

Hash Maps



Support Video



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By the end of this video you will be able to...

- Explain why modular arithmetic is useful for hash functions
- Compute the hash code of integers

Your array has 5 elements. How would you "hash"?

Key	Function	Hash Code
3	$3 \bmod 5$	3
11	$11 \bmod 5$	1

$K \bmod N$ is a common hash function

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Why?

Possible values of $K \bmod N$

" The remainder when we divide K by N "

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Integer between 0 and $N-1$

Possible values of $K \bmod N$

" The remainder when we divide K by N "



Integer between 0 and $N-1$

Perfect for storing in an array of size N !

Possible values of $K \bmod N$

" The remainder when we divide K by N "



Gives us algorithm for computing

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$$11 = 2 * 5 + 1$$

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Your array has 5 elements. How would you "hash"?

Key	Function	Hash Code
3	3 mod 5	3
11	11 mod 5	1


$$3 = 0 * 5 + 3$$

Your array has 5 elements. How would you "hash"?

Key	Function	Hash Code
3	3 mod 5	3
11	11 mod 5	1


$$3 = 0 * 5 + 3$$

Collisions?

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Key	Function	Hash Code
3	$3 \bmod 5$	3
13	$13 \bmod 5$	3

Many different integers have the same remainder mod 5!