Extendible Hashing

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Terminology

Words we'll be using

- Depth
  - Number of bits measured in a directory (global) or bucket (local)
  - Example:

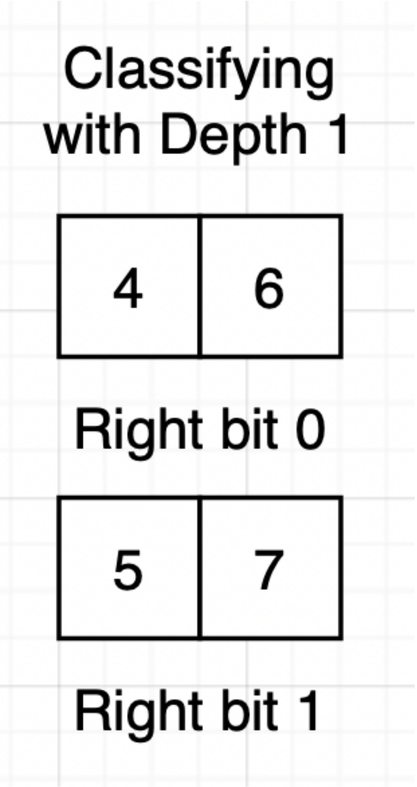
    4 base 10 = 100 base 2

    . = 101

    . = 110

    7 base 10 = 111

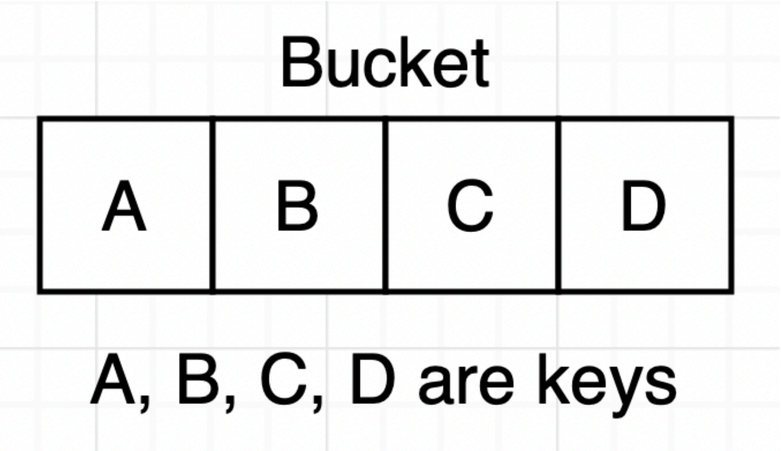
    Classifying with depth of 1, we read 1 bit from the right
    Same as doing k % (2 ^ n) for an 'n' depth structure



