

BIP-39 SEED PHRASE

The Principles of Cryptographic Backup and Wallet Recovery

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1. Introduction

With the growth of blockchain technology and cryptocurrencies, the need for standardized methods of generating and backing up wallets has become critical. One widely adopted standard is BIP-39, which enables users to create and restore private keys using human-readable mnemonic phrases, known as seed phrases.

2. What is BIP-39?

BIP-39 (Bitcoin Improvement Proposal 39) is a proposal that outlines a method for generating mnemonic phrases from random data. These phrases are used to derive private keys, allowing for secure access to cryptocurrency wallets. BIP-39 is widely supported by many popular hardware and software wallets.

3. The Seed Phrase: Definition and Purpose

A **seed phrase** (or mnemonic phrase) is a sequence of 12, 15, 18, 21, or 24 words that represents a wallet's master key. It serves as a secure backup, enabling users to recover their entire wallet and all associated funds on any compatible wallet software or device.

4. How a Seed Phrase is Generated

Seed phrases are generated using a combination of entropy (random data), a defined wordlist (usually in English), and a checksum for validation. The process includes:

- Creating a random binary number (entropy),

- Adding a checksum,
- Splitting the result into chunks,
- Mapping each chunk to a word from the BIP-39 wordlist.

This results in a user-friendly list of words that encodes the original entropy securely.

5. Using a Seed Phrase to Recover a Wallet

To recover a wallet, a user simply re-enters the exact seed phrase into any wallet software that supports BIP-39. This process regenerates the same private keys, restoring full access to the user's funds and transaction history, regardless of the device used.

6. Security and Storage Best Practices

Because a seed phrase provides access to all associated cryptocurrency, its security is crucial. Best practices include:

- **Never storing it digitally** (e.g., on your phone or cloud),
- **Writing it down on paper** and keeping it in a secure place,
- **Using fireproof, waterproof seed storage solutions,**
- **Never sharing it** with anyone.

If someone gains access to your seed phrase, they can take full control of your assets.

7. Conclusion

BIP-39 is a foundational standard in the cryptocurrency ecosystem, offering a simple yet powerful way to back up and recover wallets.

Understanding how seed phrases work and how to protect them is essential for any crypto user who values security and self-custody.

8. Glossary of Terms

- **BIP (Bitcoin Improvement Proposal):** A formal proposal to improve Bitcoin functionality.
 - **Seed Phrase:** A sequence of words encoding the master key to a wallet.
 - **Entropy:** Randomness used to generate cryptographic keys.
 - **Mnemonic:** Memory aid; in this case, words easier to remember than raw numbers.
 - **Private Key:** A secret number that allows spending cryptocurrency.
 - **Checksum:** Error-detecting code used to verify data integrity.
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9. References

1. BIP-39 Specification:
<https://github.com/bitcoin/bips/blob/master/bip-0039.mediawiki>
2. Ledger Academy: What is a Recovery Phrase?
3. Trezor Docs: BIP-39 & Mnemonic Recovery
4. Andreas M. Antonopoulos – *Mastering Bitcoin* (O'Reilly Media)

Seed Phrase List

kidney similar forest game because device brave brother banner alert desert truck	kidney similar forest game because device brave brother banner alert desert truck	kidney similar forest game because device brave brother banner alert desert truck	kidney similar forest game because device brave brother banner alert desert truck
clutch echo increase era flash airport soul find tragic portion exhaust skin	clutch echo increase era flash airport soul find tragic portion exhaust skin	clutch echo increase era flash airport soul find tragic portion exhaust skin	clutch echo increase era flash airport soul find tragic portion exhaust skin
capital flush nest spoon appear slush rely when audit lobster other you	capital flush nest spoon appear slush rely when audit lobster other you	capital flush nest spoon appear slush rely when audit lobster other you	capital flush nest spoon appear slush rely when audit lobster other you
abandon nice scheme path check pencil token bus return reason bullet pull	abandon nice scheme path check pencil token bus return reason bullet pull	abandon nice scheme path check pencil token bus return reason bullet pull	abandon nice scheme path check pencil token bus return reason bullet pull
punch issue fan wreck useful jungle scan eagle snack walnut sphere plug	punch issue fan wreck useful jungle scan eagle snack walnut sphere plug	punch issue fan wreck useful jungle scan eagle snack walnut sphere plug	punch issue fan wreck useful jungle scan eagle snack walnut sphere plug
play flame manage pizza invest embrace elbow raccoon wall alpha mail laugh	play flame manage pizza invest embrace elbow raccoon wall alpha mail laugh	play flame manage pizza invest embrace elbow raccoon wall alpha mail laugh	play flame manage pizza invest embrace elbow raccoon wall alpha mail laugh
retreat old yard few trash awake involve frost lecture injury garden lemon	retreat old yard few trash awake involve frost lecture injury garden lemon	retreat old yard few trash awake involve frost lecture injury garden lemon	retreat old yard few trash awake involve frost lecture injury garden lemon
motion begin agent soccer twenty blush potato quiz require surge tired office	motion begin agent soccer twenty blush potato quiz require surge tired office	motion begin agent soccer twenty blush potato quiz require surge tired office	motion begin agent soccer twenty blush potato quiz require surge tired office
now kit lava genius people fee phone eager twelve movie core suggest	now kit lava genius people fee phone eager twelve movie core suggest	now kit lava genius people fee phone eager twelve movie core suggest	now kit lava genius people fee phone eager twelve movie core suggest
sketch eternal survey cost lunar fortune organ face emotion resist agree gown	sketch eternal survey cost lunar fortune organ face emotion resist agree gown	sketch eternal survey cost lunar fortune organ face emotion resist agree gown	sketch eternal survey cost lunar fortune organ face emotion resist agree gown
home glue fever canoe assist upset			

