### Mid Exam-2 Algorithms and Practice (CSE130) 2023-1

### Name : KimSunah Student ID : 2020136146 Signature\_\_\_\_\_\_\_\_\_\_\_\_

­­­­­­­­­­­­­­­­­­­

Q1. (Points 15) Write worst-case complexity for the algorithms for problem size n

|  |  |  |
| --- | --- | --- |
| **SNO** | **Algorithm** | **Worst-case**  **Complexity** |
| 1 | Recursive Algorithm for computing the n-th power of 2 | O(logn) |
| 2 | Brute Force Algorithm for Closest-Pair Problem for k-dimensional space | O(n^2) |
| 3 | Brute Force Algorithm for Convex Hull | O(n^3) |
| 4 | nth Fibonacci Term (Iterative) | O(n) |
| 5 | Recursive algorithm for Tower of Hanoi puzzle | O(2^n) |
| 6 | Radix sort (d is the number of digits, k is the base) | O(d\*(n+k)) |
| 7 | nth Fibonacci Term (Recursive) | O(2^n) |
| 8 | Brute force algorithm to find the intersection of two sets with sizes m and n | O((n^2)\*(m^2)) |
| 9 | Rank selection algorithm using the sieve technique | O(n^2) |
| 10 | Partition algorithm | O(n-1) |
| 11 | Strassen’s Algorithm for Matrix multiplication | O(n^(ln7)) |
| 12 | Divide and conquer approach for Closest-Pair Problem | O(nlogn) |
| 13 | Karatsuba’s algorithm for the Multiplication of Large Integers | O(n^1.58) |
| 14 | Divide and conquer approach for Tromino Puzzle | O(n^2) |
| 15 | Divide and conquer approach for Convex Hull | O(nlogn) |

Q2.(point 10) Write average-case and worst-case complexities for the algorithms for problem size n

|  |  |  |  |
| --- | --- | --- | --- |
| **SNO** | **Algorithm** | **Average-case**  **Complexity** | **Worst-case**  **Complexity** |
| 1 | Searching in Binary Search Trees (BST) | O(logn) | O(n) |
| 2 | Searching in B-Trees | O(logn) | O(logn) |
| 3 | Interpolation Search | O(n) | O(loglogn) |
| 4 | Quick Sort | O(nlogn) | O(n^2) |
| 5 | Merge Sort | O(nlogn) | O(nlogn) |