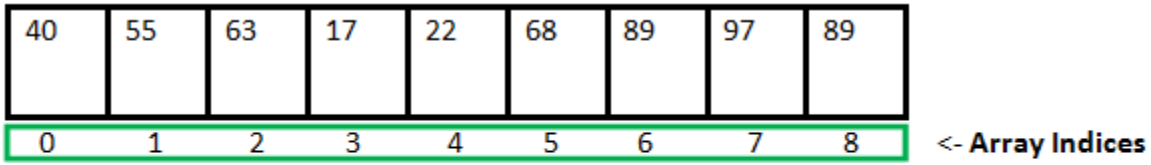
- url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414]
- url https://builtin.com/data-science/python-linked-list [20230414]
- url https://machinelearningmastery.com/setup-python-environment-machine-learning-deep-learning-anaconda/ [20230414]

Refs from internet (cont.)

- url https://www.educative.io/answers/how-to-create-a-linked-list-in-python [20230415]
- url https://stackabuse.com/python-linked-lists/ [20230415]

Array & linked list

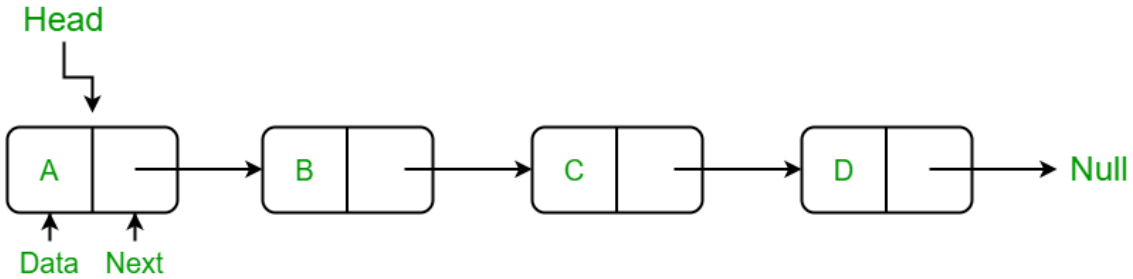
Array



- Arrays store elements in contiguous memory locations, resulting in easily calculable addresses for the elements stored and this allows faster access to an element at a specific index.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

Linked-list



- Linked lists are less rigid in their storage structure and elements are usually not stored in contiguous locations, hence they need to be stored with additional tags giving a reference to the next element.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

Array and linked list comparison

Parameters	Array	Linked list
Storing location	Arrays are stored in contiguous location.	Linked lists are not stored in contiguous location.
Size	Fixed in size.	Dynamic in size.
Memory	Allocated at compile time.	Allocated at run time.
Memory use	Less memory than linked lists.	More memory than array because it stores both data and address of next node.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

Array and linked list (cont.)

Parameters	Array	Linked list
Access to element	Element can be accessed easily.	Element accessing requires the traversal of whole linked list.
Operation time	Insertion and deletion operations take time.	Insertion and deletion operations are faster.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

Linked list & blockchain

Blockchain

- A blockchain is a Distributed Ledger Technology (DLT) meaning it can store records of transactions that are not editable any further. It is always online as it is distributed among a vast network of computers in the world that are called nodes.
- A blockchain is a reliable store of data as it is decentralized and chronological, making any malicious changes at any single or few nodes easily detectable since their timestamps and hash codes will change while the other nodes' will not.

Sandeep Bhandari, "Difference Between Blockchain and Linked List", Ask Any Difference, 11 Apr 2023, url https://askanydifference.com/difference-between-blockchain-and-linked-list/ [20230415].

