

LEXON LITEPAPER

INTRODUCTION

Lexon is a ground-breaking, plain-text programming language that revolutionizes the way contracts and law can be written, driving down the cost of access to justice for everyone. Lexon can be used to write statute, regulations, bylaws, contracts, and more — on-chain, off-chain, and even off-machine. It is the perfect language for blockchain smart contracts.

The Lexon Online Compiler makes this powerful device accessible to everyone without installation. It opens an intuitive path to one-click deployment of smart contracts for non-programmers, drawing on the richness and simplicity of natural language. The Lexon Online Compiler is deployed on the Aeternity Blockchain, a particular well-suited DLT for economic and fast digital contracts.

UNDERPINNINGS & APPROACH

LEX Escrow.

"Payer" is a person.

"Payee" is a person.

"Arbiter" is a person.

"Fee" is an amount.

The Payer pays an Amount into escrow, appoints the Payee, appoints the Arbiter, and fixes the Fee.

CLAUSE: Pay Out.

The Arbiter may pay from escrow the Fee to themselves, and afterwards pay the remainder of the escrow to the Payee.

CLAUSE: Pay Back.

The Arbiter may pay from escrow the Fee to themselves, and afterwards return the remainder of the escrow to the Payer.

For centuries, humanity has been searching for a method to compute legal texts. Yet despite the advent of electronic discovery in the 1970s, the realization of electronic analysis of legal texts — the cornerstone of Computational Law — remained elusive.

Lexon emerges from the ideals of Legalism and uses symbolic AI to finally make computers 'understand' the intricacies of laws and agreements — and of human speech. Lexon fulfills a vision of language processing, first articulated at the dawn of computer sciences, with an exact internal model of language, which is missing with machine learning.

Blockchain smart contracts written in Lexon are true *digital contracts*. They are readable and unbreakable. While lawmakers will need time to understand their new options, Lexon immediately shines as the language for private law. Its application is broad (see Use-cases, pg. 3) and its immediate potential for additional features, building on the basic innovation, could not be more exciting (Roadmap, pg. 3).

A Lexon digital contract

Thanks to trustless technology, Lexon empowers everyone to be their own lawmaker, judge, and law enforcement. In typical trustless fashion, Lexon supercharges the legislative with judicial and executive powers. The difference is that Lexon contracts — in contrast to usual smart contracts — are fully compatible with the legacy system because *anybody can read them*. Including judges.

In an era where smart contracts and blockchain technology are inexorably transforming the standard for commercial transactions, the need for *legally enforceable* smart contracts has become paramount. Through its readability, Lexon safeguards blockchain projects against frivolous — or just misguided — legal attacks and paves the way for the mainstream adoption of smart contracts in business by allowing backwards compatibility to the legal system.

And the synergy between Lexon and blockchain technology doesn't stop there. By rendering smart contracts readable to all stakeholders, Lexon completes the last remaining step needed for a truly trustless setup, mitigating the need to trust any intermediaries, even if they are programmers. Beyond gaining their trust, non-programmer domain experts can have direct input on the program code, greatly improving its quality and fidelity.

In the 1940s, Isaac Asimov coined the term *robotic laws* for his science-fiction universe. A century later, our planet is in urgent need of the real robotic laws, both to address the glaring structural inefficiencies in the existing legal systems, and to address emerging technologies. Lexon, a language that both machines and humans understand, unambiguously, is the answer.

Asimov's stories explore how easily his robot laws can become self-contradictory and exploitable by a rogue or errant machine. Today, the emerging technology of AI creates concern about unchecked power — Asimov's fantasy is no longer fiction. Lexon is uniquely positioned to rein in the opaque results of data crunching. Its classic, symbolic AI approach is the perfect complement to tame the 'shoggoth-like,' incomprehensible and burgeoning power of machine learning. It offers mankind a better path that keeps machine brains closer to human thought, to guarantee clear communication and, most importantly, fidelity to human intentions.

1 – A robot may not injure a human being or, through inaction, allow a human being to come to harm;

2 – A robot must obey the orders given it by human beings except where such orders would conflict with the First Law;

3 – A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

Asimov's Robotic Laws

HOW LEXON WORKS

Lexon is a plain-text programming language. This means that it reads like English and digital contracts written in Lexon can be understood by anyone, without requiring any prior knowledge of programming. With moderate effort — or guidance by commodity co-writing tools — everyone will be able to write them. But Lexon is also understood by machines. Its grammar expresses the intersection of what both humans and machines can parse.

Lexon works by doing less. It tackles the hardest problem first, the seeming intractability of language. Modern linguistics fail to provide a usable model on which to base automatic language *comprehension*. The hard limits of machine learning, basically a fixation on the past, have been seen on the world stage at this point. Lexon accepts this quandary and proposes a different technique,

putting language first and processing second. The result is much more economic, transparent, and precise.

The Lexon approach has long been suspected to be a feasible path to give machines a handle on natural language but had so far successfully been applied only to first-order logic, which typically does not suffice to express relevant programs. Lexon, like most programming languages and the language of law, is based on higher-order logic.

