# Versioning of GIS Database

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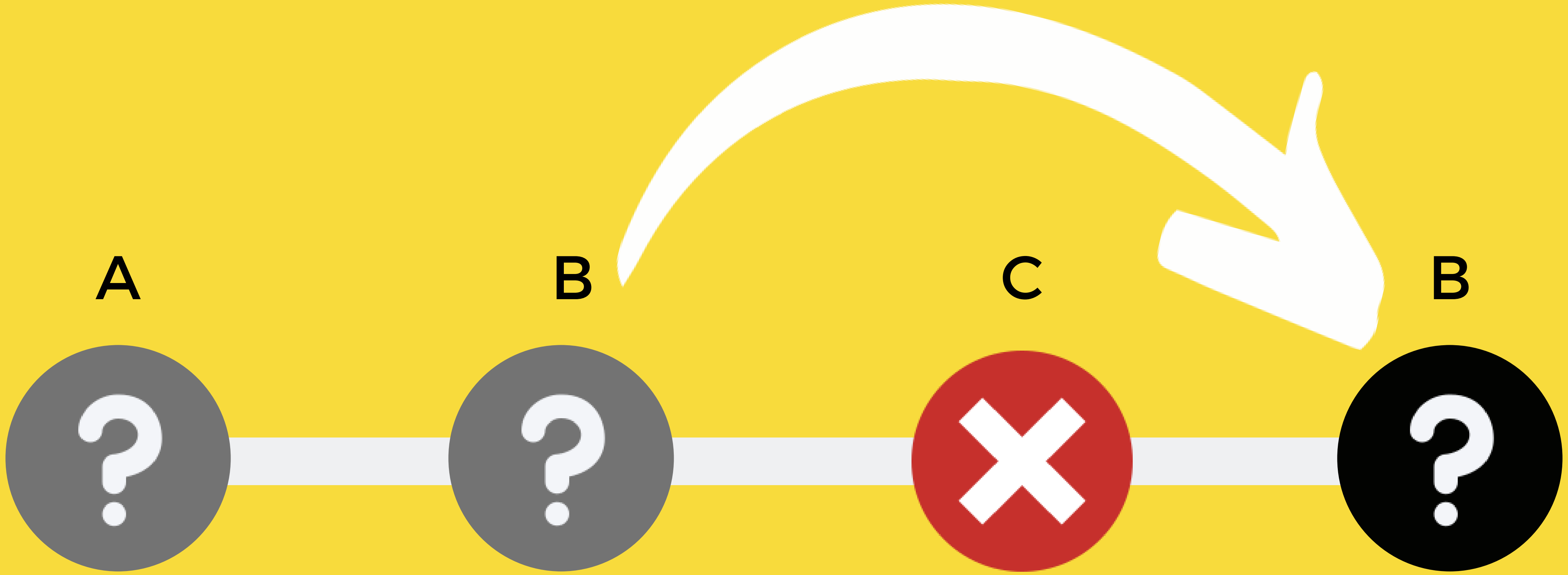
# Why are versions important?

Because **we don't just want** to know what we have **now**.

