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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech-VIII Semester (CS/IT/ECE/Civil/BT)

COURSE CODE: 18B1WCI732   MAX. MARKS: 25

COURSE NAME: Social and Information Network Analysis

COURSE CREDITS: 3   MAX. TIME: 1 Hour 30 Min

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. Identify the core methods for Community Detection and Mining for social networks. [3]

2. Collaborative Filtering Approach with large scale applications is hugely in the analysis of data on the social networks. Specify the process used for attaining this. [3]

3. Derive mathematically how differences in activities of individuals in a community may be defined based on the relationship which they exhibit with their immediate neighbors. [3]

4. Cluster the following eight points with (x, y) representing locations into three clusters:

   A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9)

   Initial cluster centers are: A1(2, 10), A4(5, 8) and A7(1, 2). The distance function between two points a = (x1, y1) and b = (x2, y2) is defined as $P(a, b) = |x2 - x1| + |y2 - y1|$ Use K-Means Algorithm to find the three cluster centers after the second iteration. [5]

5. Suppose that in a group of 5 people: A, B, C, D, and E, the following pairs of people are acquainted with each other. A and C; A and D; B and C; C and D; C and E .

   (i)   Draw a graph G to represent this situation. [2]

   (ii) List the vertex set, and the edge set showing the sets V and E for the vertices and edges. [2]
   (iii) Deduce the degree(s) of each vertex and draw an adjacency matrix. [2]

6. Perform a breadth-first search of the following graph, where E is the starting node. In other words, show the output if we issue the call BFS (E). Provide two cases:

   (a) Use a counter clockwise ordering from the top (12 o'clock position). [2.5]

   (b) Use a clockwise ordering from the top. [2.5]