CS50 for JDs

cs50.harvard.edu/hls/2019/winter/

Programming Languages

Python


crucial
by Micron
47J6
4G85
8BB12
D9HXT
4G85
8BB12
D9HXT
4G85

floating-point imprecision

integer overflow

Assignment 1

- In your own words, what's the difference between machine code and source code?
- In your own words, what's a compiler?

- pseudorandom.py
- guess.py
- guesses.py

```
bool

float

int

str

...
```

dict

list

range

set

tuple

...

Algorithms, Data Structures

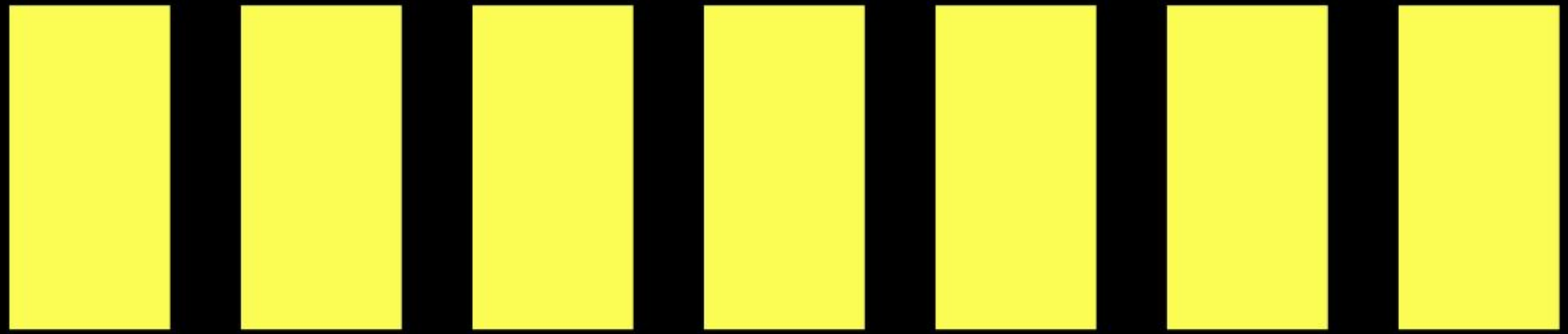
O

- $O(n^2)$
- $O(n \log n)$
- $O(n)$
- $O(\log n)$
- $O(1)$
- …

Ω

- $\Omega(n^2)$
- $\Omega(n \log n)$
- $\Omega(n)$
- $\Omega(\log n)$
- $\Omega(1)$
- …

⊖



bubble sort

```
repeat until no swaps
    for i from 0 to n-2
        if i'th and i+1'th elements out of order
            swap them
```

selection sort

```
for i from 0 to n-1
    find smallest element between i'th and n-1'th
    swap smallest with i'th element
```

