ZJU-ADS-HQM2020-WK10

判断题 2　A. 单选题 3

1-1 An approximation scheme that runs in $O(n^2/\epsilon)$ for any fixed $\epsilon > 0$ is a fully polynomial-time approximation scheme. (2分)

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1-1 答案正确 (2 分)　创建提问

1-2 An approximation scheme that runs in $O(n^2 3^{\epsilon})$ for any fixed $\epsilon > 0$ is a polynomial-time approximation scheme. (2分)

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1-2 答案正确 (2 分)　创建提问

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判断题 2 | A. 单选题 3

2-1 For the bin-packing problem: let $S = \sum S_i$. Which of the following statements is FALSE? (2分)

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- A. The number of bins used by the next-fit heuristic is never more than $\lceil 2S \rceil$
- B. The number of bins used by the first-fit heuristic is never more than $\lceil 2S \rceil$
- C. The next-fit heuristic leaves at most one bin less than half full 0.2 0.9 0.2 0.9 ...
- D. The first-fit heuristic leaves at most one bin less than half full

2-1 答案正确 (2 分) 创建提问

2-2 To approximate a maximum spanning tree T of an undirected graph $G = (V, E)$ with distinct edge weights $w(u, v)$ on each edge $(u, v) \in E$, let's denote the set of maximum-weight edges incident on each vertex by S. Also let $w(E') = \sum_{(u,v)\in E'} w(u, v)$ for any edge set E'. Which of the following statements is TRUE? (2分)

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- A. $S = T$ for any graph G
- B. $S \neq T$ for any graph G
- C. $w(T) \geq w(S)/2$ for any graph G
- D. None of the above

2-2 答案正确 (2 分) 创建提问

2-3 Assume that you are a real world Chinese postman, which have learned an awesome course "Advanced Data Structures and Algorithm Analysis" (ADS). Given a 2-dimensional map indicating N positions $p_i(x_i, y_i)$ of your post office and all the addresses you must visit, you'd like to find a shortest path starting and finishing both at your post office, and visit all the addresses at least once in the circuit. Fortunately, you have a magic item "Bamboo copter & Hopter" from "Doraemon", which makes sure that you can fly between two positions using the directed distance (or displacement).

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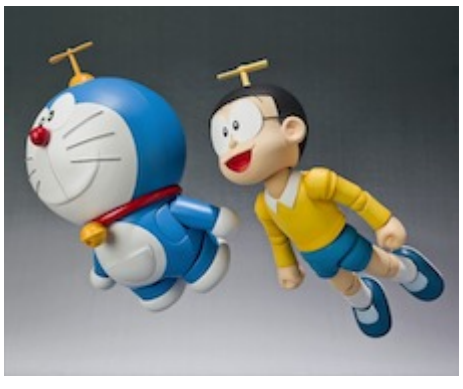

("Bamboo copter & Hopter", japan12.com/bamboo-copter-hopter)

However, reviewing the knowledge in the ADS course, it is an NPC problem! Wasting too much time in finding the shortest path is unwise, so you decide to design a $2 - approximation$ algorithm as follows, to achieve an acceptable solution.

```
Compute a minimum spanning tree T connecting all the addresses.
Regard the post office as the root of T.
Start at the post office.
Visit the addresses in order of a _____ of T.
Finish at the post office.
```

There are several methods of traversal which can be filled in the blank of the above algorithm. Assume that $P \neq NP$, how many methods of traversal listed below can fulfill the requirement? (2分)

- Level-Order Traversal
- Pre-Order Traversal
- Post-Order Traversal

- A. 0
- B. 1
- C. 2
- D. 3

2-3 答案正确 (2 分) 创建提问