**ASSIGNMENT 11 – Graphs**

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| Topics |
| * Elementary Graphs * Dynamic Programming on graphs |
| Readings |
| * CLRS, Chapter 25.1, 25.2 * CLRS, Chapter 12 |
| Instructions | |
| 1. Select a **partner** and inform instructor who you will work with  2. Do the problems and answer the questions listed in the next section   * Keep in mind Guidelines on plagiarism.   3. Follow instructions for submitting your work.  PROBLEMS AND QUESTIONS | |
| Problems and Questions |
| Part A Graph Representation (30 pts) |
| Create a procedure (Java method) for converting adjacency matrix into array of adjacency linked lists.  Apply this procedure for the following matrix:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | a | b | c | d | e | f | | a | 0 | 1 | 0 | 1 | 0 | 0 | | b | 1 | 0 | 1 | 0 | 1 | 0 | | c | 0 | 1 | 0 | 0 | 0 | 1 | | d | 1 | 0 | 0 | 0 | 1 | 0 | | e | 0 | 1 | 0 | 1 | 0 | 1 | | f | 0 | 0 | 1 | 0 | 1 | 0 |   Assume the data portion of the list node is a Character.  Make sure to output the resulting lists. |

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| Part B All-Pairs Shortest Paths (manually) (20 pts) |
| For the given graph, show steps of the Floyd algorithm, including predecessor matrix.  3  2  1  1  5  2 |

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| Part C Floyd Implementation ( 50 pts) |
| 1. Create a procedure (Java method) for converting an array of Strings representing adjacency lists into a weight matrix. 2. Implement Floyd-Warshall algorithm for finding all-pairs shortest paths. Run a demo program with the following list:   {“(2, 3), (3, 8), (5, -4)”,  “(4, 1), (5, 7)”,  “(2, 4)”,  “(1, 2), (3, -5)”,  “(4, 6) “ }  Output both weight matrix and shortest-paths matrix |

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| Bonus ( 10 pts) |
| For part C, update the code to create the predecessor matrix |

2. **Summary questions:**

a. What concepts did you have trouble with? What still confuses you?

b. Suggestions for improving this assignment in the future?

Help instructor help you

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| Submitting your work |

1. Make sure that your name(s) are in all your files.
2. If you have more than one file for your solution, make a .zip file for your project
3. In Blackboard, attach your solution file to the submission for this assignment.

GUIDELINES ON

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| Guidelines on Plagiarism in Computer Science |

Outlined in the Syllabus