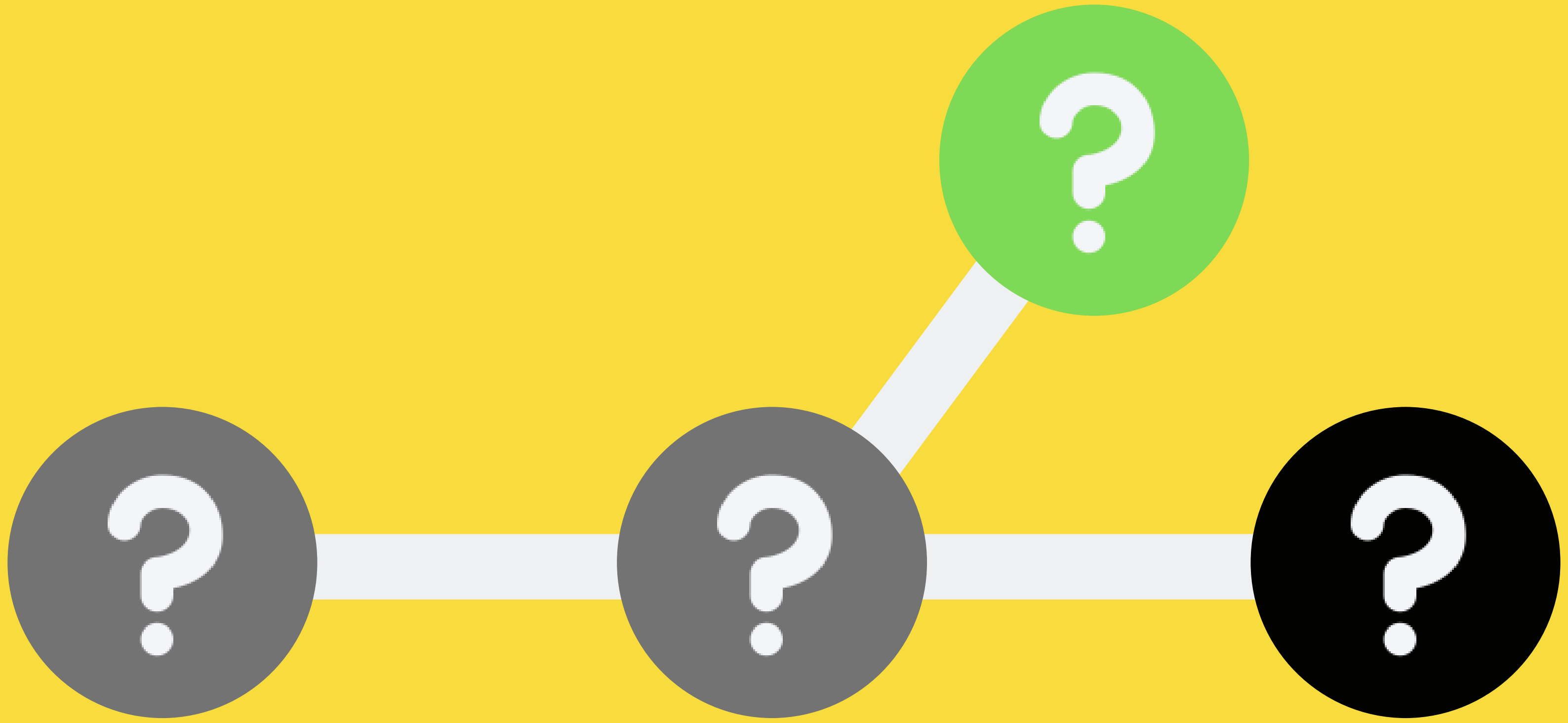
We also want to see the **history at any time**.

git log



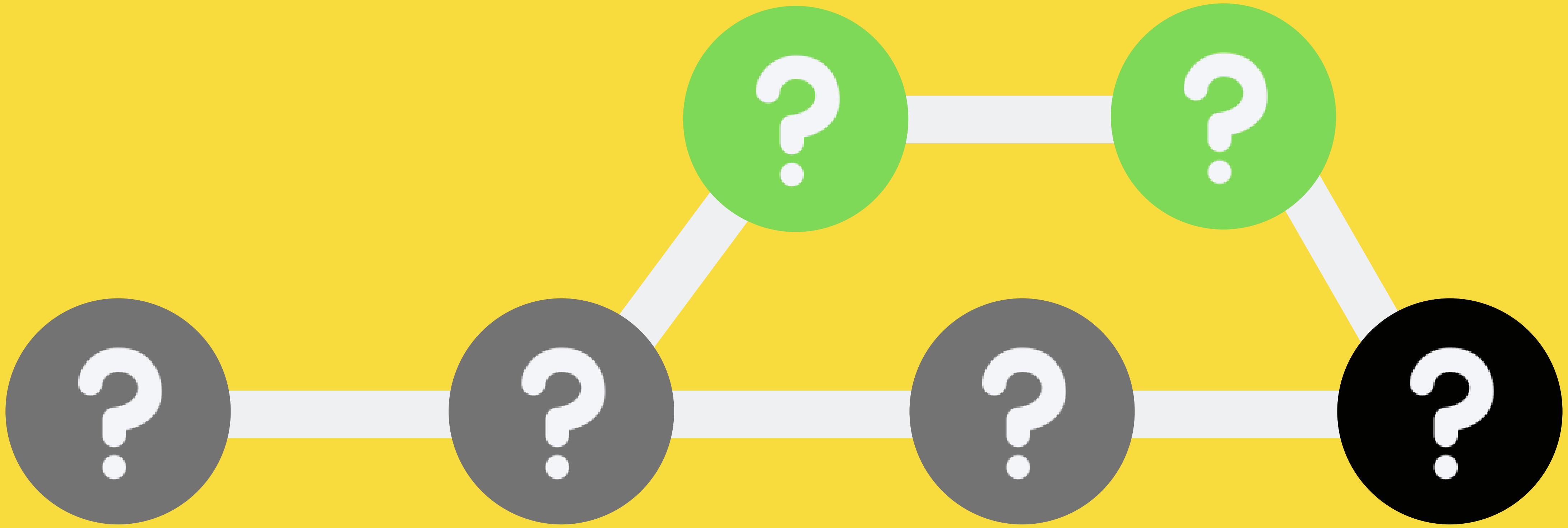
We would like **to revert** any changes.

