

<http://www.enseignement.polytechnique.fr/informatique/INF478/>

INF478 — Résolution de Problèmes Algorithmiques

Amphi 0

Steve Oudot

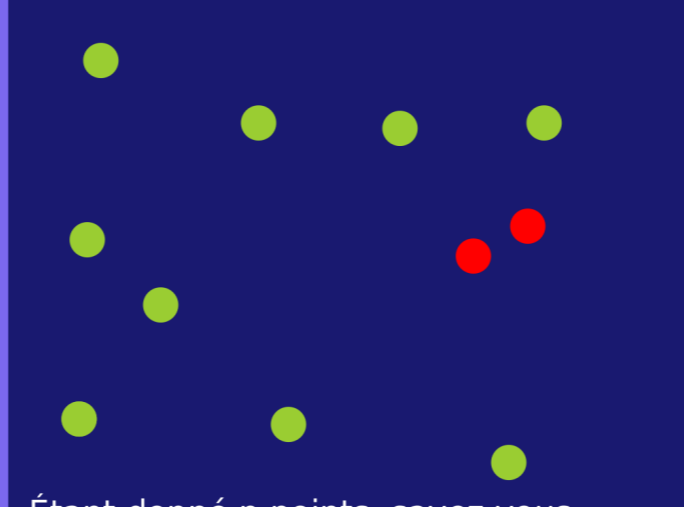
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Sauriez-vous évaluer la stabilité de cette structure efficacement ?



Étant donné n points, savez vous trouver la paire la plus proche en temps $O(n \log n)$ ou même en temps $O(n)$ avec un algorithme randomisé ?

1	9	2	4	7		5	E				6				
B	D			4	9	A	7		8						3
F			E	2	B		4					9	A		
			8		6	3		2	1	9	D	E			B
2	0	D	9	B			A					6	8	4	
4			7	8	F		9			6	1		C		
8		1			2			9	5				7		
3		6		D	7	C		B	8	F	4				9
	B			A	D	7	8		4	2	C		3		5
		A				F	B			E			2		6
		9		3	5			8	D	B	4				A
5	7	4					2				0	D	B	C	8
9			F	0	3	B	6		D	1		8			
	1	3					7			4	2	B			C
	6				C	4		9	B	8				0	3
					B			0	6	7	5	4	E	9	

Connaissez vous un algorithme de backtracking assez rapide pour résoudre un Sudoku de taille 16×16 ?

entrée :

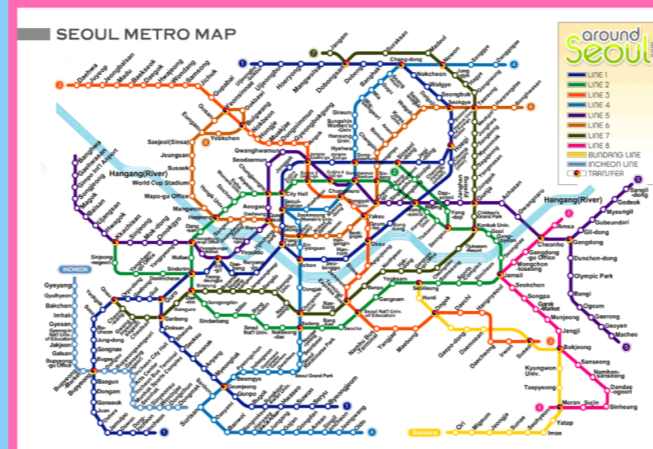
$$A1 = 2 * (B2 + C2 / 3)$$

$$B2 = 4 * C2$$

$$C2 = 1 + 12 / 4$$

savez vous calculer la valeur de la cellule A1 en temps linéaire ?

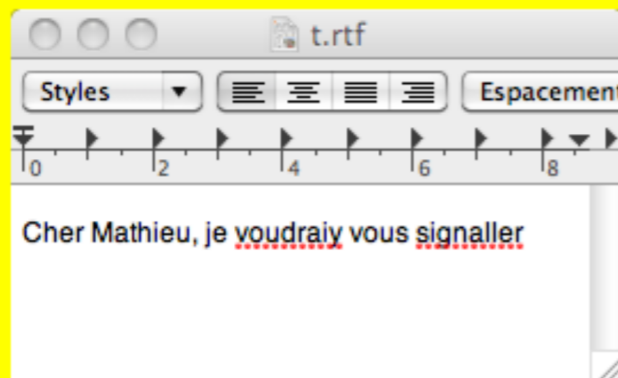
...et détecter une dépendance circulaire le cas échéant ?



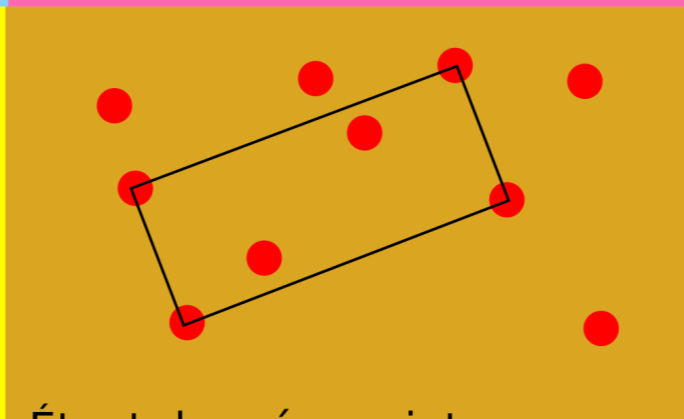
Étant donné un plan de métro, savez vous calculer avec une *deque* un trajet reliant deux stations et minimisant les correspondances ?



