

Sample Lab Exercise

N.B: Read all input from a input.txt file

1.	Given the truth values of the propositions p and q, find the truth values of the conjunction, disjunction, exclusive or, conditional statement, and biconditional of these propositions.
2.	Write a program to create two sets and perform the union, intersection operation on sets
3.	Find complement of a set
4.	To create two sets and perform cartesian product, symmetric difference operation on these two sets.
5.	To find power set of a given set.
6.	Given an ordered list of n integers and an integer x in the list, find the number of comparisons used to determine the position of x in the list using a linear search and using a binary search.
7.	Given a list of integers, determine the number of comparisons used by the bubble sort and by the insertion sort to sort this list.
8.	Compare either the number of operations or the time needed to compute Fibonacci numbers recursively versus that needed to compute them iteratively.
9.	Determine which Fibonacci numbers are divisible by 5, which are divisible by 7, and which are divisible by 11. Print that your conjectures are correct.
10.	Given a positive integer n and a nonnegative integer not exceeding n, find the number of r-permutations and r-combinations of a set with n elements.
11.	Given a sequence of positive integers, find the longest increasing and the longest decreasing subsequence of the sequence.
12.	Find the probabilities of each type of hand in five-card poker and rank the types of hands by their probability.
13.	Construct a Gray code where the code words are bit strings of length six.
14.	Find the shortest path a traveling salesperson can take to visit each of the capitals of the 50 states in the United States, traveling by air between cities in a straight line.
15.	Given the adjacency matrix of an undirected simple graph, determine whether the graph is a tree.
16.	Given a list of items, construct a binary search tree containing these items.
17.	Given a binary search tree and an item, locate or add this item to the binary search tree.
18.	Given the list of edges and their weights of a weighted undirected connected graph, use Kruskal's algorithm to find a minimum spanning tree of this graph.