Linked list and blockchain comparison

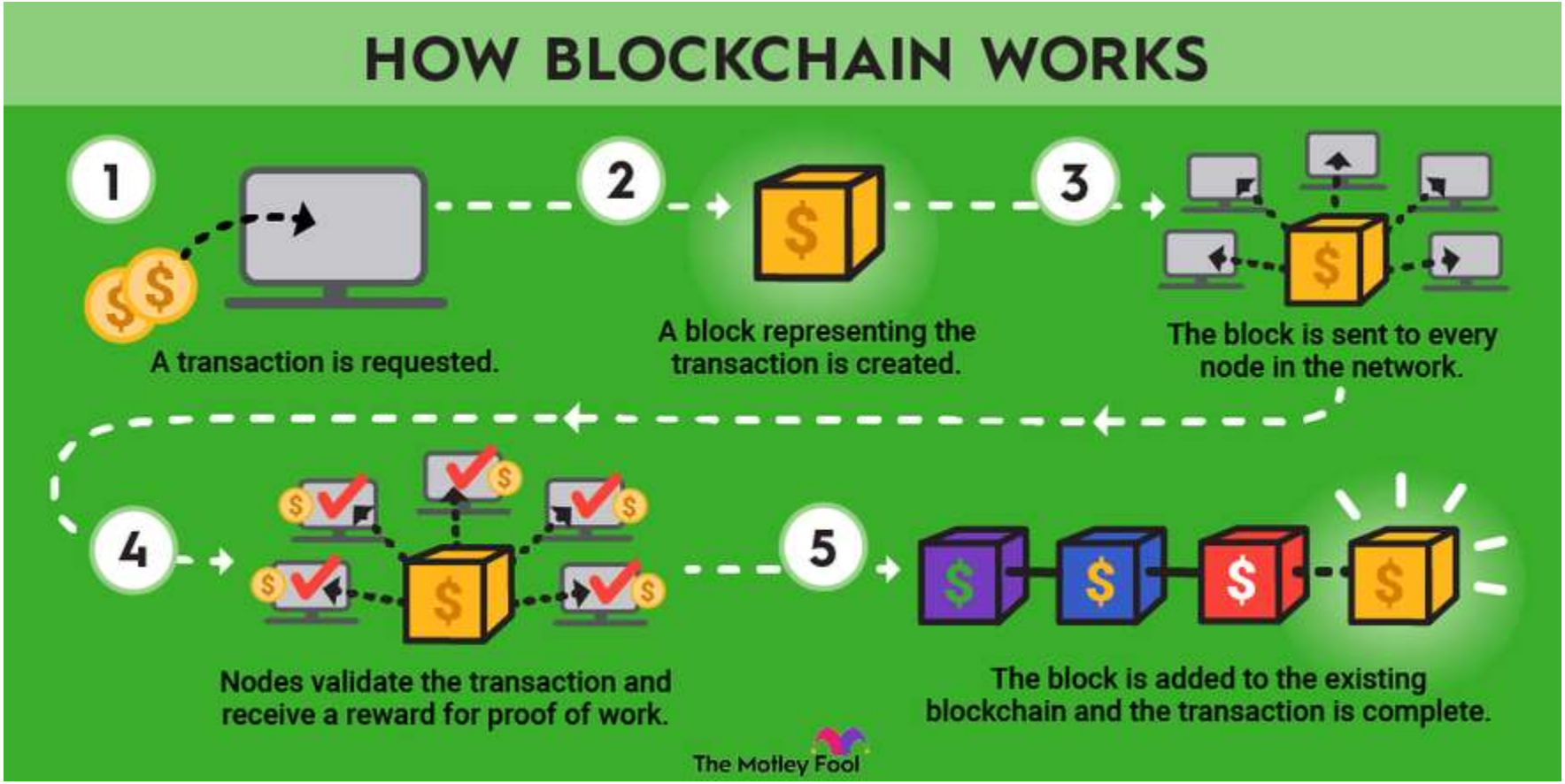
Parameters	Blockchain	Linked list
Formation	Every block in a blockchain contains a hash address for the previous block.	A linked list has a pointer carrying the address of the next element in the list.
Complexity	It is a very complex data structure that has Merkle roots to store transaction data.	It is the simplest data structure storing only integer values.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

