PES UNIVERSITY

Dissertation on

Smart Marriage Contract

Submitted in partial fulfilment of the requirements for the award of degree of

Bachelor of Technology
in
Computer Science & Engineering

UE20CS461A – Capstone Project Phase - 2

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FACULTY OF ENGINEERING
CERTIFICATE

This is to certify that the dissertation entitled

'Smart Marriage Contract'

is a bonafide work carried out by

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1. _____ _____

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DECLARATION

We hereby declare that the Capstone Project Phase - 2 entitled **"Smart Marriage Contract"** has been carried out by us under the guidance of Prof. Surbhi Choudhary, Assistant Professor and submitted in partial fulfilment of the course requirements for the award of degree of **Bachelor of Technology** in **Computer Science and Engineering** of **PES University, Bengaluru** during the academic semester June – Nov. 2023. The matter embodied in this report has not been submitted to any other university or institution for the award of any degree.

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ABSTRACT

The Project focuses on the development of the Smart Marriage Contract using blockchain technology. This project serves as a technological advancement over traditional paper-based marriage contracts by providing an immutable and transparent record of marital agreement and asset ownership. Automatic asset transfers ensure efficient management of assets in various scenarios such as divorce and inheritance.

The contract aims to streamline the process of asset management within marriages, ensuring security, transparency, and efficiency in accordance with legal regulations and traditional legal frameworks.

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CHAPTER 1

INTRODUCTION

1.1 Blockchain

Technology is at the core of the twenty-first century. People are more willing to embrace emerging technologies as the need for modernization in our daily lives grows. One of such concepts, Blockchain, the most recent ground-breaking technology that is reshaping various sectors, was miraculously launched into the market. The main idea behind this technology was to resolve the issue of centralized server systems which was done using various Blockchain concepts. Learning from this, in our project we are trying to implement the concepts of Blockchain in the creation of a smart marriage contract in order to store the details of assets owned by the spouses during the lifetime of their marriage which would ensure a transparent and immutable record of marital agreement and asset ownership. This would also enable a smooth and efficient transfer of assets in the events of a divorce or inheritance.

1.2 Marriage contracts

The current system of marriage contracts which are in place in several countries including India. However, they are heavily influenced by cultural, religious and legal factors in each country. In India, there are several marriage acts that govern the laws for marriages across different communities such as "Hindu marriage act", "muslim personal law", "special marriage act" and so on. In traditional marriages, there are no specific guidelines regarding the asset ownership between the spouses that have not been clearly outlined which would drive the novelty of this project.

CHAPTER 2

PROBLEM STATEMENT

The traditional paper backed process of managing marriage certificates involves a high level of physical intervention. Additional problems such as errors in the document, even tampering fraud can be observed which will eventually lead to potential disruption of the system will cause potential legal complications

Some key problems faced by traditional marriage certificates are -

1.   **Risks of tampering and fraud** – traditional paper-based documents are susceptible to unauthorized/fraudulent modification or damage

2.   **Late execution and dispute resolution** – due to enforcement of physical intervention the process becomes time consuming and will often lead to delays in time which can drag the process of divorce

3.   **Storage Space Requirements** – when dealing with large quantities of certificates which are in the form of hard copy, it creates limitations in physical storage space

Risk natural damage or loss – physical damage from natural events such as fire, flood etc makes a hard copy vulnerable to natural forces.

CHAPTER 3

LITERATURE SURVEY

1) Sreehari P , M Nandakishore, Goutham Krishna, Joshin Jacob and Shibu V.S, SMART WILL Converting the Legal Testament into a Smart Contract.	
Summary	This paper talks about the use of blockchain technology and smart contracts for minting and probating wills, mentioning the vulnerabilities and inefficiencies of the current system and proposing a more secure and efficient alternative. also exploring the potential future implementation of blockchain technology in property management.

