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## **BLOCK INTRODUCTION**

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This block introduces algorithm and its complexity analysis with respect to time. This block is organized around three units. In this we describe how to define an algorithm and find out whether it is efficient or not by finding its complexity. Recurrence and its solution methods are discussed so that they can be further used in algorithm complexity analysis. Different notations and comparison of different type of algorithm like Linear, Quadratic, Polynomial and Exponential are described. Then, we discuss how to analyze the time complexity of basic searching and sorting techniques.

Brief description of each unit in the block is as follows:

Unit-1, Being the first unit of the course, it starts with basic definition of an algorithm, what is an algorithm, what are the issues related to analysis of an algorithm, what are the best case, worst case and average case of complexity of algorithms. To understand best case, worst case and average case, an example of linear search algorithm is used. The study of algorithm includes many fundamental and important techniques. These are DIVIDE AN CONQUER, GREEDY TECHNIQUE, DYNAMIC PROGRAMMING, BACKTRACKING AND BRANCH & BOUND TECHNIQUES. This is discussed in the section 1.3.

In this unit basic construct for analysis of algorithm i.e recurrence is defined. A recurrence is an equation or inequality that describes a function in terms of its value on smaller inputs. Different methods i.e substitution method, iteration method and master method are discussed for solving a recurrence problem.

Unit-2, illustrates asymptote, bounds, asymptotic notations and basics of efficiency of an algorithm. Various algorithms like linear, quadratic, polynomial and exponential efficiency comparison are also given.

Unit-3, explains some simple or familiar problems algorithms like GCD computation, Polynomial evaluation, Matrix multiplication, search and sort methods. For each problem pseudo code, algorithm with examples are provided. Also for each problem worst case and average case, complexity analysis is discussed in terms of best case.