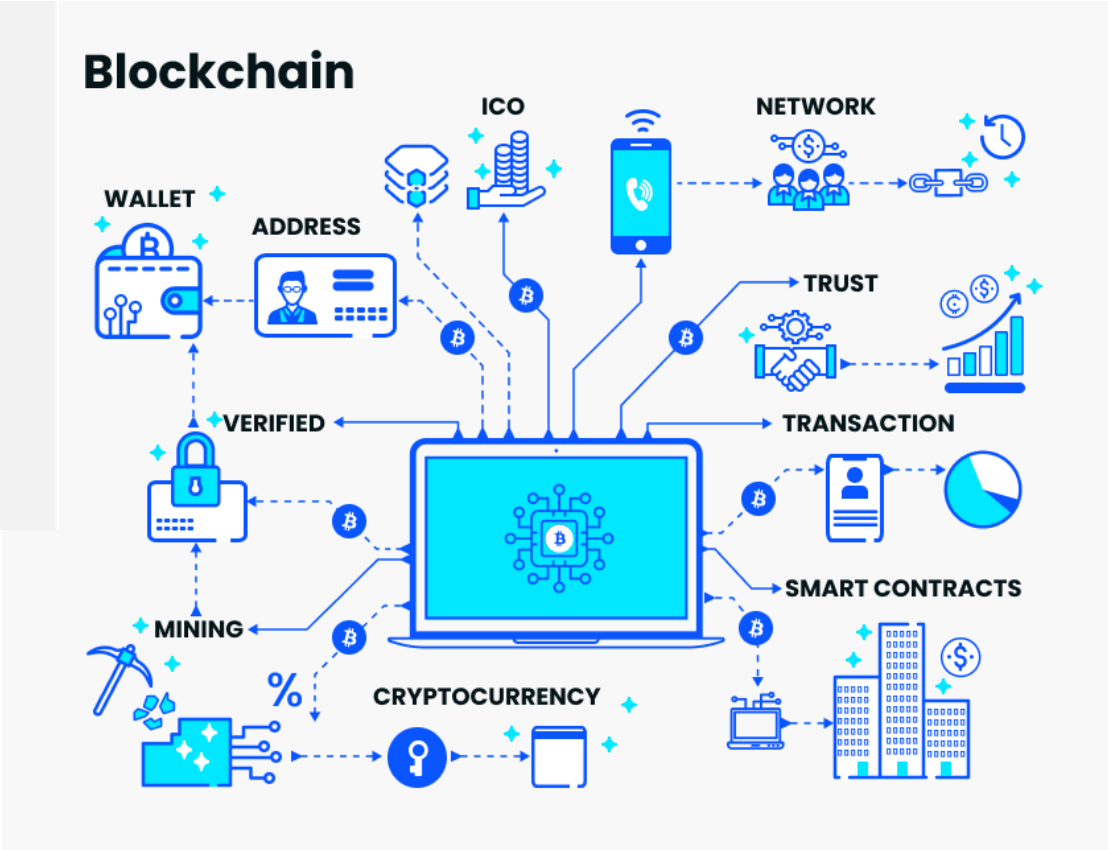
Linked list and blockchain (cont.)

Parameter	Blockchain	Linked list
Type of bond	The bond between blocks is permanent and cannot be broken or changed.	A linked list is easily editable and elements can be edited, added, and deleted.
Nature	It is by rule, decentralized, and chronological in nature.	It is not decentralized and may or may not be chronological.
Data	Information once entered into a block is transformed using cryptography to protect it from leaking.	Data is stored in its simple form as it was entered into the elements.

GeeksforGeeks, “Linked List vs Array”, GeeksforGeeks, 29 Mar 2023, url https://www.geeksforgeeks.org/linked-list-vs-array/ [20230414].