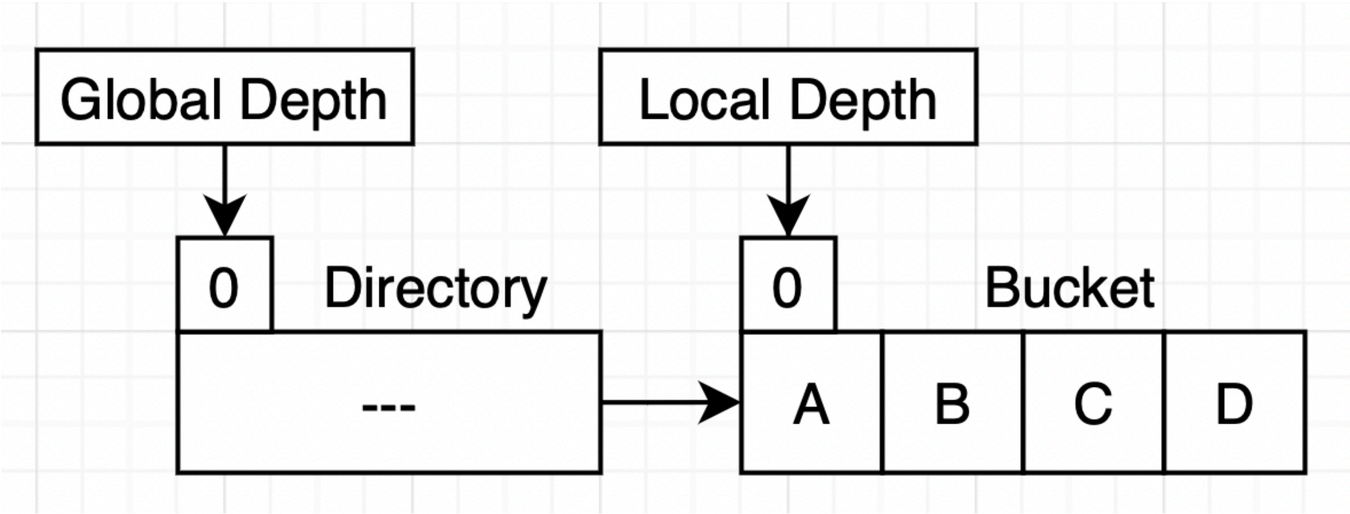
Terminology

Words we'll be using

- Bucket
  - Has it's own local depth
  - Stores keys in groups of 4



- Directory
  - Stores pointers to contact buckets
  - 2 ^ global depth is the number of entries



Terminology

Words we'll be using

- Bucket Splitting
  - When a bucket overflows, we create a new bucket
  - Called bucket splitting because elements in bucket can be split apart
  - Bucket splitting increases the local depth by 1

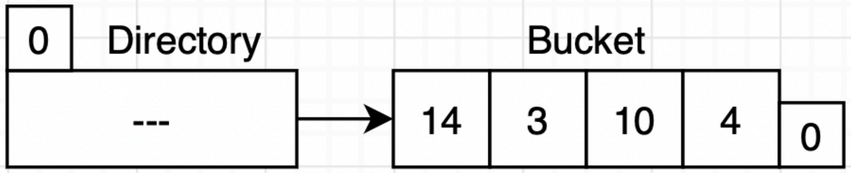
- Directory Expansion
  - When all bucket of a certain directory are filled and no new buckets can be made, the global depth increase by 1 and twice the amount of directories are now available
  - The exact condition is when:

Local Depth (Bucket) > Global Depth (Directory's)

