

Vietnam Web Summit 2018


# Algorithms and Data Structures in Web Development

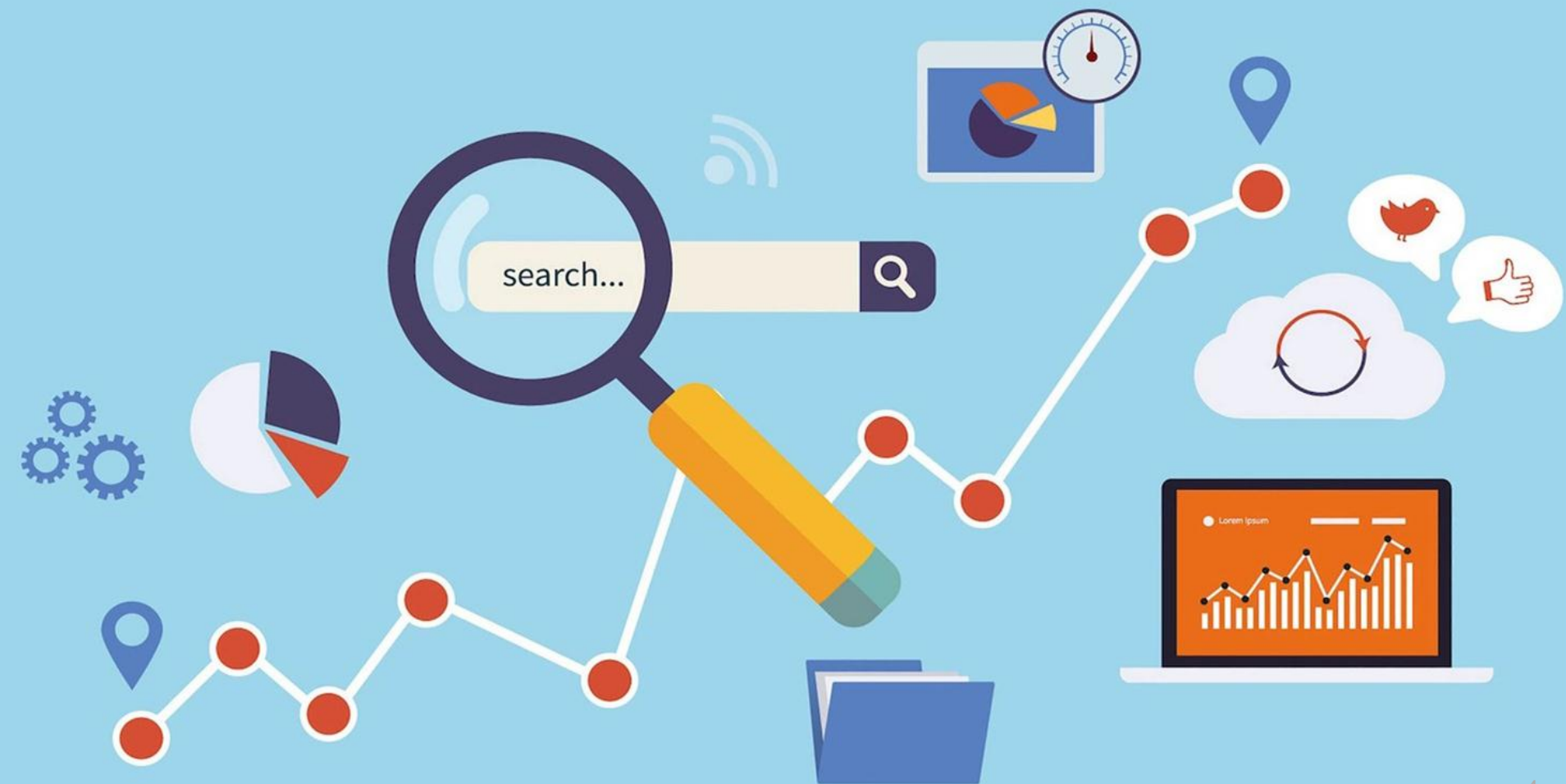
by **Lam Do**

Team leader BigO-Coding



1. How important learning Algorithms and Data structures is
2. Algorithms in your coding
3. Five common Algorithms in Web Development

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- 1. How important learning Algorithms and Data structures is**
  2. Algorithms in your coding
  3. Five common Algorithms in Web Development