git revert



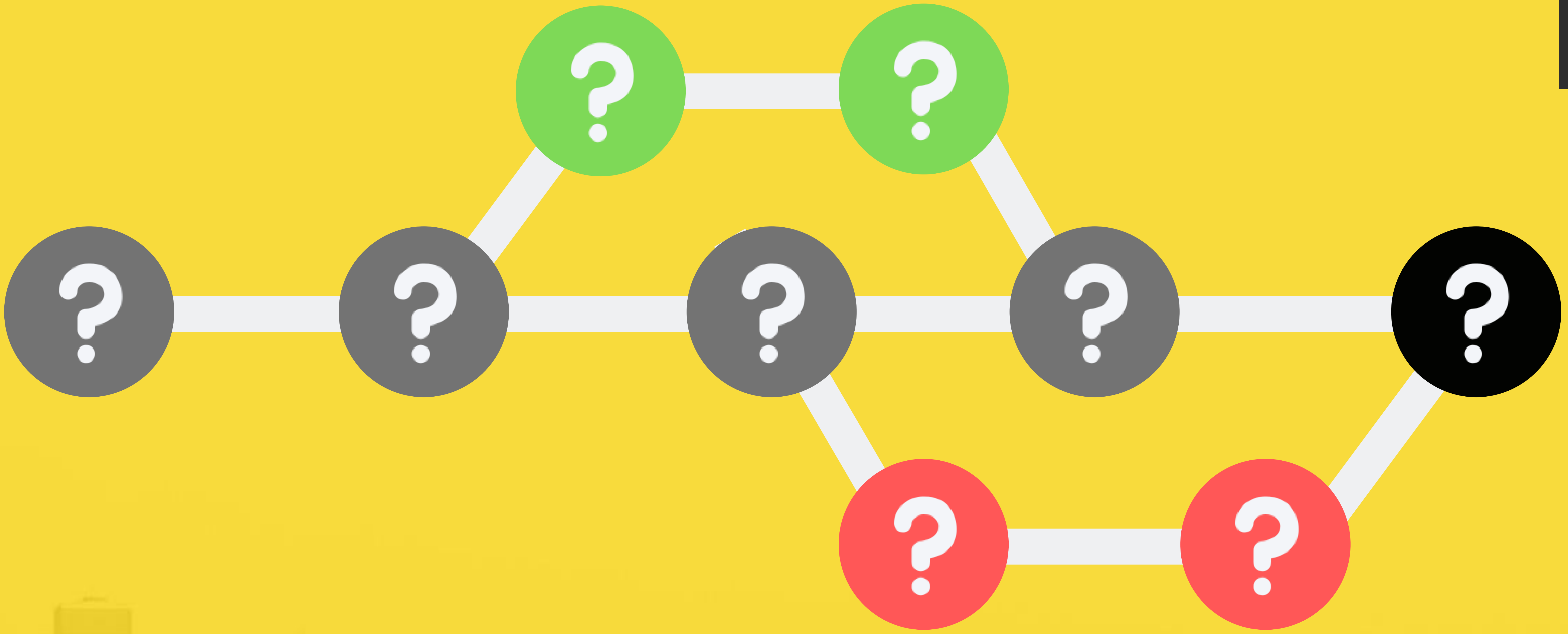
We would like to manage the **pending changes.**

git branch



Up to several **changes based on each other.**

git merge



Multiple editors make changes **simultaneously**.