$$(n - 1) + (n - 2) + \ldots + 1$$

$(n - 1) + (n - 2) + \ldots + 1$

$n(n - 1)/2$

$(n - 1) + (n - 2) + \ldots + 1$

$n(n - 1)/2$

$(n^2 - n)/2$

$(n - 1) + (n - 2) + \ldots + 1$

$n(n - 1)/2$

$(n^2 - n)/2$

$n^2/2 - n/2$

$(n - 1) + (n - 2) + \ldots + 1$

$n(n - 1)/2$

$(n^2 - n)/2$

$n^2/2 - n/2$

$O(n^2)$

$n^2/2 - n/2$

$n^2/2 - n/2$

$1{,}000{,}000^2/2 - 1{,}000{,}000/2$

$n^2/2 - n/2$

$1{,}000{,}000^2/2 - 1{,}000{,}000/2$

500,000,000,000 – 500,000

$n^2/2 - n/2$

$1{,}000{,}000^2/2 - 1{,}000{,}000/2$

$500{,}000{,}000{,}000 - 500{,}000$

$499{,}999{,}500{,}000$

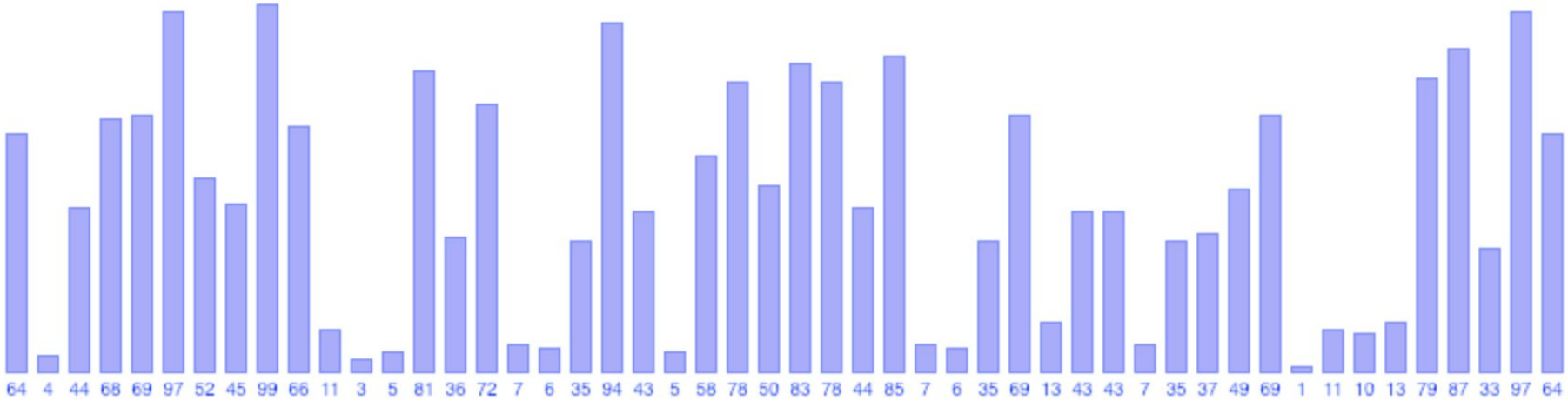
$n^2/2 - n/2$

$1{,}000{,}000^2/2 - 1{,}000{,}000/2$

$500{,}000{,}000{,}000 - 500{,}000$

$499{,}999{,}500{,}000$

$O(n^2)$



https://www.cs.usfca.edu/~galles/visualization/ComparisonSort.html

https://www.toptal.com/developers/sorting-algorithms


Google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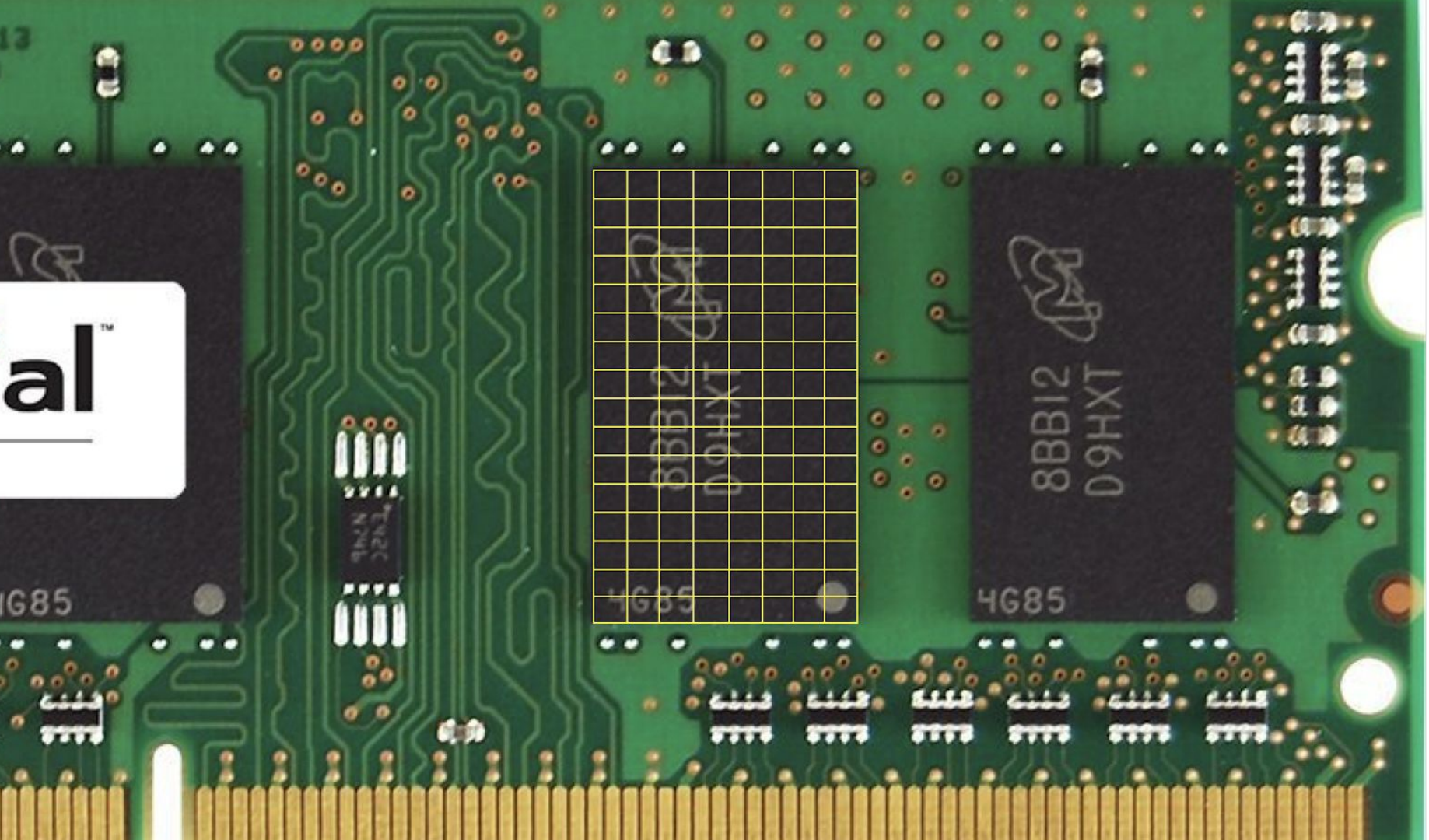
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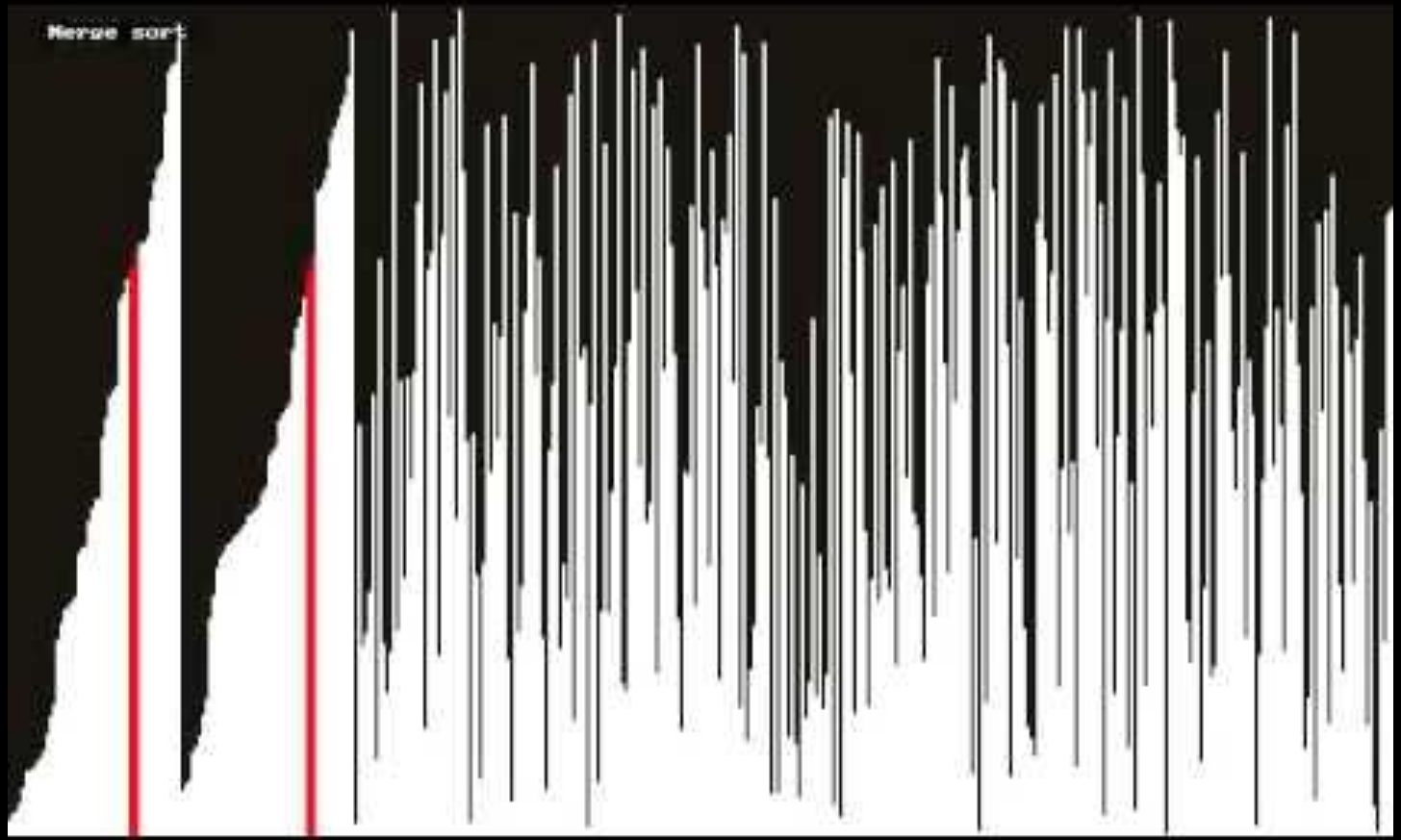
Merge sort

Assignment 2