## *Find the maximum value in an array*

```
// Please abstract the fact that Array.prototype.sort  
// This is stupid and sorts things in lexicographical order  
var maxValue = myArray.sort().pop();
```

[3, 5, 6, 7, 1, 4, 2]

MyArray

[1, 2, 3, 4, 5, 6, 7]

After sorting

Time complexity for **sort()** is  **$O(n \cdot \log_2 n)$**

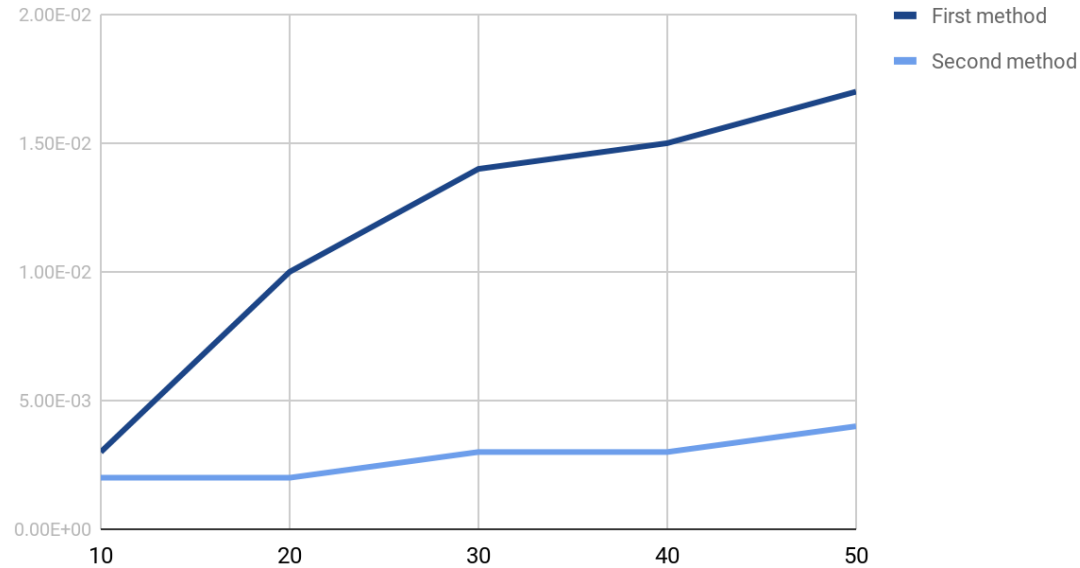
## *Find the maximum value in an array*

```
var maxValue = null;
for (var i = 0; i < myArray.length; i++) {
    if (maxValue === null || maxValue < myArray[i]) {
        maxValue = myArray[i];
    }
}
```