# How?

# Solutions of our ancestors

# Date of creation and last modification

★☆☆☆☆

# Date of termination

★★☆☆☆

# Details of occurrence and termination in the associated table

★★★☆☆

# Distinguish between pending and live states

★★★★☆

# What's the problem with the solutions previously?

✖

# Not authentic.

Any history can be rewritten.

In order to invalidate the previous state, it must be **subsequently modified**.

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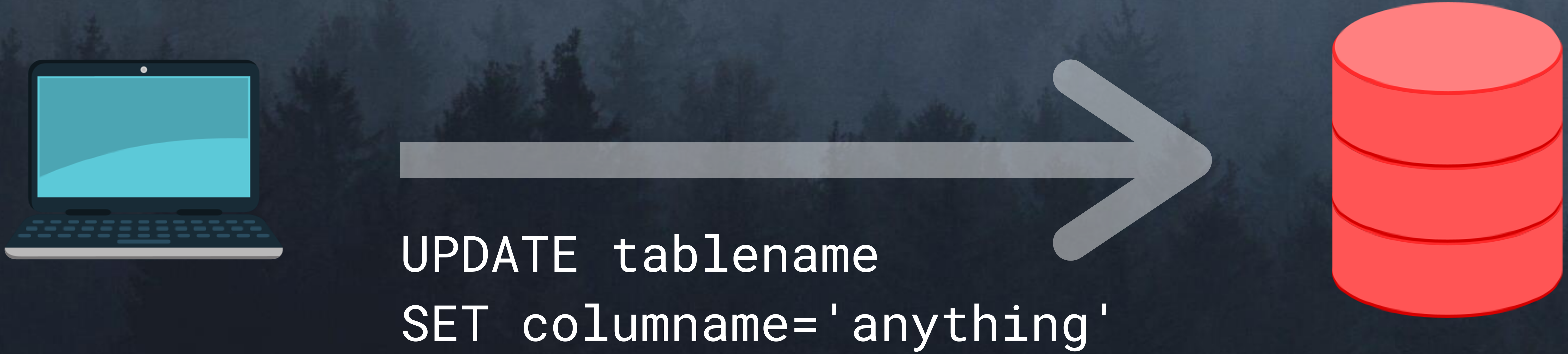
In case of subsequent modification **history rewriting** cannot be excluded.

