

CS 240

Data Structures and Algorithms I

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Hashing

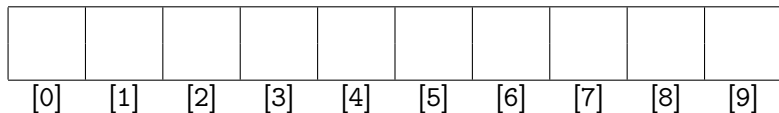
Idea: design a data structure in such a way that we know where any particular element **should** be stored

Example

Suppose we have the following data:

38 16 47 15 53 90 29

How we we store it in an array of length 10? What happens when we search for, say, 92?



Hashing

Idea: design a data structure in such a way that we know where any particular element **should** be stored

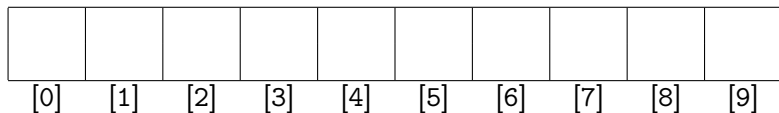
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Suppose we have the following data:

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How we we store it in an array of length 10? What happens when we search for, say, 92?

- **Hash** function: $\text{data}[\text{hash}(i)] = i$; let's try $\text{hash}(i) = i \% 10$



Hash Tables

- Take the idea of a hash function storing objects in an array...
- ... But use two distinct parameters

Before

```
data[hash(i)] = i;
```

After

```
data[hash(k)] = v;
```

Using Hash Tables

- http://www.csupomona.edu/~carich/programming_contests/201104/bar_code.java
- <http://docs.oracle.com/javase/7/docs/api/java/util/Hashtable.html>