Time complexity for **one loop** is **O(n)**

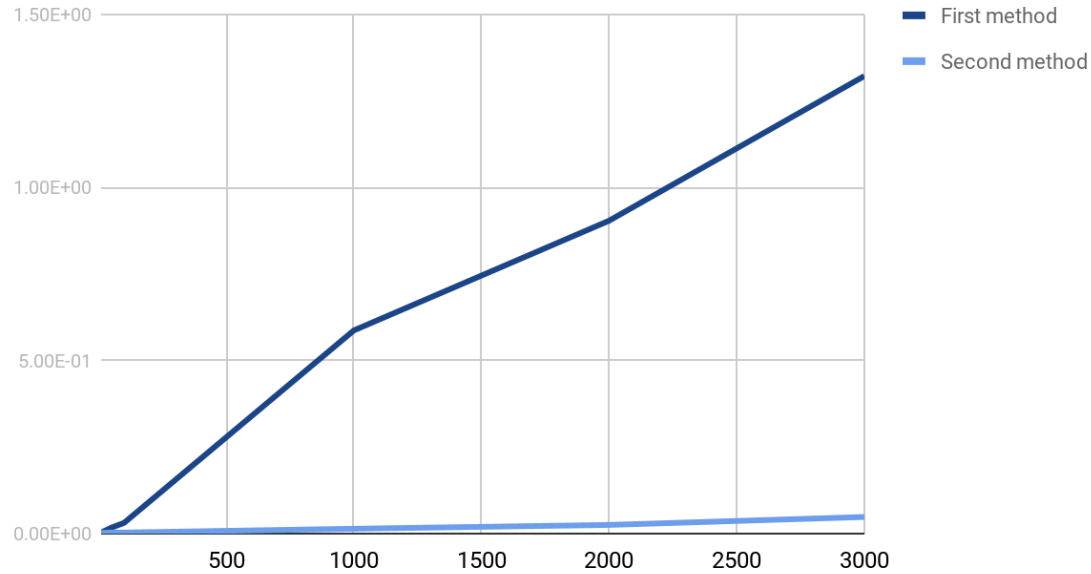
## *Find the maximum value in an array*

Run time

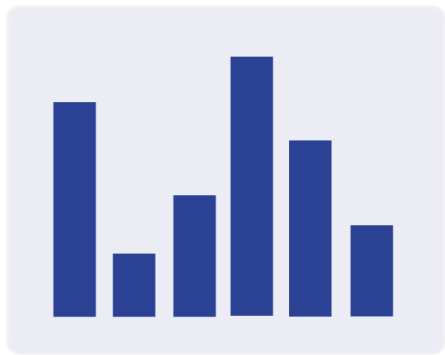


## *Find the maximum value in an array*

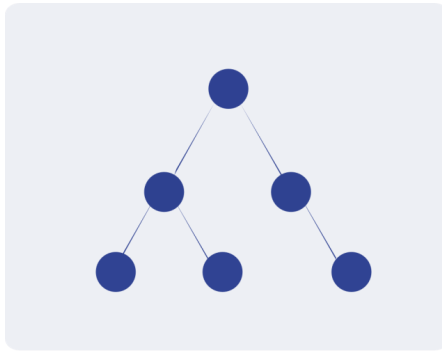
Run time



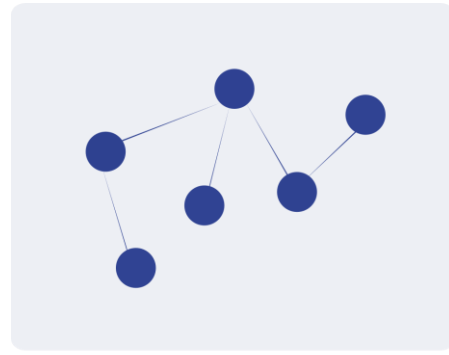




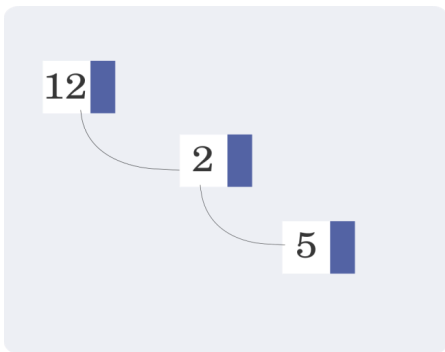
Sorting



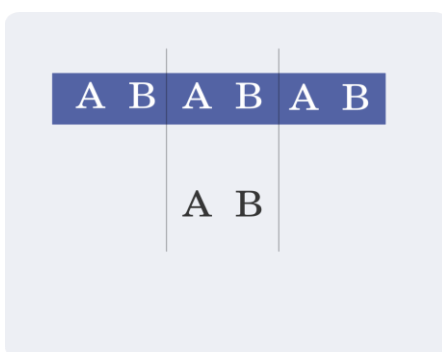
Searching



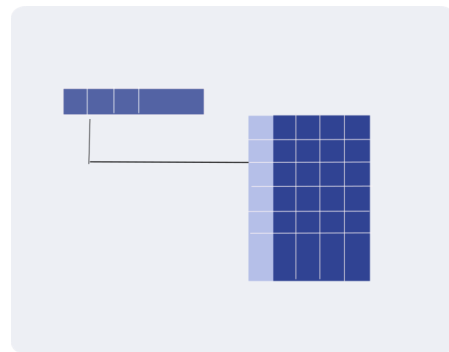
Spanning stree



Linked list



String matching



Hashing

1. How important learning Algorithms and Data structures is
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3. Five common Algorithms in Web Development



