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CS590 Homework 11: Graphs and Traversals Reinforcement Exercises

Due Date: April 10, 2022

Problem 13.7.4:

The 9 language courses which Bob can schedule are given as follows:

LA15, LA16, LA22, LA31, LA32, LA126, LA127,LA141, and LA 169

The courses prerequisites are shown as follows:

- LA15: (None)
- LA16: LA 15
- LA22: (None)
- LA31:LA 15
- LA32:LA16, LA31
- LA126: LA22, LA32
- LA127: LA 16
- LA141:LA22, LA 16
- LA 169: LA32.

It means if there is a prerequisite like A à B, then it means B has to be completed before A.

The required sequence for the course schedule based on the above prerequisites can be given as follows:
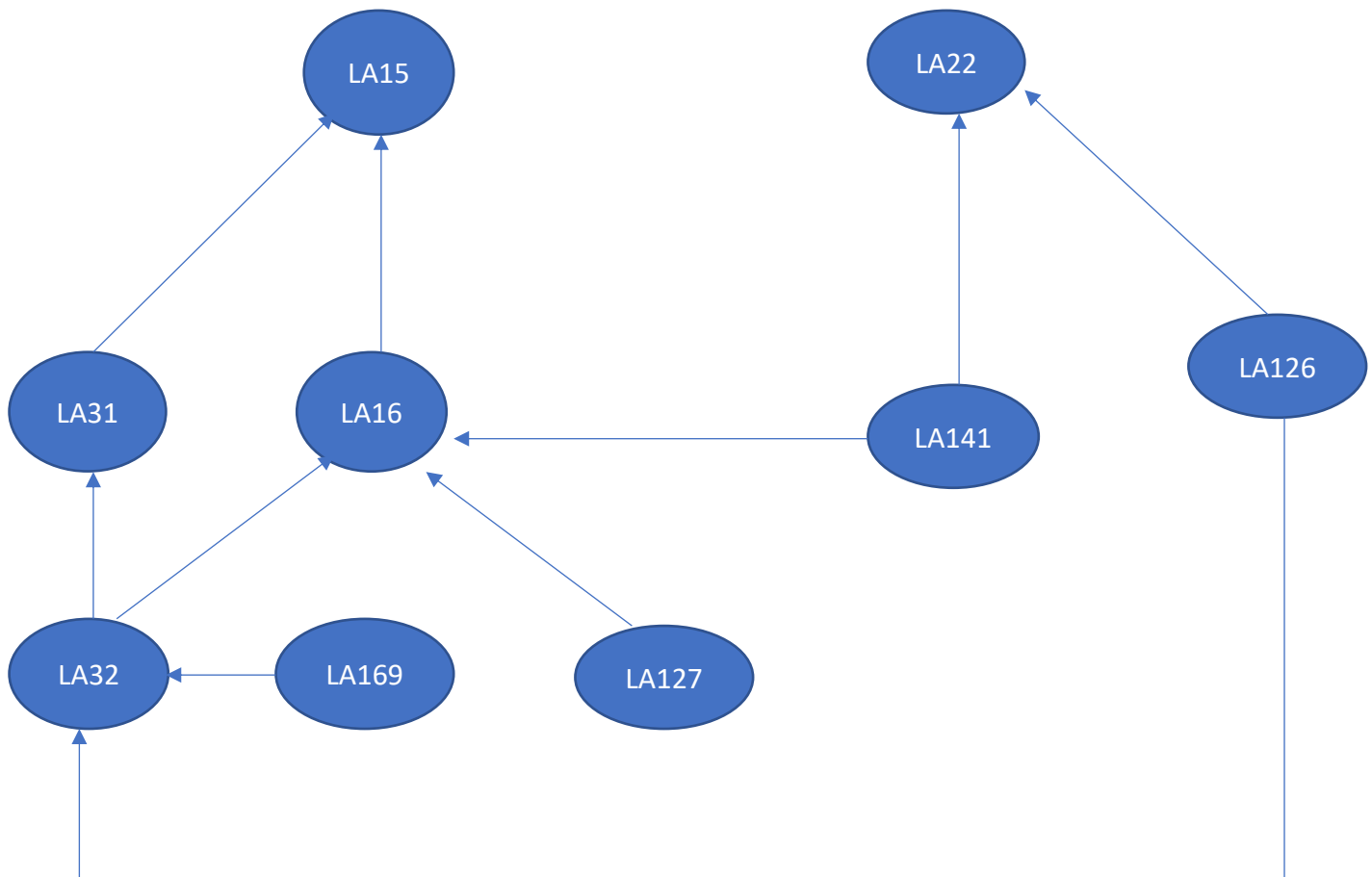
The sequence of courses that allows Bob to satisfy all the prerequisites given above can be shown as follows:

LA15, LA16, LA31, LA32, LA127, LA169, LA22, LA126, and LA141

<u>Problem 13.7.7:</u>

In cases a and b you must use the adjacency list structure:
a)list needs: $10000+20,000=3*10^4$entries, matrix needs :$10000^2=10^8$ entries
b)list needs:$10,000+20,000,000=20,010,000$ entries, matrixneeds : $10000^2=100,000,000$ entries

So in cases a) and b) you must use the list structure in order to use as little space as possible.

In case c), if you use the matrix structure you can answer the query are adjacent in constant time (practically instantaneously), but you will need to transverse the entire list of a node to do so in the list structure, so you must use the matrix structure.

Therefore, in case c), you must the matrix structure.