Advantages	It makes wills tamper-proof, secure, and transparent, while also increasing the speed of the process. This technology eliminates the vulnerabilities and legal complications of the current system, ensuring faster processing. Additionally, blockchain technology allows for the creation of smart contracts, which can automate transactions and provide a secure, legitimate, and efficient way to execute agreements. The use of blockchain for wills offers increased security, efficiency, and transparency in the legal process.
Limitations	The limitations of the current system for drafting and probating wills include the vulnerability of wills stored as hard or soft copies, which can be tampered with or destroyed. The processing of wills faces legal complications, taking a lot of time and money. Probating a will, including transactions, also takes a significant amount of time and money, and can lead to family disputes. Additionally, the current system is susceptible to corruption and bias, leading to delays in serving justice. Finally, the

	current system lacks transparency and security, making it difficult to ensure the proper distribution of assets.

2) N.Asfour , Role of Blockchain and smart contracts in transforming social contracts.	
Summary	This paper talks about how to increase efficiency, reduce costs, and enable more transparent interactions. These technologies have entered sectors such as finance and healthcare, leading to applications like Bitcoin and smart contracts. Research aims to integrate blockchain and smart contracts with existing systems to address issues

	like high transaction costs and inefficiencies in traditional networks, as well as explore their social and economic impacts.
Advantages	Some of the advantages stated in the paper are Increased efficiency, Reduced costs, More transparent interactions, Removal of financial intermediaries, Facilitation of easier ownership transfers, Reduction of administrative costs, Enablement of more flexible terms.
Limitations	Early blockchain applications faced limitations such as constrained transaction capabilities. Research and development efforts are ongoing to address these limitations through improved interfaces and expanded functionality.

3) L. SISÁK, SMART MARRIAGE CONTRACTS: THE FUTURE OF BLOCKCHAIN IN MATRIMONIAL PROPERTY LAW.	
Summary	This paper examines smart marriage contracts (**SMCs) as a new application of blockchain technology in matrimonial property law. The paper finds that **SMCs established through marriage contracts can focus on managing common property, serving as a shared digital wallet, and potentially partitioning property after dissolution of marriage. Under German and Austrian law, which have liberal approaches to contractual freedom in family law, **SMCs can be formed via marriage contract. However, more conservative Slovak law does not permit this due to its narrow rules on marital agreements.

Advantages	The advantages of smart marriage contracts (**SMCs) can be summarized as follows, Management of common property through **SMCs, acting as a shared digital wallet, Potential partitioning of property after dissolution of marriage, Liberal approaches to contractual freedom in family law in German and Austrian law, allowing for the formation of *SMCs via marriage contracts, Attention to content issues when drafting marriage contracts to establish *SMCs, such as ensuring a community of property regime applies, Identification of factors for marriage contract terms, including detailing registration duties and setting sanctions for noncompliance.
Limitations	Factors for marriage contract terms, such as detailing registration duties and setting sanctions for noncompliance, need to be carefully considered, Ensuring a community of property regime applies is crucial when drafting marriage contracts to establish *SMCs. Clauses proposing registrations in the *SMC that

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	have direct legal effects violate ethical principles and are invalid.

*SMC- Smart marriage contract.

CHAPTER 4

PROJECT REQUIREMENTS SPECIFICATION

Product Perspective:

Product Functionality:

Smart marriage contract implemented through blockchain can offer several benefits to the married couples, here are some ways in which it can help -

1. **Creating trust and transparency** – any contracts including smart marriage contracts become immutable, which implies that once the contract is created it cannot be changed, if change is needed it can be recorded, the nature of blockchain being decentralized can create transparency which can be verifiable, which leaves no room for misunderstanding between the couples, both the immutable and transparent nature of blockchain creates trust among people

2. **Efficiency and automation**- the advantage of smart contract is that it can trigger specific events based on predefined conditions. This type of automation reduces involvement of additional people, increasing the efficiency of the process also reducing administrative delays and paperwork this increases the speed to formalization or dissolution of the union.

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3. **Data integrity and security** – smart contracts within blockchain technology are tamper proof and protected from unauthorised access because of features like cryptography, the smart marriage contract remains valid and reliable over passage of time which becomes helpful in legal verifications or any proceedings.

4. **Contract customization and management** – couple are granted the ease to form their own terms while creating the contract, the couples can customize their contract with constraints like property ownership or any financial arrangements, these contracts an also be adapted by the couple consent which can occur due to change in circumstances by the passage of time.

5. **Accessibility** – smart marriage contract being put in the blockchain network also makes it easily accessible for couple living in a long-distance relationship or in any given place with access to the internet.