Un-indexed database



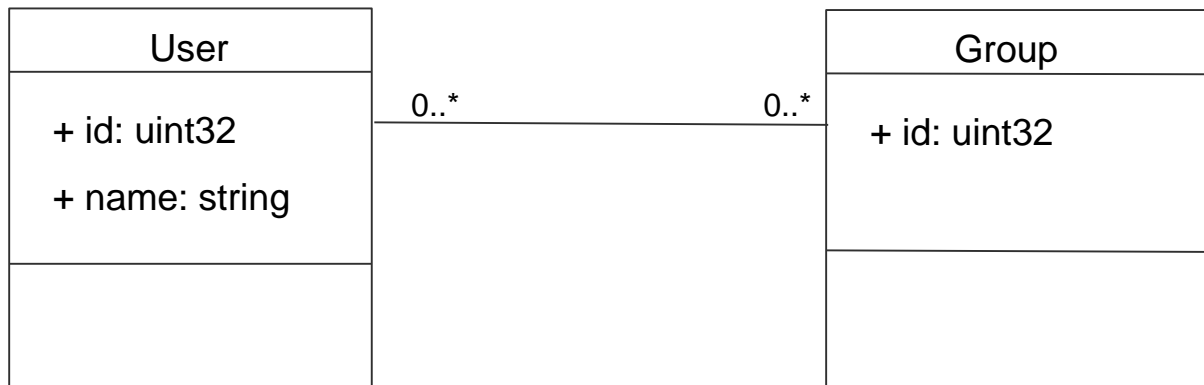
Indexed database

## Creating group of users

You want to apply one promotion to **one list of users**. You design database as below.

When you create new promotion and apply it, you will create one group and assign it.

To save your database, **check the list before creating; if it exists, use available group. Otherwise, create one.**



```
groupList = []  
userList.forEach(function(user) {  
    groupList = groupList.concat(getUserGroups(user));  
});
```


size of  
users

```
groupList.forEach(function(group) {  
    usersInGroup = getUsersInGroup(group);  
    if (checkContain(userList, usersInGroup)) {  
        result = group;  
    }  
});  
result = result || createNewGroup(userList)
```

size of  
groups  
contain  
one of  
users

```
groupList = getUserGroups(user[0]);
```

```
groupList.forEach(function(group) {  
    usersInGroup = getUsersInGroup(group);  
    if (checkContain(userList, usersInGroup)) {  
        return group;  
    }  
    return createNewGroup(userList);  
});
```



size of  
groups  
contain  
first user

# FRONTEND



# BACKEND

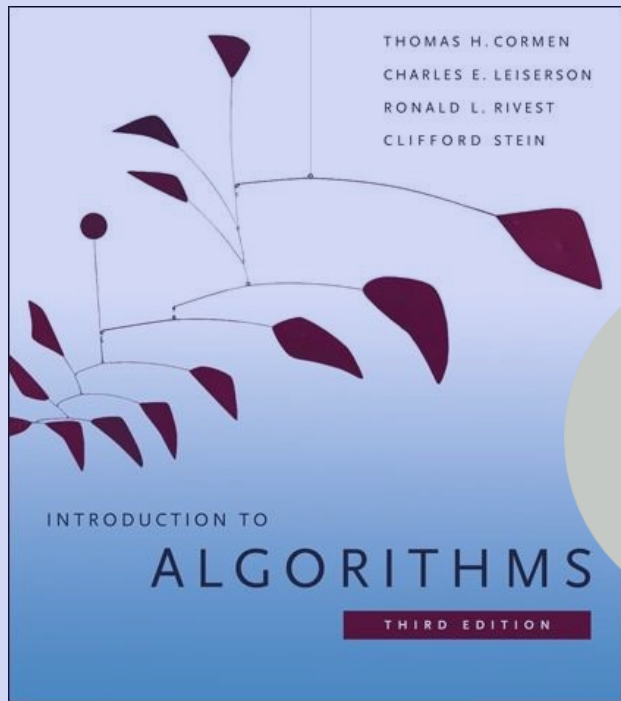








1. How important learning Algorithms and Data structures is
2. Algorithms in your coding
3. **Five common Algorithms in Web Development**



## **Introduction to Algorithms**

By [Thomas H. Cormen](#), [Charles E. Leiserson](#),  
[Ronald L. Rivest](#) and [Clifford Stein](#)



