1. Which features distinguish databases from Blockchain ledgers? Provide a comparative analysis of the two.

Database:
Generally a database is a data structure which is used for storing information. It is a organised collection or storage of data which is able to store a new data or access a existing data. The data stored in a database can be organized using a database management system. The database administrator can modify the data stored in the database. A database is implemented using the client-server network architecture.

Blockchain:
A blockchain is a growing list of records, called blocks, that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Here, modification of data is not permissible by design. It allows decentralized control and eliminates the risks of modification of data by other parties with sufficient access to the system.
Key differences between Blockchain and a Database are:

Database	Blockchain
• Database uses centralized storage of data. • Database needs a Database admin or Database administrator to manage the stored data. • Modifying data requires permission from database admin. • Centralized databases keep information	• Blockchain uses decentralized storage of data. • There is no administrator in Blockchain. • Modifying data does not require permission. Users have a copy of data and by modifying the copies does not affect the master copy

that is up-to-date at a particular moment • Centralized databases are used as databases for a really long time and have a good performance record, but are slow for ertain functionalities.	of the data as Blockchain is irresistible to modification of data. • Blockchain keeps the present information as well as the past information that has been stored before. • Blockchain is ideal for transaction platform but it slows down when used as databases, specially with large collection of data.

2. Analyse, using a diagram, how a distributed ledger works, present its main characteristics, and explain how it differs from a “traditional” centralized ledger.

Distributed ledger technology is a technology that makes it possible to store multiple copies of the same ledger as exact mirrors of each

other. This means that any action taken on one ledger is automatically replicated across all other ledgers, almost in real time.

What is a distributed ledger?

A ledger is simply a place where transactions are recorded. Ledgers are often associated with **financial transactions**. In principle, however, they can be used for any purpose. For example, ledgers are increasingly being used to keep track of environmentally sensitive goods. If all legitimately sourced goods are recorded on a ledger, then illegal goods can be easily identified.

Ledgers have been used since ancient times. When computers were first invented, organizations simply moved their paper-based ledger system to a digital format. Distributed ledgers are a big step forward from this. They have all the functionality of traditional ledgers, plus the ability to synchronise transactions automatically across ledgers held in different locations.

Distributed ledger vs centralised ledger

Distributed ledgers operate independently of a central authority. This makes them faster and more flexible than traditional centralised ledgers. The fact that transactions are automatically mirrored across all ledgers means that information is shared with minimum delay.

What's more, each distributed ledger goes through its own verification process for each transaction. This means that if a transaction is entered in error, there is a very high chance of that error being caught quickly.

Even if the error is missed by the automated verification process, the fact that multiple human eyes will look at it acts as an effective secondary check.

With traditional centralised ledgers, by contrast, a central authority controls transaction entry. Transactions may be (and often are) copied into other ledgers, sometimes very quickly. They are not, however, subject to any additional verification.

In short, therefore, distributed ledgers undertake security checks on a per-ledger basis whereas centralised ledgers only undertake one

round of security checks. This means that distributed ledgers are much more resource-intensive, but also much more secure.

Distributed ledger technology vs blockchain

Distributed ledger technology uses the technology that underpins **blockchain**. It is the technology that underpins the cryptocurrency, bitcoin. Digital ledger technology can, however, be used in many other contexts – blockchain is now being increasingly used separately from bitcoin.

What makes blockchain special is that transactions are packaged into blocks that are chained together. As the number of transactions increases, so does the number of blocks, and hence the length of the chain.

This approach gives blockchain a very high level of security. Unfortunately, it also makes it particularly resource-intensive. This means it is relatively slow compared to other forms of distributed ledger technology.

Unless the speed of blockchain can be substantially improved, its commercial uses will likely be limited to situations where security is the primary consideration.

Distributed ledger technology and security

The same security considerations apply to distributed ledger technology as apply to regular ledgers. In particular, sensitive data needs to be kept encrypted at all times and across all ledgers.

The fact that a distributed ledger automatically mirrors transactions across the other distributed ledgers means the backup process is very robust. This is crucial to protecting against threats such as ransomware, which are becoming increasingly prevalent.