body atom rent pony solve drill			
phrase able fiber section imitate cruise pistol pause ice ordinary summer whip	phrase able fiber section imitate cruise pistol pause ice ordinary summer whip	phrase able fiber section imitate cruise pistol pause ice ordinary summer whip	phrase able fiber section imitate cruise pistol pause ice ordinary summer whip
cloth young seat tornado shallow six unlock cake tackle ostrich project near	cloth young seat tornado shallow six unlock cake tackle ostrich project near	cloth young seat tornado shallow six unlock cake tackle ostrich project near	cloth young seat tornado shallow six unlock cake tackle ostrich project near
they venture sell cool country proof casino broom weekend city noodle birth	they venture sell cool country proof casino broom weekend city noodle birth	they venture sell cool country proof casino broom weekend city noodle birth	they venture sell cool country proof casino broom weekend city noodle birth
mule vapor element brisk arm antenna version grow patch caught boost burger	mule vapor element brisk arm antenna version grow patch caught boost burger	mule vapor element brisk arm antenna version grow patch caught boost burger	mule vapor element brisk arm antenna version grow patch caught boost burger
rough lizard broccoli bean dizzy mass exit sweet unusual pond witness jar	rough lizard broccoli bean dizzy mass exit sweet unusual pond witness jar	rough lizard broccoli bean dizzy mass exit sweet unusual pond witness jar	rough lizard broccoli bean dizzy mass exit sweet unusual pond witness jar
material soup midnight shift evoke timber betray ship olympic base vacuum coast	material soup midnight shift evoke timber betray ship olympic base vacuum coast	material soup midnight shift evoke timber betray ship olympic base vacuum coast	material soup midnight shift evoke timber betray ship olympic base vacuum coast
traffic volcano forum mimic topple improve ride submit void circle verb youth	traffic volcano forum mimic topple improve ride submit void circle verb youth	traffic volcano forum mimic topple improve ride submit void circle verb youth	traffic volcano forum mimic topple improve ride submit void circle verb youth
coffee hamster box good photo share salmon enhance culture dose dune catalog	coffee hamster box good photo share salmon enhance culture dose dune catalog	coffee hamster box good photo share salmon enhance culture dose dune catalog	coffee hamster box good photo share salmon enhance culture dose dune catalog
better remember wide ancient front joy open creek elevator relief soap girl	better remember wide ancient front joy open creek elevator relief soap girl	better remember wide ancient front joy open creek elevator relief soap girl	better remember wide ancient front joy open creek elevator relief soap girl
swing air kitten course merry raw chief federal loop night various mix	swing air kitten course merry raw chief federal loop night various mix	swing air kitten course merry raw chief federal loop night various mix	swing air kitten course merry raw chief federal loop night various mix