✖

# Aggravating circumstances

✖

# Direct SQL access



```
UPDATE tablename
SET columnname='anything'
```

✖

# Unnecessarily many permissions with poor authentication

root

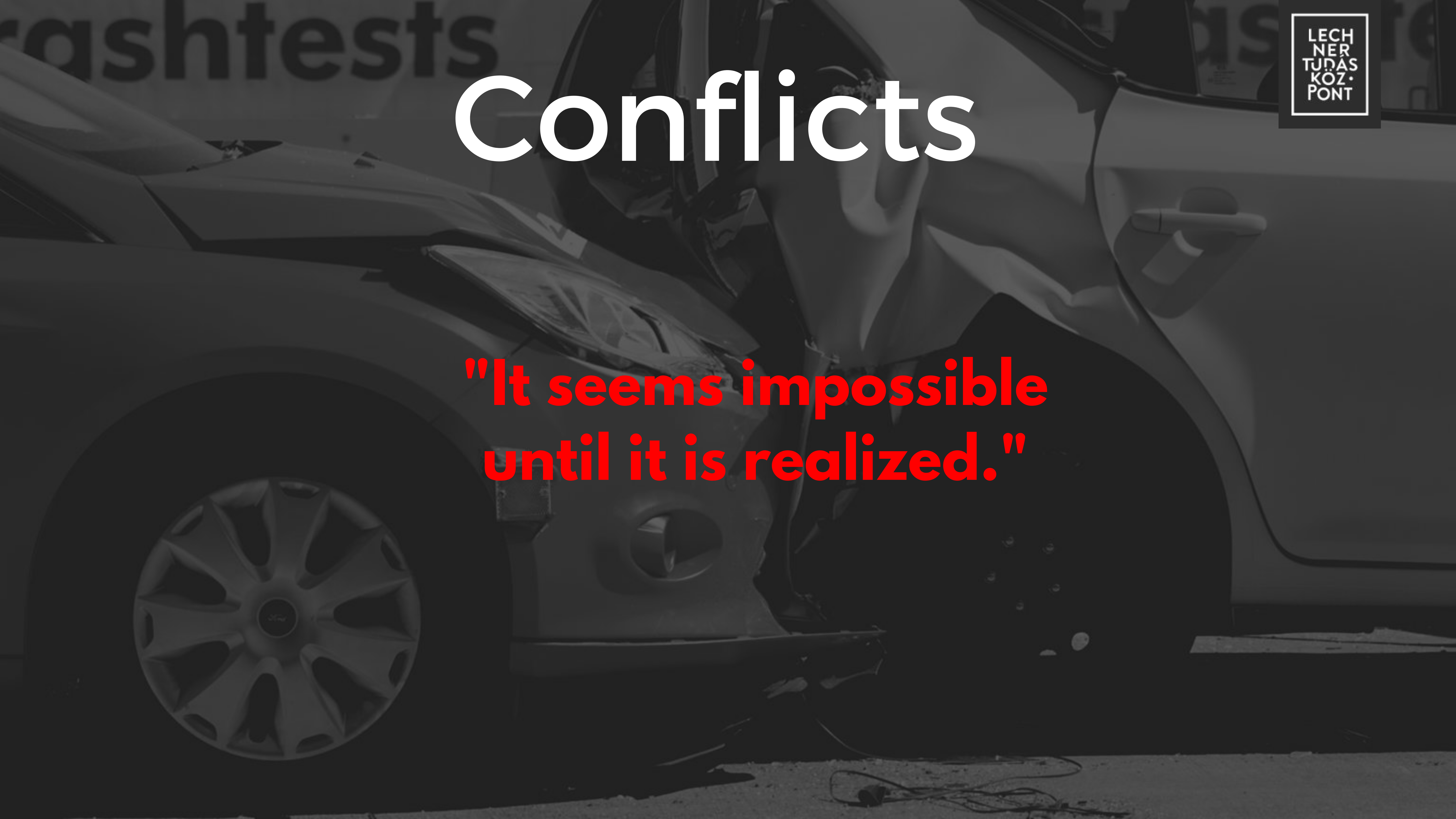
****

# What is the good solution?

✓

Store new versions without modifying the previous versions

# Certified signature and time stamping



# Conflicts

"It seems impossible until it is realized."

# What is the Git?

git

- Distributed version-control system
- tracking changes in source code
- during software development
- It is designed for coordinating work among programmers
- Its goals include speed, data integrity, and support for distributed, non-linear workflows
- Originally Linux development

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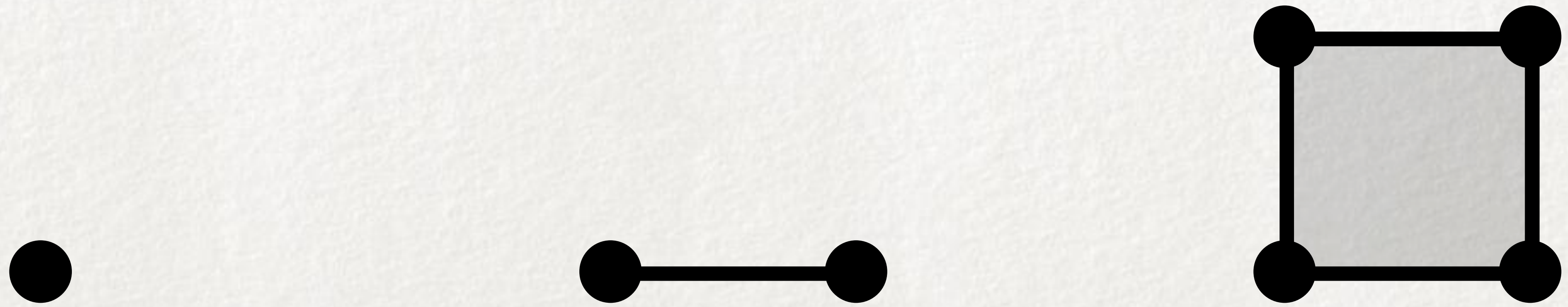
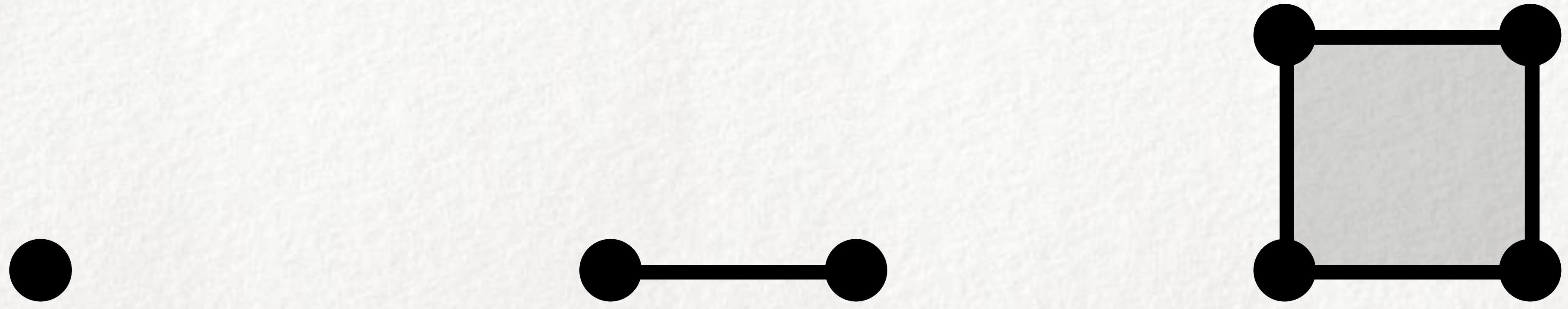
# What does this look like in a **GIS** database?



