VIETNAM NATIONAL UNIVERSITY OF HOCHIMINH CITY
THE INTERNATIONAL UNIVERSITY
SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

THESIS TITLE

By

AUTHOR NAME
STUDENT ID

A thesis submitted to the School of Computer Science and Engineering
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[THESIS TITLE]

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Acknowledgments

I would like to express my sincere gratitude to...

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List of Abbreviations

ABC — Example Abbreviation

Abstract

Keywords: keyword1, keyword2, keyword3, keyword4, keyword5

Chapter 1

INTRODUCTION

1.1 Motivation

Describe the motivation behind your research. Why is this topic important?

1.2 Problem Statement

Clearly define the problem you are addressing.

1.3 Scope

1.3.1 In Scope

What is included in your research?

1.3.2 Out of Scope

What is explicitly excluded from your research?

1.3.3 System Assumptions

List any assumptions made in your work.

1.3.4 System Constraints

Describe any limitations or constraints.

1.4 Objectives

List your research objectives in a table format:

Table 1.1: Research Objectives

#	Objective	Measurement
1	Objective 1	How to measure success
2	Objective 2	How to measure success

1.5   Thesis Organization

Describe how the rest of the thesis is organized.

Chapter 1: Introduction establishes the research foundation...

Chapter 2: Background and Related Work provides the theoretical foundation...

Chapter 2

BACKGROUND AND RELATED WORK

2.1 Theoretical Background

2.1.1 Topic 1

Describe the theoretical foundation of your research area.

2.1.2 Topic 2

Continue with relevant theoretical concepts.

2.2 Current Advancements

Survey existing work in your field:

Table 2.1: Comparison of Existing Systems

System	Description
System A	Description of System A
System B	Description of System B

2.3 Research Gaps

Identify the gaps in existing research that your work addresses.

Chapter 3

METHODOLOGY

3.1 System Requirements

3.1.1 Functional Requirements

Table 3.1: Functional Requirements

ID	Requirement	Priority
FR1	Requirement 1	Must
FR2	Requirement 2	Should

3.1.2 Non-Functional Requirements

Table 3.2: Non-Functional Requirements

ID	Requirement	Target
NFR1	Performance	Less than X seconds
NFR2	Cost	Less than $X

3.2 System Design

3.3 Complexity Analysis

Table 3.3: Time Complexity Analysis

Operation	Complexity	Notes
Operation 1	O(n)	Description
Operation 2	O(log n)	Description

Chapter 4

IMPLEMENTATION

4.1 System Architecture Overview

Describe the overall architecture of your implementation.

4.2 Algorithms

Present key algorithms using pseudocode:

Algorithm 1 Algorithm Name

1: **function** FunctionName(input) → output
2:     initialization
3:     **for each** item **in** collection **do**
4:         process item
5:     **end for**
6:     **return** result
7: **end function**

4.3 Implementation Details

Describe specific implementation choices, tools, and technologies used.

4.3.1 Technology Stack

Table 4.1: Development Tools and Their Purposes

Tool	Purpose
Tool 1	Purpose description
Tool 2	Purpose description

4.4 Integration and Testing

Describe your testing approach and results.

Table 4.2: Testing Strategy by Level

Level	Scope	Tools
Unit	Individual components	Testing framework
Integration	System interactions	Test clients

Chapter 5

RESULTS

5.1 Performance Benchmarks

Present your experimental results:

Table 5.1: Performance Measurements

Metric	Value
Metric 1	Value 1
Metric 2	Value 2

5.1.1 Timing Benchmarks

Table 5.2: Timing Benchmarks

Operation	Time
Operation 1	X ms
Operation 2	Y ms

5.2 Analysis and Discussion

Analyze your results and discuss their implications.

Chapter 6

DISCUSSION

6.1 Interpretation of Results

Discuss the meaning and significance of your results.

6.1.1 Performance Implications

What do your performance results mean for practical use?

6.1.2 Security Implications

Discuss any security considerations.

6.2 Research Contributions

Summarize your key contributions:

Table 6.1: Research Contributions and Their Impact

Contribution	Impact
Contribution 1	Description of impact
Contribution 2	Description of impact

6.3 Limitations

Acknowledge the limitations of your work:

Table 6.2: System Limitations and Mitigations

Limitation	Impact	Mitigation
Limitation 1	Impact description	How to address

6.4 Future Work

Suggest directions for future research:

- Future direction 1

- Future direction 2

- Future direction 3

Chapter 7

CONCLUSION

7.1 Summary of Contributions

Summarize the key contributions of your thesis:

1. First major contribution

2. Second major contribution

3. Third major contribution

7.2 Impact

Discuss the academic and practical impact of your work.

7.3 Final Remarks

Conclude with final thoughts on the research and its significance.

Bibliography

[1] J. Smith and J. Doe, "Blockchain technology in education: A comprehensive review," *IEEE Transactions on Education*, vol. 45, no. 2, pp. 123–135, 2023.

[2] V. A. Nguyen and T. B. Tran, "A verifiable credential system for academic records," in *Proceedings of the 2024 ACM Conference on Computer Science Education*, (New York, NY, USA), pp. 456–461, ACM, 2024.

[3] S. Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*. Self-published, 2008.

[4] M. Sporny *et al.*, "Verifiable credentials data model 1.0," w3c recommendation, World Wide Web Consortium (W3C), 2019.

[5] Ethereum Foundation, "Ethereum documentation." `https://ethereum.org/en/developers/docs/`, 2024. Accessed: 2024-01-15.

[6] T. T. H. Le, "Blockchain-based transcript verification system," bachelor's thesis, The International University, Vietnam National University, 2023.

[7] W. Zhang, *Scalable Cryptographic Protocols for Distributed Systems*. PhD thesis, Massachusetts Institute of Technology, 2022.

Appendix A

Additional Material

A.1 Proof of Theorem

Add your detailed proofs here.

A.2 Additional Tables

Table A.1: Additional Data

Column 1	Column 2	Column 3
Data	Data	Data
Data	Data	Data

A.3 Source Code

```solidity
pragma solidity ^0.8.19;

contract ExampleContract {
    address public owner;
    uint256 public value;

    event ValueUpdated(uint256 newValue);

    constructor() {
        owner = msg.sender;
    }

    function setValue(uint256 _value) public {
        require(msg.sender == owner, "Not authorized");
        value = _value;
        emit ValueUpdated(_value);
    }
}
```

Listing A.1: Sample Solidity Contract

```c
# Compile the project
gcc -o program main.c

```

```
4 # Run tests
5 ./run_tests.sh
6
7 # Clean build files
8 make clean
```

Listing A.2: Sample Build Commands

```python
1  def calculate_average(numbers):
2      """Calculate average of a list of numbers."""
3      if not numbers:
4          return 0
5      return sum(numbers) / len(numbers)
6
7  # Example usage
8  scores = [85, 90, 78, 92]
9  avg = calculate_average(scores)
10 print(f"Average: {avg}")
```

Listing A.3: Sample Python Script