## **Algorithms**

Robert Sedgewick and Kevin Wayne



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BESTSELLER

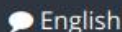


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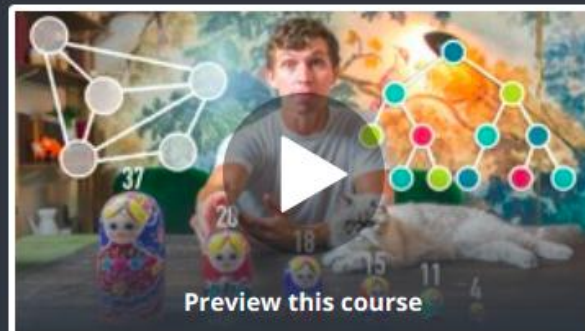
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English



English [Auto-generated]



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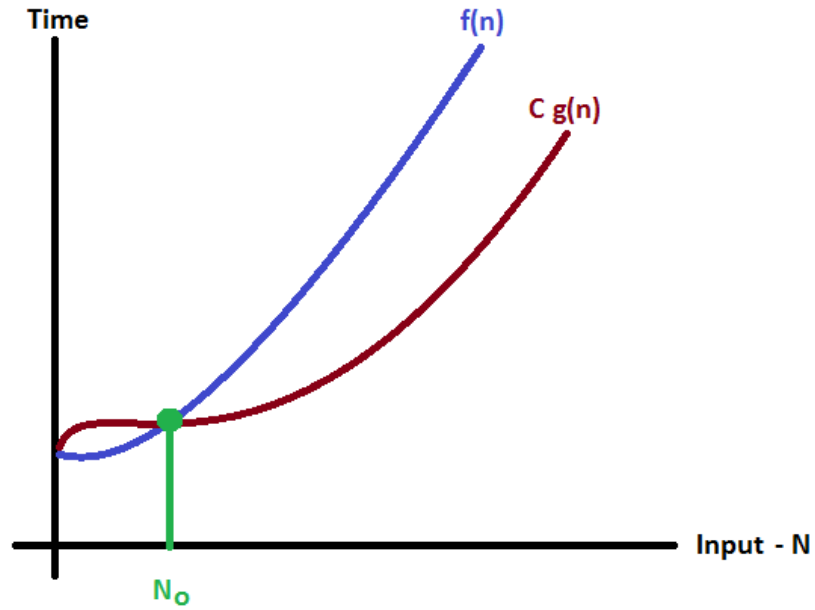
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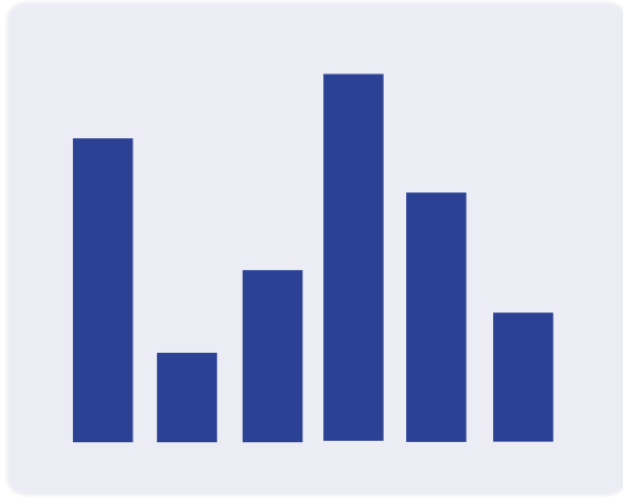
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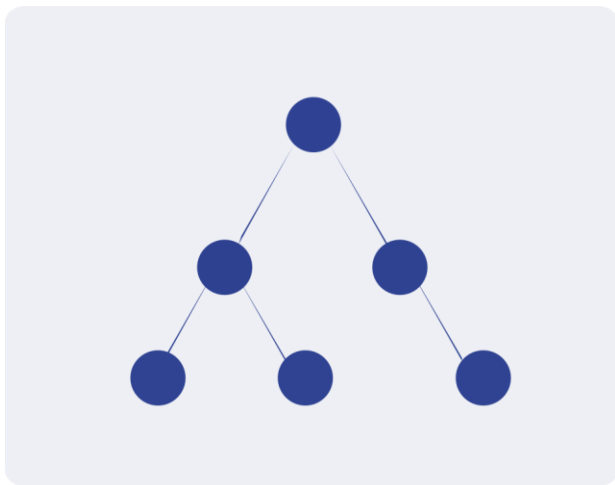
## Time complexity