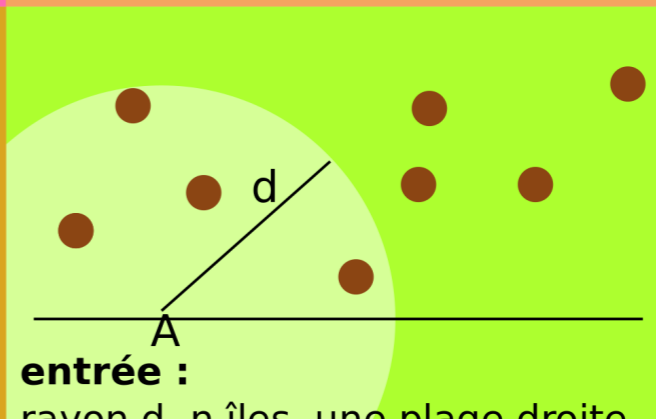
Savez vous trouver le plus grand rectangle monochromatique dans une image binaire en temps linéaire ?



Quelle structure de données est adaptée pour stocker un dictionnaire dans un correcteur orthographique ?



Étant donné n points savez vous compter en temps $O(n^2)$ combien de rectangles on peut former ?



entrée :

rayon d , n îles, une plage droite

Savez vous placer en temps $O(n \log n)$ un nombre minimum d'antennes sur la plage couvrant toutes les îles ?

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▲ 0 ▼
of 0 votes

Assume we only take the least significant digit of each value in fibonacci sequence, and form the sequence of digits into pairs. In those pairs, the first value of one pair is the same as second value of its predecessor.

As we know the fibonacci sequence is 1, 1, 2, 3, 5, 8, 13, 21... so the pair sequence is:
[1, 1], [1, 2], [2, 3], [3, 5], [5, 8], [8, 3], [3, 1] ...

Write a function to output the first n pairs of this sequence.
void Outputpairs(int n)

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Google
Software Engineer / Developer
Algorithm

★

1
Answer




▲ 0 ▼
of 0 votes

You are given a monochrome bitmap as a byte array (together with its width and height). Draw a horizontal line.

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★

1
Answer



▲ 0 ▼
of 0 votes

Part 1: You are given a computer #1 with array Foo, a computer #2 with array Bar and a spare computer #3. You need to apply a function F to corresponding/matching elements of the two arrays. How would you do that?

Part 2: Once you scale up, how would you balance the number of machines sorting with the machines applying the function?

★

1
Answer

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pinky

Hi... Did anyone give the Amazon online code review recently or know about it? Please respond...

@roy.. Hi.. Did you already give your amazon coding assessment?

Haley

Does anyone here live in the Portland, OR area trying to study for a Google tech phone interview, but I'm not used to studying alone. I always

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The class focuses on computer science topics that frequently come up in programming interviews. It covers time complexity, hash tables, binary search trees, and some other things you might learn in 6.046. **However, most of the time is devoted to topics you won't learn in class**, such as crafty bitwise logic and tricks to solving problems. If you have any interest in working at a computer science company, make sure you don't miss this class!

The class is held in room 32-124 from 5:00-6:30 PM on January 12 - 15, 2009.

Please register!

<http://courses.csail.mit.edu/iap/interview/index.php>

Objectifs

- apprendre à modéliser un problème
 - acquérir les bons réflexes de design et de debuggage
 - expérimenter de nouvelles façons de programmer et de collaborer
- ... tout en s'amusant !

Syllabus

1. recherche exhaustive avec backtracking
2. algorithmes gloutons
3. programmation dynamique I
4. programmation dynamique II
5. calcul
6. exploration de graphes
7. couplages
8. flots

En pratique

- matin (10h30-12h): amphis
 - après-midi (13h30-18h): TDs
- } salles info 35-36

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-
- évaluation des approches/codes : jeux de tests ouverts (+ checkers) + solution
 - évaluation : pâle sur machine (même format que TDs) + projet ?
- **Important:** bien commenter son code (en-tête avec l'approche + points stratégiques)

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<http://binetacm.wikidot.com/>

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codility

WE TEST CODERS



```
@a = sort { $a <=> $b } @a;  
procedure union(f, j: lonint):  
begin i := getprf(i);  
mx.(f) <- List.sort compare mx.(f);  
(let ((counts (sort (mapcar #'buckets (gethash name 'items*) #'>)))  
double ang2 = Math.atan2(r2[1]y - r2[0]y, r2[1]x - r2[0]x);  
for ps in permx(b); yield (q+ps  
[>>>>+<<<<+<<<<+<<<<+<<<<+<<<<  
For l = 0 To 2 * (2 ^ ((M + 1) / 2) - 1) Step 2  
ms = (1..m).map[ gets.split.map[6;to _i ]  
int.] distFromBase . simpleBFS[map, startX, startY, #'T', false, out ex, out epl];  
while (n-- > 0) if ((!(n & (n + 1))) cout << n + 1;
```

WHAT LANGUAGE DO YOU SPEAK?

code jam presented by Google
print "hello, world!"



Aujourd'hui

- équipes de 2-3
- 5 problèmes à résoudre sur le papier (approche + algo + DS + complexité)
- chez vous : regarder des problèmes types d'entretiens chez Google, Yahoo, Twitter, etc.

<http://www.careercup.com/page?pid=google-interview-questions>

<http://www.glassdoor.com/Interview/>

[Google-Software-Engineer-Interview-Questions-EI_IE9079.0,6_K07,24.htm](http://www.glassdoor.com/Interview/Google-Software-Engineer-Interview-Questions-EI_IE9079.0,6_K07,24.htm)