1. Algorithm Design

In general, algorithm design is a specific method to create a mathematical process in solving problems by the proper use of algorithms. It involves proving theorems for programs rather than writing and debugging programs.

To design an algorithm for a problem, the problem must be analyzed at first. As an example of algorithm design, a program for finding minimum of two integers can be used. We can take two integers say x and y as inputs and see if the first number is smaller than the second one. If so, then the first number is the minimum else, the second number is the minimum. We design an algorithm to solve the problem as follows:

1. Get input values for x and y;
2. Compute minimum value

```
if(x<y)
        min = x;
else
        min = y;
```

3. Return output value min

As another example, a program for finding sum of positive integers can be presented. We can design the algorithm for the problem as:

1. Get input value for n, a positive integer;
2. 2. Compute sum of integers 1 through n

```
Sum = 0;
For(k=1; k<=n; k++)
{
        Sum = sum + k;
}
```

3. Return output value sum.

This is how we design an algorithm to solve specific problems.

2. Algorithm Design-A systematic View'

Algorithm Design basically deals with the study of applying mathematical tools in solving problems of programming. This design of algorithm deals with finding the solution of a particular problem by the proper use of algorithms. This chapter teaches us about how we can use algorithms for fast processing of output and also how the time can be reduced for processing certain programs. Algorithms are better used to solve problems that deal with large set of numbers.

The chapter here presents five problems as a background of algorithm design. The first problem is subset testing problem which illustrates the time savings by using proper algorithms. The second problem is the substring searching problem that provides an interesting blend of theory and practice. Moving on to the next problem is Fast Fourier transform which uses some algorithmic techniques and eminently practical. Fourth, the matrix multiplication problem is presented with a remarkably counterintuitive solution. Lastly, the chapter includes problem regarding algorithmic aspects of a public-key cryptosystem.

For development of an algorithm, firstly the problem is to be defined and a model for solving it is developed. An algorithm specification is to be provided and designing of algorithm should be started. The algorithm after designed should be checked for correctness and analysis is to be done. The developed algorithm is to be implemented and program testing is to be carried out.