# Smart Contractual Agreements

**CSEC-659: Blockchain & Smart Contracts**
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**Problem Statement:**

Despite modern technological advancements, creating, negotiating, and executing a legal contract remains a time-consuming and expensive process. Many modern legal bindings, such as rental agreements, employment contracts, and sales negotiations, require human intervention, which tends to incur significant inefficiencies, delays, and increased costs for all parties involved. Relying on intermediaries such as lawyers and notaries further complicates the process and introduces additional expenses.

These problems create a gap that an automated legal contract service could fill. By using today's technology, streamlining the contract process would become much easier; relieving inefficiencies, lack of transparency, and cost. With blockchain technology, automated contracts will also eliminate the need for extended human intervention and, by association, the risk of human error. By developing and deploying these ‘smart’ contracts on the Ethereum blockchain, the consequential immutability and transparency of agreements ensure that trust and accountability are maintained at all times.

The design and implementation of automated legal contracts presents many challenges, including compliance with existing legal regulations and standards, addressing potential security vulnerabilities, and integration with current legal frameworks and business processes. Nevertheless, there is an urgent need for research and development into user-friendly automated legal contract solutions that have the potential to revolutionize the way legal agreements are created, executed, and enforced across all domains.

**Objectives:**

Our objective for this project is to develop a proof-of-concept. We would like to meet the following criteria:

- Implement smart contract logic that accurately captures traditional legal agreements' terms and conditions and current relevant legal regulations and standards.
- Ensure a secure, immutable, and transparent record of contract execution, providing irrefutable evidence of contract terms and changes.
- A secure authentication system to verify the identities of contract parties, preventing unauthorized access to non-involved parties.
- A system that allows all parties to see if and when a contract is signed.
- Allow parties to access and view the finalized contract on the blockchain securely.
- Enabling parties to verify the authenticity of contracts and confirm the signatures' identities via post-signature verification.
- Develop a user-friendly interface that allows for contract creation and signing.

**Scope:**

The project scope encompasses any agreement between two or more parties willing to have a public, immutable, and transparent contract viewable on the blockchain. Since legal agreements

are present in every field, the scope tends towards a dynamic implementation free of design restraints —a framework per se.

**Expected Outcomes:**
We are expecting many outcomes from this project:

- A proof-of-concept demonstration successfully showing the functionality and feasibility of an automated legal contract between two or more parties.
- Collect feedback from classmates and teachers on the concept's limitations, effectiveness, feasibility, and implementation.
- Develop a roadmap for future development based on current insights and lessons learned from the proof-on-concept phase. Define any priorities, milestones, or believed limitations for future iterations.

**Methodology:**
We plan to use Solidity, Hardhat, and the Sepolia test network to create, test, and deploy automated legal contracts. We can control and maintain the codebase by utilizing Version Control Software (VCS) like GitHub. The storage on a public repository also allows for the forking and further development of the codebase by others who wish to do so.

**Significance:**
The significance of this project can depend on its deployed scale.

- Efficiency & Cost Reduction: A practical implementation can eliminate human intervention and the reliance on intermediaries such as lawyers and notaries, dramatically reducing the cost of creating legal agreements between two parties.
- Transparency & Accountability: The contract creation process would be more transparent, as blockchain's immutable and tamper-proof nature ensures that the contracts cannot be retroactively altered. This fact enhances trust between parties and leads to higher levels of accountability.
- Disintermediation & Decentralization: By utilizing blockchain technology, parties can interact directly with each other and conduct decentralized agreements without relying on third-party intermediaries such as lawyers, notaries, or escrow agents.
- Legal Compliance & Risk Mitigation: Automating the contract process can help organizations comply with legal regulations and standards. By encoding legal conditions into code-based smart contracts, parties can automate compliance checks and regulatory requirements, reducing the risk of contract breaches or disputes.
- Enhanced User Experience & Accessibility: Accessing and signing legal contracts via a comprehensive GUI allows parties with limited legal experience to create, negotiate, and sign contracts quickly. It also allows for remote signatures allowing all parties to verify and sign anywhere with a network connection.
- Innovation & Competitive Advantage: Companies and individuals adopting an automated decentralized contract system can gain a competitive edge over competitors by modernizing their contract management practices.
- Global Reach & Scalability: This technology enabled organizations to execute contracts seamlessly across geographical boundaries and time zones, facilitating global business operations and international transactions.