POINT LINE POLYGON



## POINT

[654321 234567]

## LINE

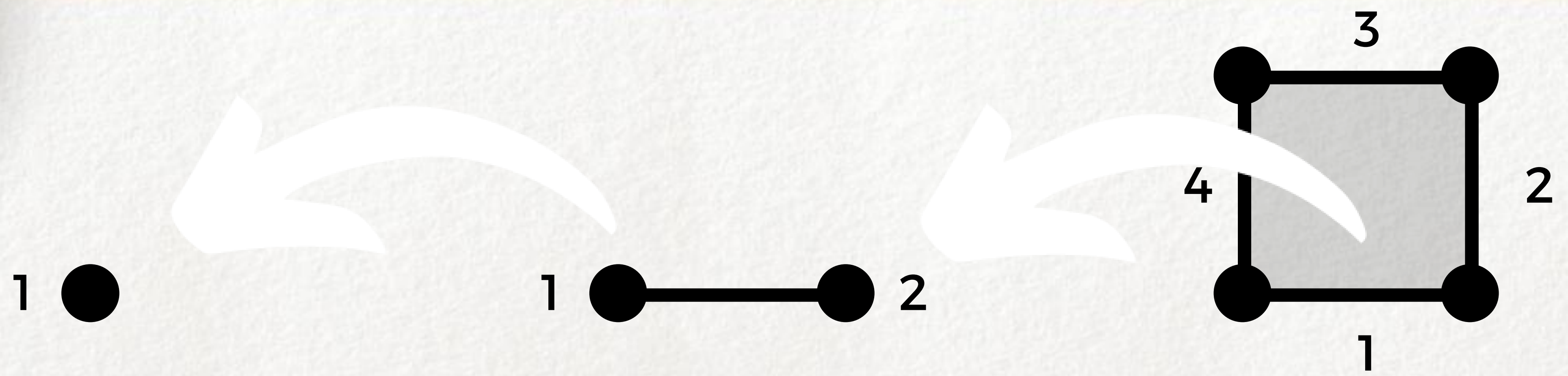
```
[
    [654321 234567],
    [654322 234567]
]
```