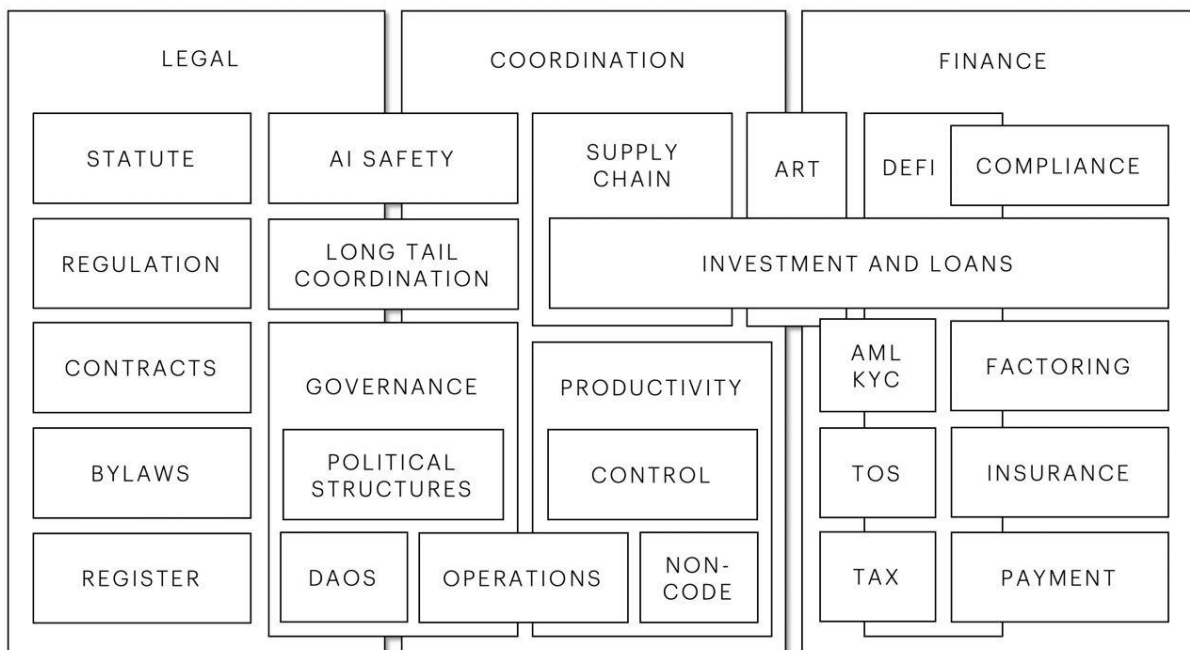
Lexon allows for the articulation of unambiguous texts and then the *deterministic* computation of logical results from them. This means, no hallucinations, no incompleteness, but the accuracy we know and expect from computers. Lexon’s grammar surfaces and utilizes the higher-order logic present in natural language. For artificial domains — like law, finance, programming, or entertainment — this helps complete a centuries-long quest for an unambiguous language of science. Lexon combines this talent with the hard facts that the confined horizons of blockchains provide, to help straighten out, and ultimately overcome our flawed legal systems.

Lexon developed in a blind spot caused by the focus on the meaning of *words* that emanated from analytical philosophy and informed — and probably hampered — the development of early, general artificial intelligence. Instead of trying to define words out of context, Lexon focuses entirely on the *context* and abandons the notion that meaning is vested in nouns.

The result is that in Lexon texts, nouns are largely interchangeable, and meaning is transported instead by the relationship between the nouns that the text describes. Demoting the inherent meaning of nouns in this way is not unusual — Lexon shares this feature with mathematical formulas and any programming language where variable names are interchangeable. It is in keeping with how in business contracts, nouns are promoted to proper names to increase clarity.

USE CASES

By virtue of its simplicity and bridge-building quality, Lexon will bring significant improvements to interrelated areas of social and commercial life. The fusion of IT, law and finance enables a plethora of new opportunities as well as productivity leaps in established industries.



Lexon Fields of Application

ROADMAP AND FUTURE DEVELOPMENTS

Lexon continues to evolve while its core invention is applied to new fields. These are the planned upgrades up for Lexon on its path towards version 1.0:

Lexon 0.4	DAOs and operating agreements
Lexon 0.5	Beginner mode, interactive prompt
Lexon 0.6	AI interface for code creation and completion
Lexon 0.7	Graphics and gaming extensions
Lexon 0.8	Modularity, code re-use, and dynamic jurisdictions
Lexon 0.9	Robotic extensions for dialog, space, and movement
Lexon 0.10	User interface generation
Lexon 0.11	Additional human input languages
Lexon 0.12	Extensibility to other domains

CONCLUSION

Lexon's unique contribution is a computer language that achieves perfect readability and acts as a bridge between law and coding, humans and machines. To this end, Lexon unites developments in computational law, cryptography, computer sciences, AI and linguistics to achieve long-sought milestones in each field: digital contract analysis, legally enforceable smart contracts, self-documenting code, deterministic language processing, and an executable human language. The resulting accessibility, agency and accuracy open new ways even to think about some of the more intractable-looking challenges of our times and solve them.

Beyond digital contracts, Lexon has the potential to be utilized for writing law and regulations. An official proposal for U.C.C. model law has already been presented to the reform committee appointed by the American Law Institute.¹ In the future, Lexon will be the language used to articulate the statute governing autonomous machines, ensuring reliable and unambiguous limitations. These laws will be plain-text code, written by elected lawmakers, approved through the democratic process.

Lexon stands to eliminate the high barriers to access to justice and to de-weaponize law, leveling the playing field for all. It strengthens creativity and merit against the power of incumbents. Its cost-effectiveness, speed, and precision make a qualitative difference that will over time transform how business, law, and politics operate.

The Lexon compiler lies at the heart of this technology, compiling English into blockchain smart contracts for the æternity blockchain. After trial uses, the compiler will run on LÆX tokens. The token is priced on a bonding curve so that its issuing price increases the more tokens circulate.

For more information visit, www.lexon.org.

4.5.4

¹ Asst. prof. Carla L. Reyes, 2021, *Creating Cryptolaw for the Uniform Commercial Code*
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3809901