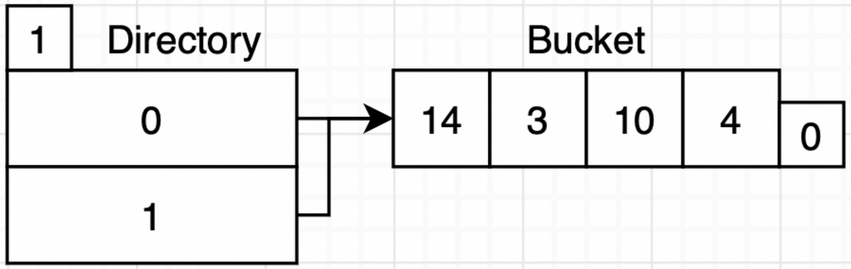
Example

- Let our keys be 14, 3, 10, 4, 5, 11, 17, 12, 7, 2

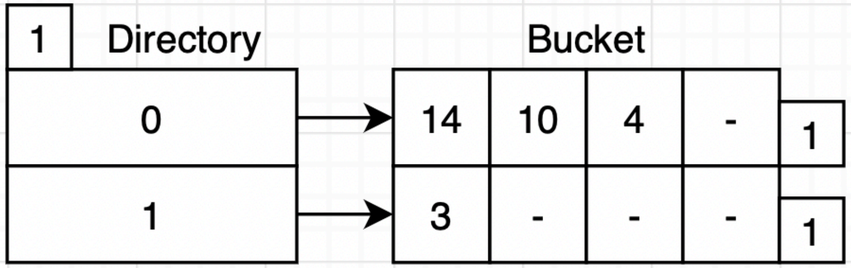
Inserting first 4 elements



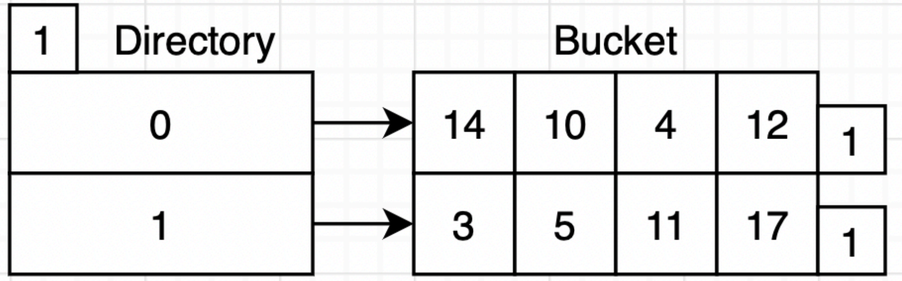
Bucket split cannot happen, so directory expansion does



