

LEARNING OUTCOME:

1. Examine the computing issues of blockchain design and developments (C4, PLO2)
2. Demonstrate the capability of developing blockchain solution with available platform and toolset (A3, PLO6)

ASSIGNMENT REQUIREMENT:

Blockchain technology has been a game changer for transacting, sharing information, and defining trust in the rapidly evolving digital world. It introduces immutability, decentralised, enhanced security, and consensus features. It also serves as a digital database or ledger system that foster transparency and accountability in business sectors especially tracking assets. With the aforementioned, there are undoubtedly potentials to be integrated within business enterprises in a way to promote better security value within business applications. Therefore, you are commissioned to analyse **ONE (1)** of the following areas in real estate industry:

- 1) Asset ownerships and tokenization
- 2) Loan and mortgage documentation
- 3) Land registration
- 4) Property management
- 5) Transparent feedback of urban planning

In your analysis, you are required to perform the following tasks.

1) Part 1: Proposal document

- Review the business use cases above covering the background including the operations and practices for the handling data.
- Propose a solution model whereby the data can be securely stored and chained as a blockchain manner by leveraging the features of Blockchain.
- As such, you are required to prepare a proposal of a selected business use case (anyone from the list above) with Blockchain integration.

Deliverables:

Your report should include the following, but not limited to, 1) the selected business use case; 2) background information; 3) importance of the issue; 4) data analysis; 5) analysis solution model; 6) benefits; 7) conclusion; 8) reference.

Deadline:

The deliverable (proposal document) is to be uploaded to Moodle on or before the due date specified in Moodle.

2) Part 2: Solution implementation

Upon the investigation performed above, develop the solution considering the concept of Blockchain to produce a distributed ledger. This ledger should be replicated across all the participating nodes in the distributed environment. Thus, each node has a copy of ledger storing the digitally signed data. The development of the solution focuses on

the 1) hashing algorithm for the block of data; 2) cryptographic algorithm; 3) digitally signed the data; 4) block then chained by referencing the block using previous hash value; and 5) immutability technique. The following diagram demonstrates the base design of blockchain architecture.

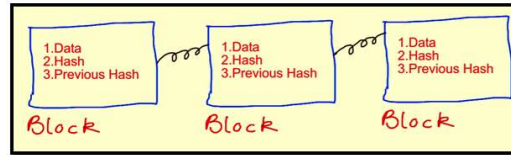


Figure 1: Block chained sample

Deliverables:

Your final report should include the following, but not limited to, 1) the introduction to the issue and solution development; 2) refined blockchain solution model, if any; 3) discussion of the blockchain solution design; 4) implementation techniques/algorithms with code snippets including explanation; 5) conclusion covering review/evaluation of developed solution; 6) reference.

2.1 Knowledge/Presentation

- Able to design and develop the block of data and connect them using generated hash value and merkle root. In the process, the hashing, cryptography, and digital signature algorithm are demonstrated. Ultimately, the appropriate ledger is produced.
- Able to explain the developed solution with code snippets in a good report presentation manner.

2.2 Software Required

- Java Development Kit (JDK) 8 or later, JavaScript or equivalent

ASSIGNMENT TYPE:

Group assignment (2 students only)

MARKING CRITERIA:

Criteria	Marks
Part 1:	
<u>Continuous assessment:</u>	
<i>Proposal</i>	10%
<ul style="list-style-type: none"> Review the business sectors/industries or use cases and identify the Blockchain solution possible integrating to the business sector 	
<i>Report of findings</i>	15%
<ul style="list-style-type: none"> Detail of findings Analysis of the selected business sector to integrate the Blockchain as a solution to their business data (approx 2000 words). Blockchain solution design and architecture benefiting the business data and operations can be produced. 	
SUBTOTAL	25%

Part 2:	
<u>Final assessment: Blockchain solution model and its implementation</u>	
<i>Solution development (with code snippets)</i>	
<ul style="list-style-type: none"> Block concept and chain 	10%
<ul style="list-style-type: none"> Hashing algorithm inclusive Merkle tree 	10%
<ul style="list-style-type: none"> Cryptography algorithm 	5%
<ul style="list-style-type: none"> Digital signature 	5%
<ul style="list-style-type: none"> Immutability technique 	5%
SUBTOTAL	35%
TOTAL:	60%

GRADING CRITERIA**MARKING KEY****A+ = Distinction**

Superior achievement in assignment,
outstanding quality; complete in every way.

A = Distinction

Very high achievement in all objectives,
excellent quality assignment.

B+ = Credit

Very good/High achievement in most objectives,
high quality assignment.

B = Credit

Good/High achievement in most objectives,
shows some of the qualities but lacks
comprehensiveness nevertheless quality assignment.

C = Pass

Satisfactory/competent achievement in most objectives,
all essential points covered plus some of the minor ones.

F = Marginal Fail / Fail

Unsatisfactory, Improvement essential/poor achievement;
poor quality assignment, some essential objectives not covered.

EQUIVALENT MARKS

A+ = 80-100

A = 75-79

B+ = 70-74

B = 65-69

C/C+/C- = 50-64

D/F+/F/F- = below 49