

MIT 6.006

Introduction to

Algorithms, Spring

2020

<https://www.youtube.com/playlist?list=PLUI4u3cNGP63EdVPNLG3ToM6LaEUuStEY>

- [1. Algorithms and Computation](#)
- [2. Data Structures and Dynamic Arrays](#)

1. Algorithms and Computation



- input ,output □ □ □ □

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- Inductive Hypothesis: if first k students contain match alg returns a match before interviewing student k + 1
- □□ □
 - □□ base case: □□ □□ □□ n=0n = 0n=0 □□ n=1n = 1n=1□□ □□ □□
 - □□ Inductive Step:
 - □□ □□: □□ □□ k□□ □□ □□□ □□□, □□ □□□ k+1□□ □□ □□ □□

- $\frac{1}{n}$ $\frac{1}{n^2}$ $\frac{1}{n^3}$ $\frac{1}{n^4}$ $\frac{1}{n^5}$
- $\frac{1}{n^2}$ $\frac{1}{n^3}$?
 - $\frac{1}{n^2}$ $\frac{1}{n^3}$ $\frac{1}{n^4}$ $\frac{1}{n^5}$ $\frac{1}{n^6}$ (IBM's research computer vs my computer)
- Don't measure time, instead count ops
- Expect performance to depend on size of our input
- $O(n)$ upper bound $\Omega(n)$ lower bound Θ both

2. Data Structures and Dynamic Arrays

What is a dynamic array and how does it work?

Interface (API / ADT)

- What is the interface (API, ADT) for a dynamic array?
- "What is the interface (API, ADT) for a dynamic array?"

Specification (What is the specification?)

- What is the specification for a dynamic array?
- What is the specification for a dynamic array?

What data can store (What is the data type?)

- What is the data type for a dynamic array?
- What is the data type for a dynamic array?

What operations are supported (What is the operation?)

- What is the operation for a dynamic array?
- What is the operation for a dynamic array?

What is the operation?

- What is the operation for a dynamic array?
- "What is the operation for a dynamic array?"

Representation (如何表示)

- 如何表示一个字符串
- 如何表示一个数组
 - 如何表示一个数组
 - 如何表示一个数组

How to store data (如何存储)

- 如何存储一个字符串
- 如何存储一个数组
 - 如何存储一个数组
 - 如何存储一个数组

Algorithms to support operations (如何支持操作)

- 如何支持一个字符串
- 如何支持一个数组

Word RAM(Random Access Machine) Model

- 如何支持一个字符串
- [Word RAM Model](#) 如何支持