**1. Smart Contracts and Blockchain Technology**

**a. Introduction to Smart Contracts and Blockchain Technology**

A blockchain is a decentralised digital ledger that securely records transactions across a network of computers. Instead of storing data in a central location, it organises information and transactions into "blocks," which are linked together in a chronological "chain." Smart contracts build on this technology by utilising the blockchain to execute agreements or transactions instantly and securely when certain conditions or instructions are met, adding a new layer of functionality and efficiency. For example, if a smart contract could be set up so that as soon as you purchased concert tickets online, the tickets were automatically transferred to your digital wallet.

**b. Australian Legal Framework and Regulation**

In Australia, smart contracts are regulated under the *Electronic Transactions Act 1999* (Cth) (**ETA**). The ETA ensures electronic contracts are treated similarly to traditional paper-based contracts. For a smart contract to be legally valid in Australia, it must meet the conventional criteria of a contract, such as intention, offer and acceptance, consideration and certainty.

**c. Advantages and Disadvantages of Smart Contracts**

Smart contracts offer the potential to streamline transactions by eliminating intermediaries, however their reliance on computer code makes them susceptible to flaws.

**Advantages**

* *Removal of Intermediary*: traditional transactions often require a third party such as a lawyer, broker or financial institution to facilitate and validate a contract. This adds time, cost and the potential for human error. Smart contracts by contrast, allow parties to interact directly, streamlining the process and reducing reliance on third parties. Yet, this also means there is no third party to catch mistakes, leaving participants to navigate potential complexities alone - a shift that could be either empowering or risky.
* *Autonomous:* smart contracts operate independently, executing terms without the need for human intervention. Once conditions are met, the contract will be automatically fulfilled, reducing the risk of delays or manual errors. However, this autonomy also means flexibility is limited – if adverse circumstances arise, the ability to modify or halt a contract may be constrained.
* *Transparency:* the blockchain makes it possible for anyone, not just those involved in the smart contract, to see and follow all progress of a contract, providing a unique level of transparency. Given the contract's execution is stored on the blockchain, there is a verifiable and permanent record of every action which is taken.

**Disadvantages**

* *Potential for errors in code:* unlike traditional contracts which can be revised and renegotiated if mistakes are found, smart contracts are often unchangeable once deployed. A small bug or oversight may lead to unintended actions.
* *Security and privacy concerns:* smart contracts, if not properly coded, can be exploited by hackers leading to stolen funds or unauthorised transactions. Additionally, as blockchains are publicly accessible, sensitive information could be exposed if not adequately protected. While the transparent nature of smart contracts can increase trust, it can also compromise privacy, with all transactions and contract details potentially visible to anyone on the network.
* *Complexity in design:* designing a blockchain agreement currently requires a deep understanding of the technical aspects of blockchain programming. The process of translating legal language into code is complex and could result in misinterpretations or gaps in the contracts logic.

**d. Smart Contracts: Case Study**

In 2016, the DAO (**Decentralized Autonomous Organization**) was one of the most famous and earliest applications of smart contracts on the Ethereum blockchain. The DAO, through smart contracts, allowed participants to invest in projects without the need of intermediaries. However, a vulnerability in computer code was exploited, allowing bad actors to steal approximately $70 million USD of Ethereum. This event highlighted the potential risks associated with errors in smart contract code. Read more here: [Bitstamp: Ethereum Dao Hack](https://www.bitstamp.net/learn/crypto-101/ethereum-dao-hack/)