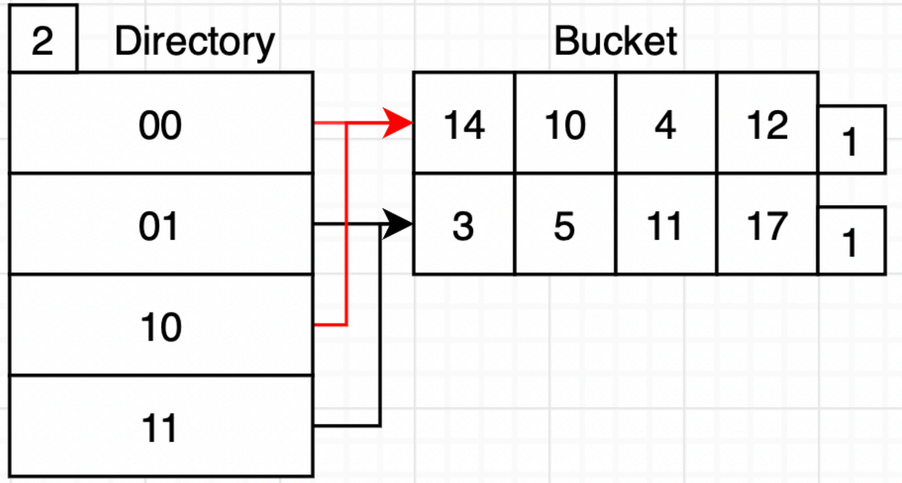
Now bucket split can happen



Next 4 elements are inserted

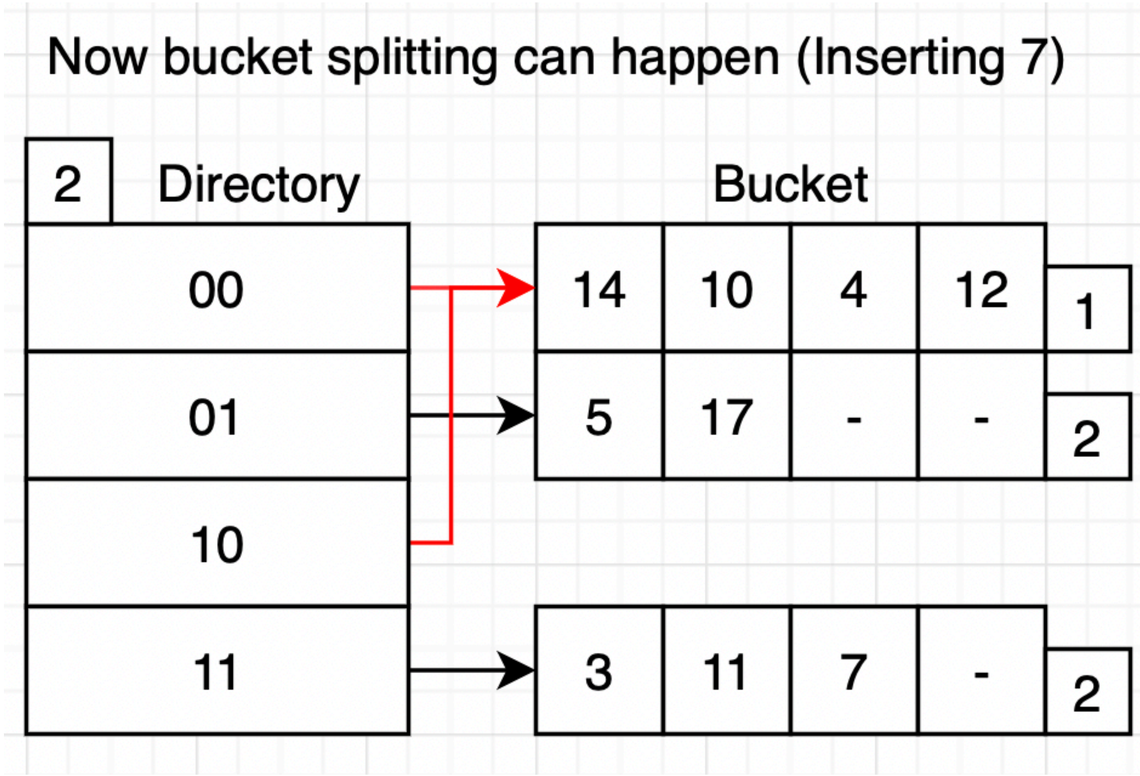


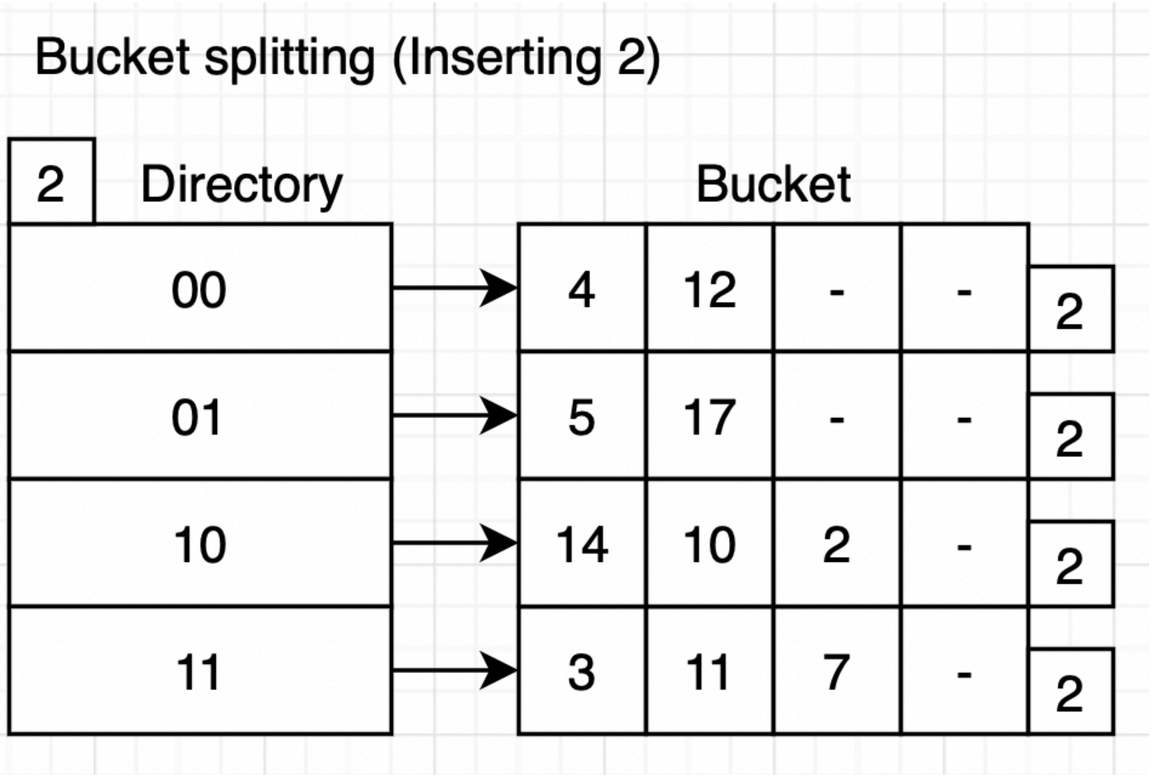
Directory expansion happens



Example

- 14, 3, 10, 4, 5, 11, 17, 12, 7, 2





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