

國立暨南國際大學九十二學年度碩士班研究生入學考試試題

第 3 節資料結構與演算法 適用:(資工所 415)

(本試題共 / 頁,第 / 頁)

- 考生注意: 1. 依次序作答, 只要標明題號, 不必抄題。
2. 答案必須寫在答案卷上, 否則不予計分, 並限以藍黑色筆作答。
3. 試題隨卷繳回。(餘請詳閱試場規則)

(I)

1. Draw the top-down 2-3-4 tree that is built when the following key sequence, "ADIAMONDISEOREVER", are inserted into an initially empty tree. (10%)
2. Draw a red-black tree representation of the tree from the previous question. (5%)
3. Discuss what structural properties the red-black trees have. (5%)
4. Suppose a 2-3-4 tree is used to store N records.
 - a. Show the minimum tree height. Explain your answer in detail. (10%)
 - b. Show the maximum tree height. Explain your answer in detail. (10%)

(II)

Given a proper representation of graph $G=(V, E)$, for each of the following two requirements,

1. report all the vertices that are adjacent to a specified vertex V_i in time proportional to the number of vertices reported. (5%)
2. determine whether two specified vertices V_i and V_j are adjacent in constant time. (5%)

(III)

1. Explain the Convex Hull problem. (5%)
2. Outline an algorithm to construct the Convex Hull based upon the exhaustive searching strategy. (5%)
3. Outline an algorithm to construct the Convex Hull based upon the Graham scan method. (10%)
4. Outline an algorithm to construct the Convex Hull based upon the divide-and-conquer searching strategy. (10%)

(IV)

1. Explain the Kruskal's method. (10%)
2. Give a comparison between the Kruskal's method and the Prim's method. (10%)

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