## Sorting

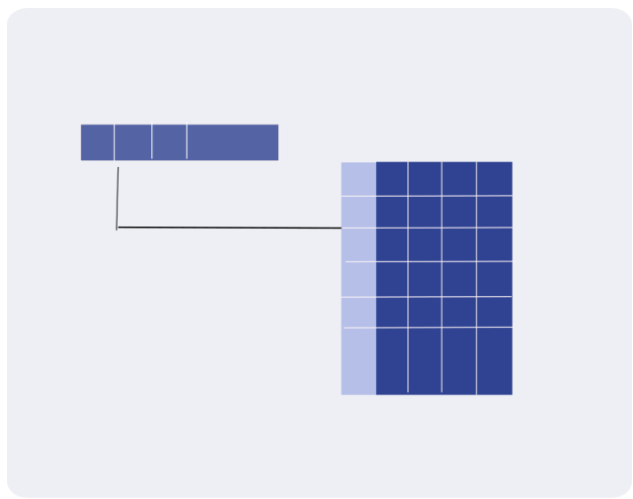
- **Bubble sort**
- **Merge sort**
- **Quick sort**
- **Heap sort**
- **Counting sort**



Searching

- **Binary Search**
- **Binary Search Tree**
- **Depth First Search**
- **Breadth First Search**



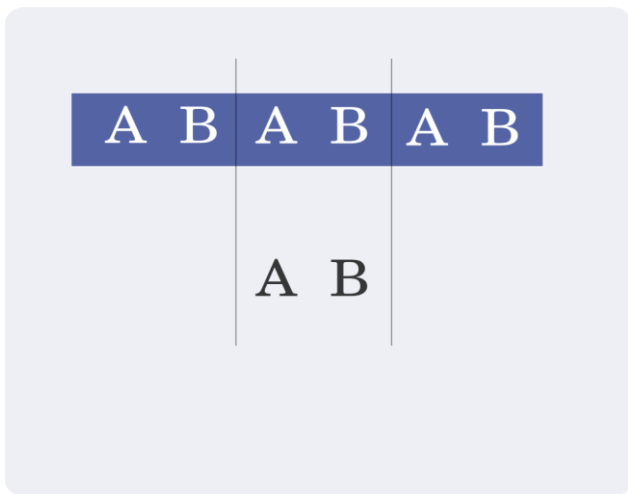


Hashing

- **Hash table**

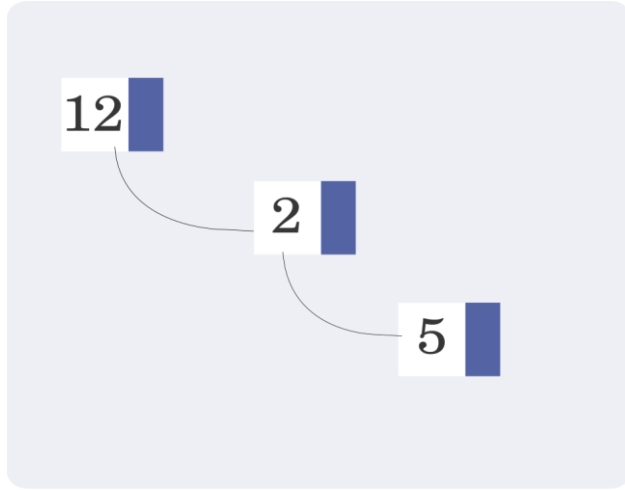






## String matching

- **String matching**
- **String parsing**
- **Elastic search**



Linked list

- **Store data**
- **Understand more database**

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ALGORITHMS

LOOPS

CONTROL FLOW

BASIC LANGUAGE FEATURES

FUNDAMENTALS

ARRAYS

STRINGS

C++

JS

Python

Java

5 kyu

## 1-800-CODE-WAR

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ALGORITHMS

STRINGS

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Java

JS

Python

Java

7 kyu

## Sum of the first nth term of Series

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FUNDAMENTALS

LOOPS

CONTROL FLOW

BASIC LANGUAGE FEATURES

ARITHMETIC

MATHEMATICS

ALGORITHMS

NUMBERS

SEQUENCES

ARRAYS

C

JS

Java

C++

C#

e

JS

Java

JS

php

Python

Java

JS

TS

7 kyu

## Geometric Progression Sequence

☆ 7 🏆 0 🔄 93% of 127 🕒 483 👤 baaart



FUNDAMENTALS

C#

JS

php

Python

Java

Vietnam Web Summit 2018

# Thank you

Lam Do

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