Operating environment -

 The system will run on windows/Linux operating system, the javascript programing language will be used to implement the front-end of the application as for the smart contract it will be coded with the help of Solidity programing language and for the blockchain network Ethereum network will be used.

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Constraints and Dependencies -

1. **Facilitation** – the system will be used by the government of India specifically the registrar of marriage so it not completely decentralized.

2. **Adaption** – the previously issued marriage certificates need to be added to the new system .

Risks-

1. **Errors in code** – smart contracts if not correctly implemented or even having code errors may contain bugs which may lead to unexpected behaviour or in extreme case may lead to hacking.

2. **Legal risks** – smart marriage contracts may not be legally implanted under some laws or frameworks as smart contracts are a very new idea it will be tough if there are limited legal laws.

Functional Requirements-

1. **Creation of smart contract and its management** – the system must allow users to create their contract with private details and custom terms.

2. **Authentication and identity verification** – the identity which are provided by the couple are the documents which are authenticated by the government.

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3. **User interface** – the system should be user friendly making it easy to create, view and manage smart contracts and important alerts must be sent to the responsible part before any change in events or triggers.

4. **Legal resolution and compliance** – the local laws and regulations must facilitate the rights of using smart marriage contracts.

External Interface Requirements-

Hardware Requirements-

1.to interact with the blockchain network we would require the nodes which are connected to the network, the nodes typically come with their own RAM, CPU and database which helps in storing the transaction

2. encryption devices like hardware security modules must be used to store cryptographic keys safely

3.users will also need their own devices to interact with the Smart marriage contract

Software Requirements-

1.A popular blockchain platform/network like Ethereum will be used to deploy smart contracts

2. Development environments such as Remix, truffle, Hardhat which will be used to write and test the contracts.

3. to build user-friendly interfaces, framework such as react is going to be used.

 Non-Functional Requirements

1. **Legal compliance and requirement** – The local laws and regulations must facilitate the compliance of smart marriage contract.

2. **Performance** – the system must be able to handle huge amounts of smart contracts without any compromises and the system must be quick to response.

3. **Reliability and availability** – the system must be reliable and should ensure that users can assess their contracts without any difficulties.

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CHAPTER 5

SYSTEM DESIGN

5.1 Introduction

The System Design lays a foundation for development and implement Smart contracts for the purpose of marriage and for the unfortunate procedures that might occur after it such as divorce, inheritance distribution or will implementation.

5.2 Design Goals

Transparency : Ensuring easily understandable and clear contracts . Here transparency is added to maintain clear records of conditions and agreements .

Security and Privacy : Blockchain's unique security features like immutability to safeguard and protect sensitive data , integrity of the contracts.Transparency being the crucial part , privacy still makes sure that the sensitive info and personal details are protected.

zero-knowledge proofs used to balance transparency with confidentiality.

Legal and compliance : Consult legal experts in law firms to ensure compliance with marriage , family laws and data protection.

Making sure that the contract is enforceable and aligns with the government laws and jurisdiction.

User friendly interface : Designing a user friendly interface to allow parties to add required information , update the terms of the contract without any technical knowledge about the back end .

5.3 Design Approach :

 Front-end : User interface to deploy or edit contracts and some other functionalities .

JavaScript , html, CSS will be used.

Back-end : Blockchain, Truffle Suite for deploying smart contracts. Ganache Test network for deploying the smart contracts.

Solidity used for programming here .