diesel library board bamboo between razor become bounce title crucial service giraffe	diesel library board bamboo between razor become bounce title crucial service giraffe	diesel library board bamboo between razor become bounce title crucial service giraffe	diesel library board bamboo between razor become bounce title crucial service giraffe
roast master swamp magnet fork drama logic alley voice gauge trick mushroom	roast master swamp magnet fork drama logic alley voice gauge trick mushroom	roast master swamp magnet fork drama logic alley voice gauge trick mushroom	roast master swamp magnet fork drama logic alley voice gauge trick mushroom
carry town donate adapt solid day earn bread subway club chunk climb	carry town donate adapt solid day earn bread subway club chunk climb	carry town donate adapt solid day earn bread subway club chunk climb	carry town donate adapt solid day earn bread subway club chunk climb
crumble fire neither always force labor dial this victory oyster obey sugar	crumble fire neither always force labor dial this victory oyster obey sugar	crumble fire neither always force labor dial this victory oyster obey sugar	crumble fire neither always force labor dial this victory oyster obey sugar
three foster post close image memory village human wink toilet jump include	three foster post close image memory village human wink toilet jump include	three foster post close image memory village human wink toilet jump include	three foster post close image memory village human wink toilet jump include
crush siren picture addict jaguar police rookie salon dinosaur oxygen announce voyage	crush siren picture addict jaguar police rookie salon dinosaur oxygen announce voyage	crush siren picture addict jaguar police rookie salon dinosaur oxygen announce voyage	crush siren picture addict jaguar police rookie salon dinosaur oxygen announce voyage
task energy news smooth payment moon supply toy music critic margin any	task energy news smooth payment moon supply toy music critic margin any	task energy news smooth payment moon supply toy music critic margin any	task energy news smooth payment moon supply toy music critic margin any
enable cliff gasp ethics planet again wire annual visual guide position safe	enable cliff gasp ethics planet again wire annual visual guide position safe	enable cliff gasp ethics planet again wire annual visual guide position safe	enable cliff gasp ethics planet again wire annual visual guide position safe
response offer glass asthma forget actress way rather cheap party nothing upon	response offer glass asthma forget actress way rather cheap party nothing upon	response offer glass asthma forget actress way rather cheap party nothing upon	response offer glass asthma forget actress way rather cheap party nothing upon
arctic truth century right write income august apology rebel top exclude absorb	arctic truth century right write income august apology rebel top exclude absorb	arctic truth century right write income august apology rebel top exclude absorb	arctic truth century right write income august apology rebel top exclude absorb
tennis walk permit describe empty			

alone family frequent leaf dog dance tube			
target turkey clip dinner illegal control pigeon wheel hybrid winter snap click	target turkey clip dinner illegal control pigeon wheel hybrid winter snap click	target turkey clip dinner illegal control pigeon wheel hybrid winter snap click	target turkey clip dinner illegal control pigeon wheel hybrid winter snap click
cancel head enjoy hidden cereal debris dragon normal student shadow shoot enroll	cancel head enjoy hidden cereal debris dragon normal student shadow shoot enroll	cancel head enjoy hidden cereal debris dragon normal student shadow shoot enroll	cancel head enjoy hidden cereal debris dragon normal student shadow shoot enroll
term angry risk awful rubber ready squeeze copy genre noise turtle owner	term angry risk awful rubber ready squeeze copy genre noise turtle owner	term angry risk awful rubber ready squeeze copy genre noise turtle owner	term angry risk awful rubber ready squeeze copy genre noise turtle owner
comfort busy slight narrow alcohol setup later sample swallow match stomach film	comfort busy slight narrow alcohol setup later sample swallow match stomach film	comfort busy slight narrow alcohol setup later sample swallow match stomach film	comfort busy slight narrow alcohol setup later sample swallow match stomach film
property glove hollow accuse bomb word range belt learn process win bird	property glove hollow accuse bomb word range belt learn process win bird	property glove hollow accuse bomb word range belt learn process win bird	property glove hollow accuse bomb word range belt learn process win bird
knife select used junk slogan live adjust poet priority weasel express ivory	knife select used junk slogan live adjust poet priority weasel express ivory	knife select used junk slogan live adjust poet priority weasel express ivory	knife select used junk slogan live adjust poet priority weasel express ivory
helmet spread choose engine gospel outer inside cram liar balance domain large	helmet spread choose engine gospel outer inside cram liar balance domain large	helmet spread choose engine gospel outer inside cram liar balance domain large	helmet spread choose engine gospel outer inside cram liar balance domain large
sponsor orange tree object gadget height follow snow abuse morning recall useless	sponsor orange tree object gadget height follow snow abuse morning recall useless	sponsor orange tree object gadget height follow snow abuse morning recall useless	sponsor orange tree object gadget height follow snow abuse morning recall useless
confirm spring monkey mesh blanket solar hen tortoise museum index list client	confirm spring monkey mesh blanket solar hen tortoise museum index list client	confirm spring monkey mesh blanket solar hen tortoise museum index list client	confirm spring monkey mesh blanket solar hen tortoise museum index list client