## POLYGON

```
[
  [
    [654321 234567],
    [654322 234567],
    [654322 234568],
    [654321 234568]
  ]
]
```

Stores coordinate pairs in each object

spaghetti data storage



## POINT

```
[654321 234567]
```

Only the point stores coordinates

## LINE

```
[
  1,
  2
]
```

Line stores point IDs

## POLIGON

```
[
  [
    1,
    2,
    3,
    4
  ]
]
```

Poligon stores line IDs

topological data storage

## Git
Version Manager

- de facto standard
- open source code
- free license
- free

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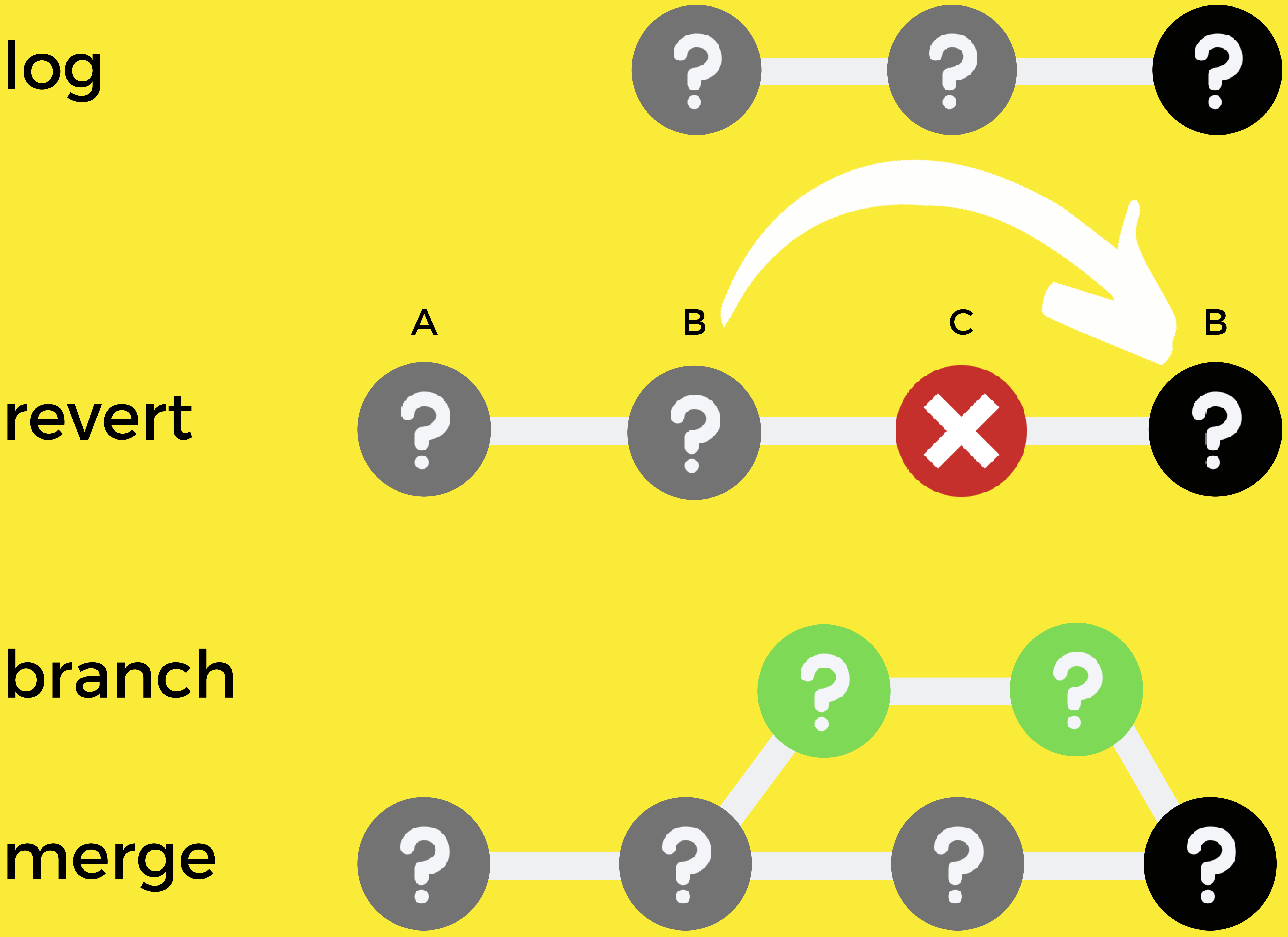
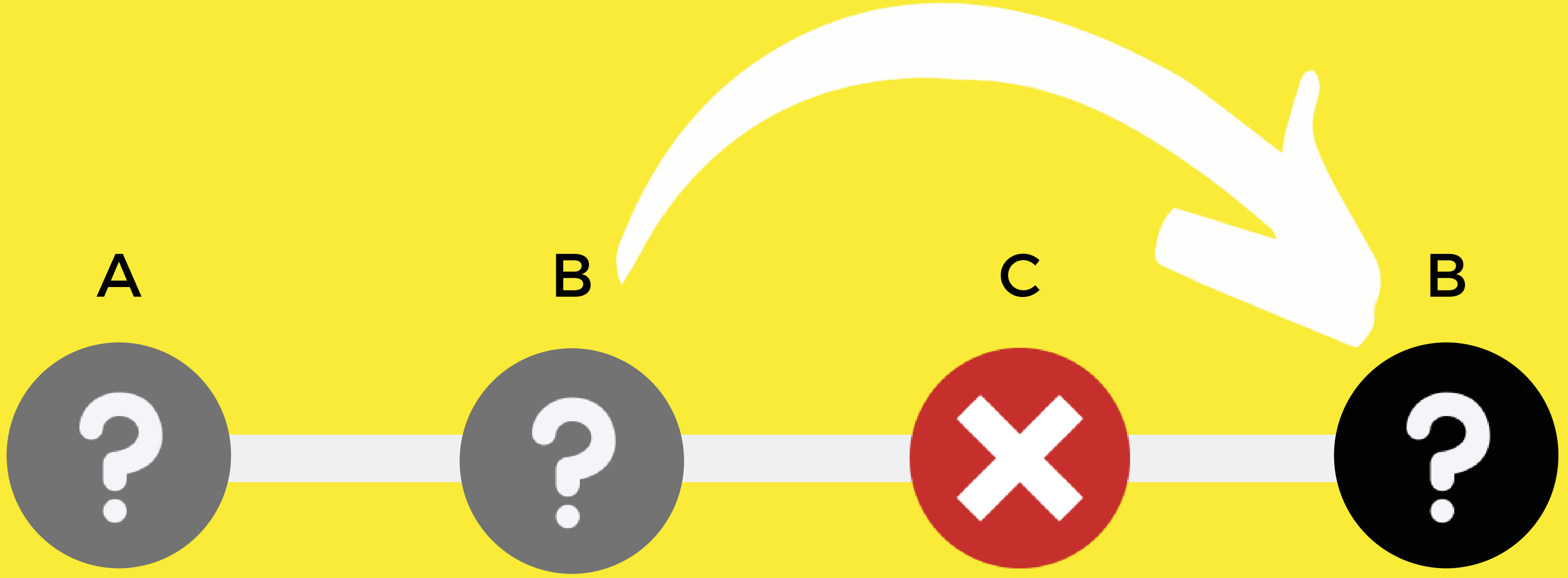