The InterPlanetary file storage system can be used to store the data of the spouse here web applications in a decentralised manner .
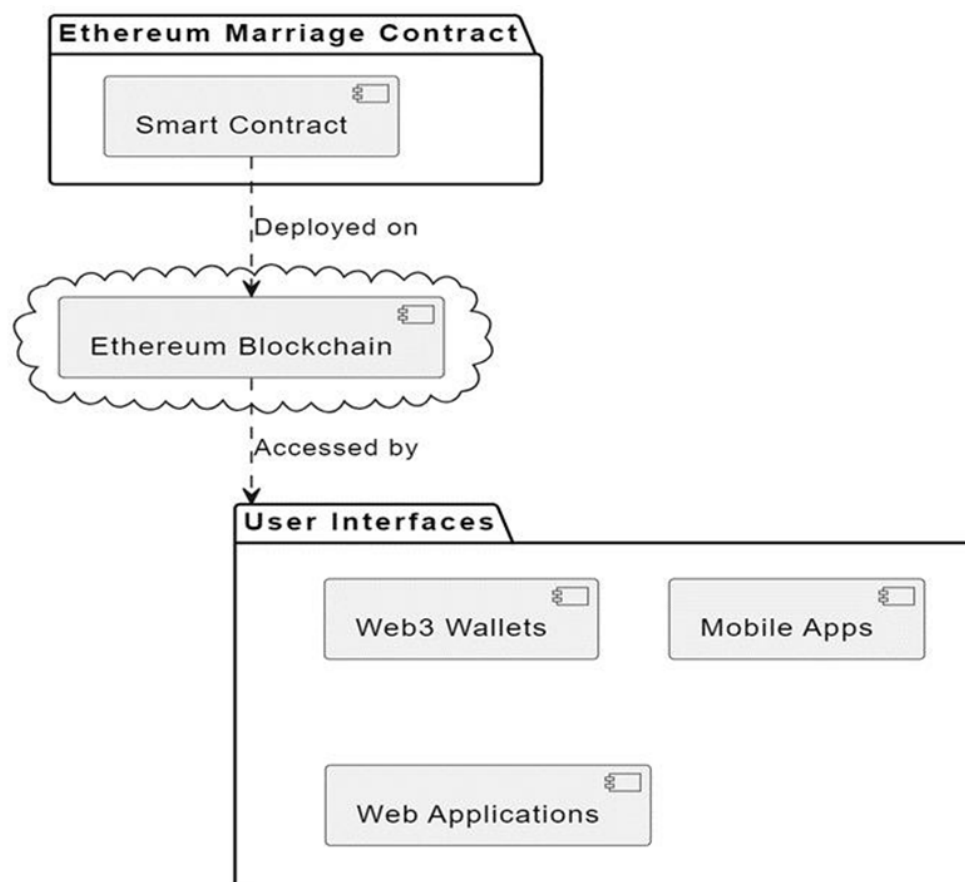
