

# Preface

Weighings, possibly the oldest and surely most extensively well-known problem concerns in the search for a counterfeit coin. In a set of  $n$  coins, there is precisely one fake coin with the possibility of heavier or lighter. We want to recognize the counterfeit coin with few weighings with an equal arm balance. The ancient puzzle of counterfeit coin serves as a prime example in discussing various aspects of search problems and, in past few decades, searching has become the special area of interest of computer science and pure mathematics. The rise of high-speed computer and the analysis of algorithms greatly contributed to the rapid development of combinatorial analysis.

The purpose of the thesis is to give an introduction to the basic ideas of single counterfeit coin problem in chapter -1. To find an optimal algorithm for two counterfeit coins problem is very difficult, though we present the collection of most interesting instances of two counterfeit coins problem. In chapter-2 we emphasize the existing counterfeit coin problem-solving techniques. In chapter 3 we presented Generalised Algorithms for solving  $n$  Coins problem. In chapter-4 we provide Algorithms for Two Counterfeit Coins Problem while both are heavier or both are lighter. In chapter-5 we gave new Algorithms for  $\Delta(w(H)) > \Delta(w(L))$  and  $\Delta(w(H)) < \Delta(w(L))$ . In chapter-6 we established another new Algorithm for Solving Two Coins Counterfeiting with  $\Delta w (H) = \Delta w (L)$ . In chapter-7 we have provided the applications and future scopes of our algorithms.