Work Sheet 2 Design and Analysis of Algorithms

Basic Algorithms

1. Suppose we are given two sorted arrays A[1 .. n] and B[1 .. n] and an integer k. Describe an algorithm to find the kth smallest element in the union of A and B in θ (log n) time. For example, if k = 1, your algorithm should return the smallest element of AUB. You can assume that the arrays contain no duplicate elements

// Assume that both arrays have a mix up of elements, so that neither of A or B has all elements less than other array is eliminated

2. Given an unsorted of distinct integers, find the largest pair sum in it. For example, the largest pair sum in {12, 34, 10, 6, 40} is 74. In O(n) time complexity

3. There is a two dimiensional array where each row and each column is sorted. You are given an elt. K. Find the elt in the array with less than $O(n^2)$ time complexity