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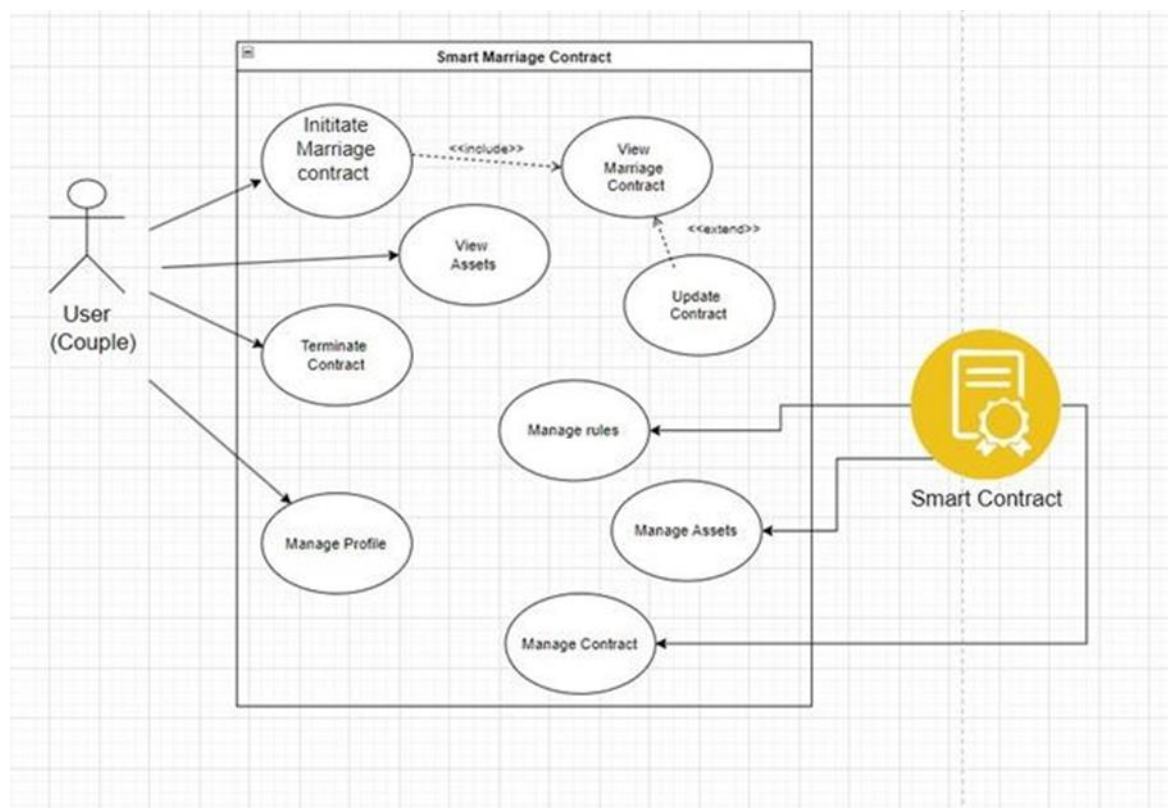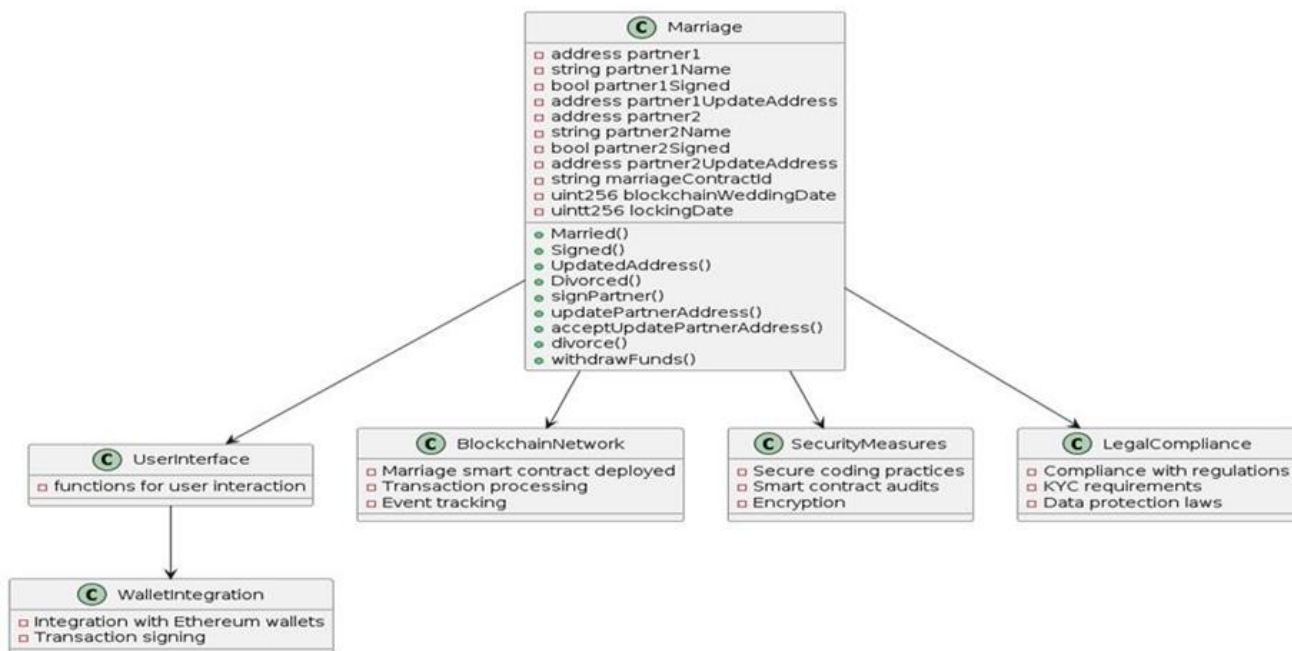
5.4 High-Level system design :