# OpenStreetMap

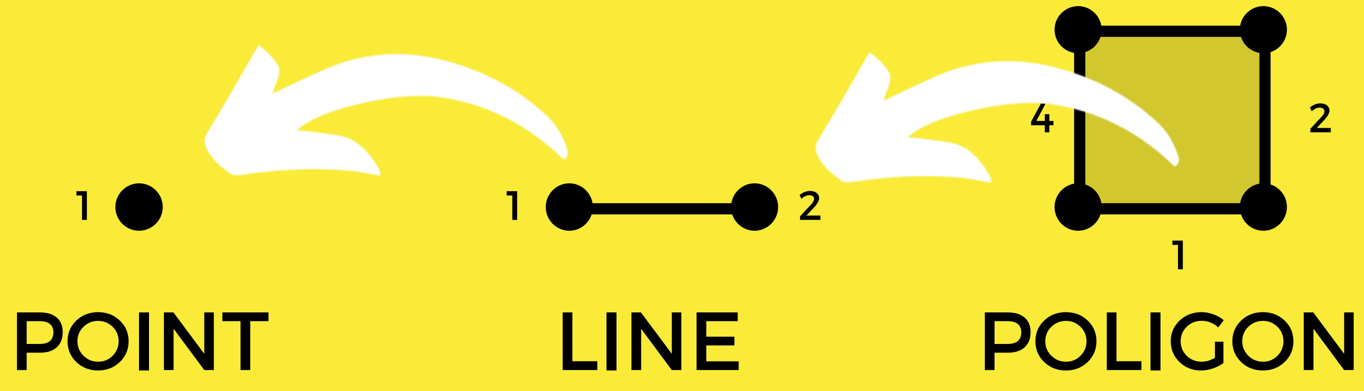
- de facto standard
- open source code
- free license
- free

history

revert



topology



# Summary

The availability and unchangeability of the previous versions depends only on careful **process planning**.

Good examples and free software implementations are available.

# Special thanks

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# Thank you for your attention!

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