Distributed ledger technology and data privacy

It can be a challenge to run distributed ledger technology in a way that ensures data privacy. The challenge is that maintaining data privacy requires all data to have an owner. This is a standard requirement for compliance programs across the world.

A data owner is not, technically, the same as a central authority for a ledger. The central authority for a ledger, however, is often the obvious choice to be a data owner.

Blockchain raises additional challenges in that it continually adds data to transactions, but never deletes old data. At some point, the initial transactional data will become obsolete and, per data privacy standards, it will need to be deleted. Blockchain, however, will be unable to do so.

3. Suggest which type of blockchain should be used for the security of donations in a charity organization. What benefits does the blockchain technology introduce in such a scenario? Explain your answer using an example

Charitable organizations often encounter barriers to success due to a lack of transparency, accountability issues, and limits to the ways they can accept donations. Crypto-philanthropy (or the use of blockchain technology to facilitate charitable contributions) offers an alternative solution, with decentralized and direct transactions that may help these organizations receive donations and raise funds more efficiently.

Blockchain basics

The creation of blockchain systems brought up many benefits in a variety of industries, as they allow for increased transparency and data security. Although the concept existed long before the creation of Bitcoin, it was only recently that blockchain's potential started to be acknowledged on a broader scale.

Blockchain is a fundamental component of nearly all cryptocurrency economic networks. It was formerly devised by Satoshi Nakamoto as the digital ledger behind Bitcoin, but the technology has since been applied to a variety of other scenarios and has proven to be quite useful not only for digital currencies but for many other types of digital communication and data sharing.

The Bitcoin blockchain operates as a distributed ledger technology (DLT), which is protected by cryptography and maintained by a huge network of computers (nodes). Such a framework allows for peer-to-peer (P2P) borderless transactions within a trustless environment. Trustless means there is no need for users to trust each other because all participating nodes are required to follow a predefined set of rules (outlined by the Bitcoin protocol).

The Bitcoin ledger used for these transactions does not reside on any single data center or server. Instead, the blockchain is distributed and replicated across a myriad of computer nodes, spread around the world. This means that every time a transaction is confirmed or data is changed, each participant has to update its own version of the blockchain, in accordance with those events (they have to reach consensus in regards to every change).

As mentioned, blockchain is often used as a distributed ledger, and the advantages provided by this unique technology are serving several philanthropy organizations and charity foundations. The Binance Blockchain Charity Foundation (BCF) is one notable example.

Cryptocurrency donations

There is still a long way to go until cryptocurrencies get globally adopted, and this route is particularly long when it comes to charity. Currently, there is a small but growing number of charitable organizations that have already embraced cryptocurrency as a donation method.

Donors that intend to use cryptocurrency to make their contributions may have to either confine their efforts to the few organizations that support them or donate large enough amounts as an attempt to persuade their favorite charities into accepting crypto payments.

Before a charity starts receiving cryptocurrency donations, it needs to have a process in place for managing and distributing the funds in a transparent and efficient way. Understanding the basics of cryptocurrencies and blockchain technology - and how the donations can be converted into fiat currency - is crucial for an effective implementation strategy.

Potential benefits of crypto-philanthropy

Crypto-philanthropy promises some notable advantages for charitable organizations and donors, which include:

- Total transparency: each cryptocurrency transaction is unique, which means that it is also easily tracked through the blockchain. The higher level of transparency and public accountability can ease donors' minds and encourage them to give while also reinforcing the charity's reputation for integrity.
- Global and decentralized: most blockchain networks present high levels of decentralization, meaning that they do not need to rely on a centralized government or other institutions. Thus, funds can move directly from donors to charities, and the decentralized nature of blockchain makes it uniquely suitable for international transactions.
- Digital agreements: blockchain makes it easier to share and store digital data, and may also be used to ensure that important documents or contracts cannot be modified without the approval of all involved members.
- Reduced expenses: blockchain technology has the potential to simplify the way charities are managed, automating parts of the process and reducing the overall costs by requiring fewer intermediaries.

- Reduced taxes: considering a US-based donor as an example, if a contribution is made with Bitcoin, the charity will get the full donated value (no capital gain taxes). Moreover, the donor would be able to claim a higher tax deduction towards governmental agencies.