5.4.1 Flow-Diagram
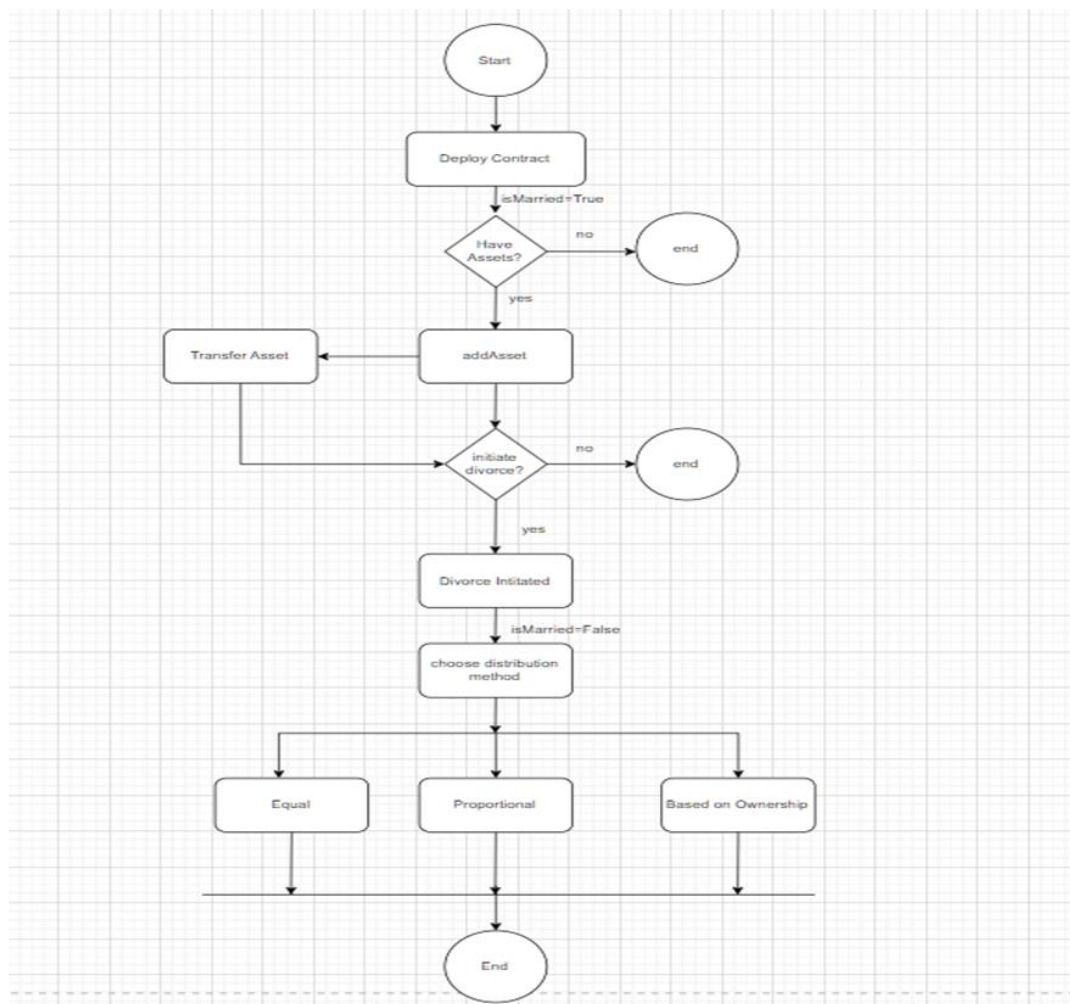
5.4.2 Architecture Diagram :

5.4.3 Use-Case Diagram :

5.4.4 Class Diagram :

CHAPTER 6

PROPOSED METHODOLOGY

Research and Requirement Analysis: Conduct a literature review, stakeholder analysis, and legal compliance research.

Blockchain Technology Selection: Choose the appropriate blockchain platform and consensus mechanism.

Smart Contract Development: Design, develop, test, and audit the smart contract using languages like Solidity or Vyper.

Legal and Regulatory Framework Integration: Ensure legal validation and draft necessary documentation.

User Interface and Experience Design: Develop a user-friendly front-end and backend integration, followed by UX testing.

CHAPTER 9

CONCLUSION AND FUTURE WORK

This project aims to implement smart contracts on marriage and unfortunate procedures that might occur after it like divorce, asset distribution between spouse or will implementation.

We welcome the feedback from the examiners and could add more futures based on the requirements in the future.

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THANK YOU !!