1	Explain any nine of the following with appropriate detail with example.
	
	   a) 8 Queen problem with brief algorithm
	
	   b) Parallel Programming
	
	   c) Survival of the fittest in genetic algorithms
	
	   d) Apriori Vs. posterior Analysis of algorithms
	
	   e) Brute Force approach
	
	   f) N Vs. NP problems
	
	   g) DFS Vs. BFS
	
	   h) Prim Vs. Kruskal
	
	   i) Use of sentinel values in code tuning technique
	
	   j) Master theorem

2 A	Consider a problem of determining if a bit string of length n contains two consecutive zeros. The basic operation is to examine a position in the string to see if it is a 0 or a 1. Either give an adversary oracle to prove that we require an algorithm that needs to examine every bit of the string or give an algorithm that solves the problem by examining fewer then n bits.
B	An Euler circuit in an undirected graph is a circuit (i.e. a cycle that may go through some vertices more than once) that includes every edge exactly once. Give an algorithm that finds an Euler circuit in a graph or tells that the graph does not have one.

C	Given an adjacency list (with edge weights in parentheses for a digraph)
	
	  A: B(4.0), F(2.0) B: A(1.0), C(3.0), D(4.0) C: A(6.0),B(3.0), D(7.0) D: A(6.0), E(2.0)
	
	  E: D(5.0) F: D(2.0), E(3.0) Digraph has three shortest paths from C to E
	
	(All of same weight). Give shortest path algorithm that will find any one of these paths.

3 A	The first n cells of the array E contains integers sorted in increasing order. The remaining cells all contain some very large integer that we may think of as infinity (name it as maxint). The array may be arbitrarily large and you don't know n. Give an algorithm to find a position of a given integer x (x< maxint) in array in O(log n) time.
B	Distribute the integers in a list according to their sizes. Creating an array of lists, named bucket. The array bucket has 10 entries. List elements in the range 0 through 99 should go into the list bucket [0], elements in the range 100 through 199 should go into the list bucket [1] and so on, and all elements that are 900 or over should go into the list bucket [9]. Assume your procedure takes two parameters only, the list of elements to distribute and the array bucket.
C	In towers of Hanoi problem six disks of different sizes are piled on a peg in order by size, with the

	largest at the bottom. There are two empty pegs. The problem is to move all the disks to the third peg by moving only one at a time and never placing a disk on top of a smaller one. The second peg may be used for intermediate moves. The usual solution recursively moves all but the last disk from the starting peg to the spare peg, and then moves the remaining disk on the start peg to the destination peg, and then recursively moves all the others from the spare peg to the destination peg. Give the recursive procedure for the above.
4 A	E is an array containing n integers and we want to find the maximum sum for a contiguous subsequence of element of E. For e.g., consider the sequence in the elements, 38, -62, 47, -33, 28, 13, -18, -46, 8, 21, 12, -53, 25 The maximum subsequence sum for this array is 55. The maximum contiguous subsequence occurs in positions 3 through 6. Give an algorithm that finds the maximum subsequence sum in an array. What is the asymptotic order of running time of your algorithm?
B	Suppose you have inherited the rights to 500 previously unreleased songs recorded by one popular group Raucous Rockers. You plan to release a set of five compact disks with a selection of these songs. Each disk can hold a maximum of 60 minutes of music, and a song can't overlap from one disk to another. Since you are a classic music fan and have no way of judging the artistic merits of these songs, you decide the following criteria a)The songs will be recorded on the set of disks in order by the date they were written b) The number of songs included will be maximized. You have a list of the length of the songs, l1,l2,….l500 in order by the date they were written. (Each song is less than 60 minutes long). Give an algorithm to determine maximum number of songs that can be included in the set satisfying the given criteria.
C	Two Players compete in the following game: There is a pile containing n chips. The first player removes any number of Chips except that he cannot take the whole pile. From then on, the players alternate moves. each person removing one or more chips but not more than twice as many chips as the preceding player has taken. The player who removes the he last chip wins. For example: suppose n=11, player A removes 3 chips; player B may remove up to 6 chips and he takes 1. There remains 7 chips, player a may take 1 or 2 chips and he takes 2, player B may remove up to 4 and picks up 1. turn. There remain 4 chips, player A now takes 1; Player B must take at least one chip and player A wins in the following. What is the best move for the player to make if there are initially 1000 chips? OR Write out the factorization that would require minimum operations to evaluate $p(x)=x^7+6x^2 - 7x^5+12x^4+2x^2-3x-8$