**ITS66204 Discrete Structure**

**Assignment - 40%**

**Semester March 2022**

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| **Student Declaration:** | | |
| **I declare that:**  **● I understand what is meant by plagiarism.**  **● The implication of plagiarism has been explained to us by our lecturer.**  **This project is all our work, and I have acknowledged any use of the publisher or unpublished works of other people.** | | |
| **Names of Group Members** | | |
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# Introduction

## Set

A set is an unordered collection of well-defined objects called elements of set. In other words set is a grouping of different objects or elements that share a common characteristic or property, such as numbers, letters, colors, shapes, or even other sets.

Sets will be denoted by capital letters A,B,C…. Elements will be denoted by lower case letters a,b,c…. The phrase “is an element of “ will be denoted by the symbol ∈. Thus we write x ∈ A for “x is an element of A.” In analogous situations, we write x ∉ A for “x is not an element of A.”

The study of sets is part of set theory, which is a branch of mathematical logic that explores the properties and operations of sets. Key concepts in set theory include union, intersection, subset, complement, and cardinality, which provide a framework for analyzing and understanding the relationships between sets.

In many areas of mathematics and beyond, sets are a powerful tool for solving problems. For instance, in algebra, sets are used to define number systems such as real numbers, integers, and rational numbers. In probability and statistics, sets are used to represent sample spaces and events. In computer science, sets are utilized to represent data structures, like arrays and lists.

## Function

Let A and B be nonempty sets. A function f from A to B is an assignment of exactly element of B to each element of A. We write f (a) = b if b is the unique element of B assigned by the function f to the element a of A. If f is a function from A to B, we write f: A→B.

The concept of a function is extremely important in mathematics and computer science. For example, in discrete mathematics functions are used in the definition of such discrete structures as sequences and strings. Functions are also used to represent how long it takes a computer to solve problems of a given size. Many computer programs and subroutines are designed to calculate values of functions. Recursive functions, which are functions defined in terms of themselves, are used throughout computer science.

# Methodology

Let P be the set of all the programs offered by IIMS College. Here the programs offered are: MBA, MCS, BBA, BIHM and BCS which are the elements of the set P.

i.e., P= {MBA, MCS, BBA, BIHM, BCS}

Here, pi represents individual programs in set P.

Let S(x) be the function which gives the number of students in each program represented by x.

S(P) gives a set of total number of students admitted in each program.

S(P) = {120, 150, 500, 200, 400}

Here let Si represent individual element. Where i ranges from 1 to n. n being the number of elements.

Let G be the set of graduate students and D be the set of drop students.

So, D= {15, 20, 100, 30, 120}

Let Di represent drop students for each program. Where i ranges from 1 to n. n being the number of elements.

So graduating students for each program (Gi) = Si-Di

So set G becomes G= {105, 130, 400, 170, 280}

Let us consider R be the set of revenue generated by unit student of each program.

R = {4, 6, 9, 12, 8}

Here each element represents amount in lakhs.

Let Total(pi) be the total revenue generated by each program for IIMS.

Now, using summation to calculate the total, we get,

Total(pi) = ∑Ri

Where i ranges from 1 to n.

Here n = G(pi)

Here, pi represents individual programs in set P.

Thus Total(pi) returns: {480, 900, 4500, 2400, 3200}

Now to calculate the grand total of revenue by the IIMS in the session 2022-23 can be calculated by:

GrandTotal = ∑Total(i)

Where i ranges from 1 to n. n being the number of programs.