Department of Computer Science and Information Technology

**Assignment-2**

**Design and Analysis of Algorithm**

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| **Q. No.** | **Question** | **CO** | **Bloom’s level** |
|  | What is Red-Black tree? Write an algorithm to insert a node in an empty red-black tree explain with suitable example. | CO2 | L4 |
|  | Insert the following element in an initially empty RB-Tree. 12, 9, 81, 76, 23, 43, 65, 88, 76, 32, 54. Now Delete 23 and 81. | CO2 | L3 |
|  | Discuss the advantages of using B-Tree. Insert the following Information 86, 23, 91, 4, 67, 18, 32, 54, 46, 96, 45 into an empty B-Tree with degree t = 2 and delete 18, 23 from it. | CO2 | L4 |
|  | Define a B-Tree of order m. Explain the searching operation in a B-Tree. | CO2 | L2 |
|  | Using minimum degree ‘t’ as 3, insert following sequence of integers 10, 25, 20, 35, 30, 55, 40, 45, 50, 55, 60, 75, 70, 65, 80, 85 and 90 in an initially empty B-Tree. Give the number of nodes splitting operations that take place. | CO2 | L3 |
|  | Insert the following keys in a 2-3-4 B Tree: 40, 35, 22, 90, 12, 45, 58, 78, 67, 60 and then delete key 35 and 22 one after other. | CO2 | L3 |
|  | Prove that if n>=1, then for any n-key B-Tree of height h and minimum degree t >=2, h<=log t ((n +1)/2). | CO2 | L2 |