Scripts

Advanced Scripts

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Objectives

Objective

Explain advanced script components

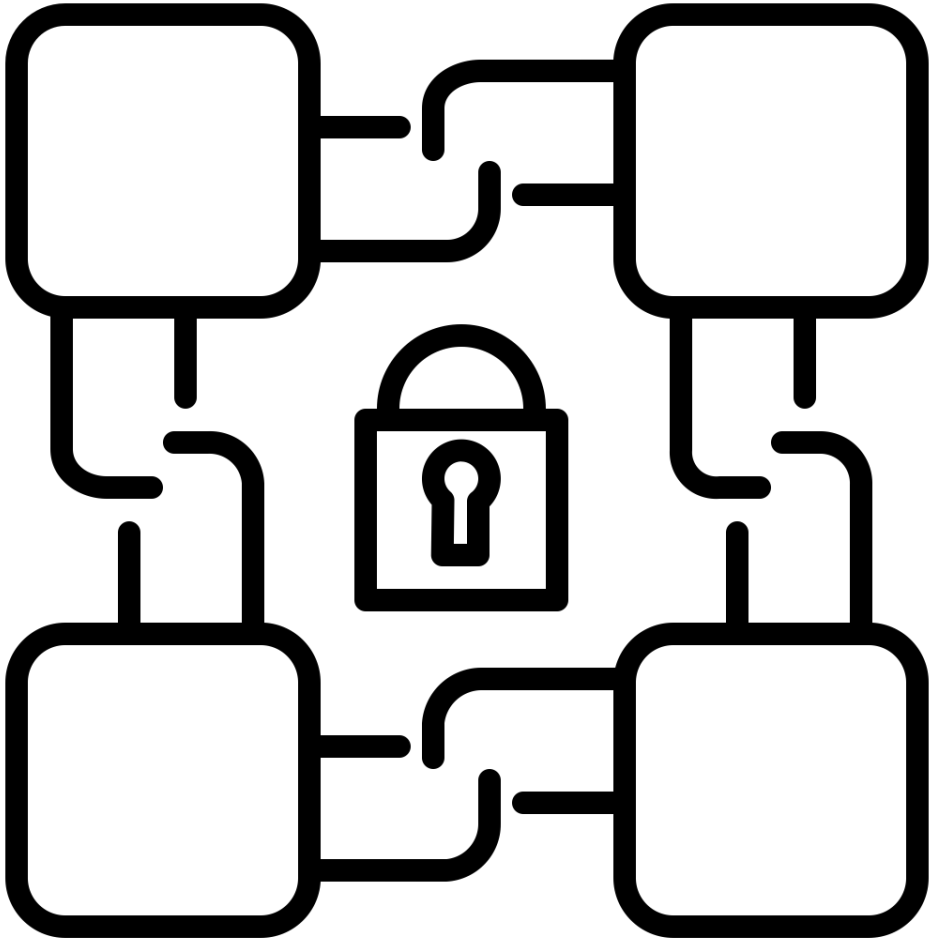
Objective

Interpret advanced scripts

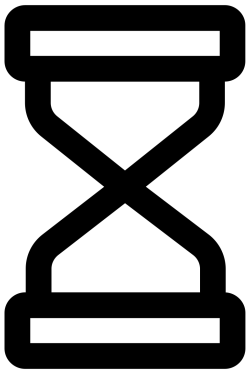
Objective

Create advanced scripts

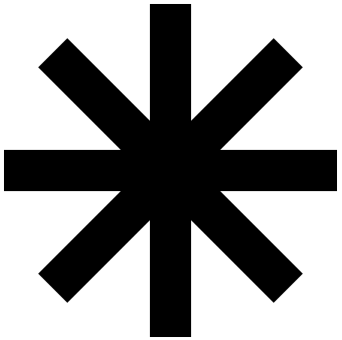
Introduction



Advanced Capabilities

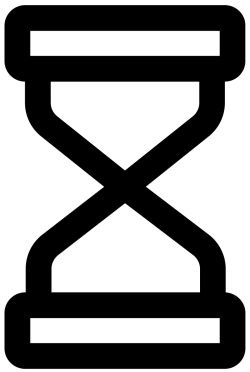


Time component



Conditional clauses

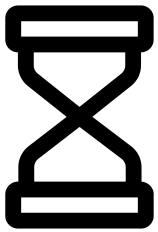
Advanced Capabilities



Time component

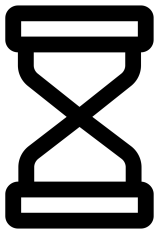
Time Locks

- nLockTime
- nSequence
- OP_CODES
  - CHECKLOCKTIMEVERIFY
  - CHECKSEQUENCEVERIFY



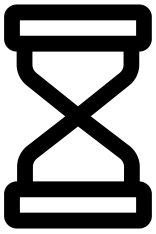
nLockTime

- Transaction-level setting (a field in the transaction data structure)
- Defines the earliest time that a transaction is valid and can be relayed on the network or added to the blockchain



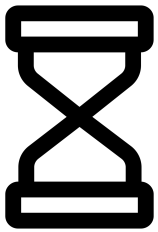
OP_CODE: Check Lock Time Verify (CLTV)

- Allows transaction outputs (rather than whole transactions) to be encumbered by a timelock
- When called, causes the script to fail unless the nLockTime on the transaction is equal to or greater than the time parameter provided to the CLTV opcode
- Ensures the CLTV-based timelock has expired before the transaction may be included in a valid block



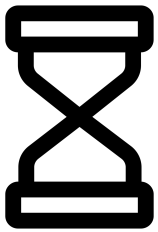
Relative Lock Time (nSequence)

- Result of BIP68/112/113
- Gave new meaning to nSequence creating a relative time lock
- Allows an input to specify the earliest time it can be added to a block based on how long ago the output being spent by that input was included in a block

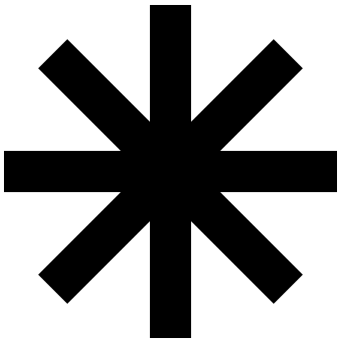


OP_CODE: Check Sequence Verify (CSV)

- Also part of the BIP68/112/113 soft fork
- Provides for relative locktime the same feature CLTV provides for absolute locktime
- Causes the script to fail unless the nSequence on the transaction indicates an equal or greater amount of relative locktime has passed than the parameter provided to the CSV opcode
- Ensures the CSV-based timelock has expired before the transaction may be included in a valid block



Advanced Capabilities



- Conditional clauses

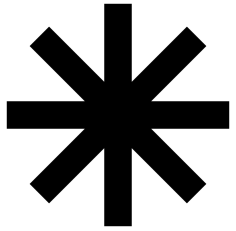
Conditional Clauses – 1/2

```
if (condition):

    code to run when condition is true
else:

    code to run when condition is false

code to run in either case
```



Conditional Clauses – 2/2

In Script, the condition precedes the IF Opcode:

```
condition
IF
    code to run when condition is true
ELSE
    code to run when condition is false
ENDIF
code to run in either case
```