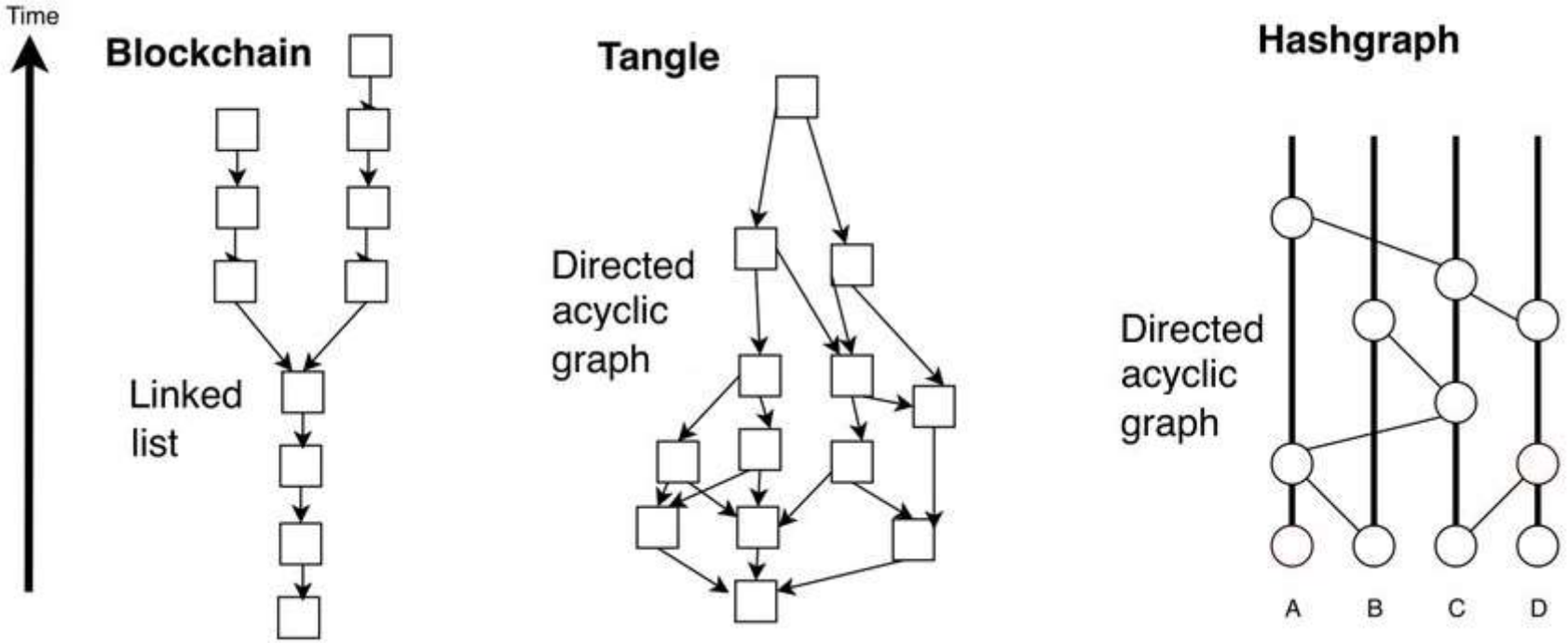


Anders Bylund, “What Is Blockchain?”, The Motley Fool, 8 Jun 2022, url https://www.fool.com/investing/stock-market/market-sectors/financials/blockchain-stocks/what-is-blockchain/ [20230415].



Remsha, “How Blockchain Technology Is Transforming The Cybersecurity”, MMC Global, 22 Mar 2022, url https://mmcgbl.com/how-blockchain-technology-is-transforming-the-cybersecurity/ [20230415].

Existing Distributed Ledger Technology



Antonio Lopez Vivar, Alberto Turégano Castedo, Ana Lucila Sandoval Orozco, Ana Lucila Sandoval Orozco, Luis Javier García Villalba, “An Analysis of Smart Contracts Security Threats Alongside Existing Solutions”, Entropy, vol 22, no 2, 203, Feb 2020, url http://dx.doi.org/10.3390/e22020203.

Sekilas list Python

List di Python

- url https://github.com/dudung/python/blob/main/src/stepin/intermediate/list/README.md

Linked list

Linked list dengan Python

- url https://github.com/dudung/python/blob/main/src/stepin/intermediate/linked_list/README.md

Diskusi dan latihan

Tugas sebelum kuliah

- Isi kehadiran di SIX.
- Baca contoh-contoh di
  - list (10),
  - linkedlist (5).
- Ajukan satu pertanyaan terkait contoh-contoh di atas (satu poin untuk tugas).
- Informasi lebih jauh tersedia di Issue 7.

Diskusi

- Silakan bila ada pertanyaan.
- Setelah kuliah pertanyaan dapat diajukan secara asinkron di url https://github.com/dudung/sk5003-02-2022-2/issues/7

Terima kasih

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