

# RAM Maths Circle

February 01, 2026

Nagpur

## Introduction

The session was based on greedy algorithm in graphs. It started with basic review of nodes(vertices) , edges and basics of graph. The goal of this session was to build an understanding of greedy algorithms in graphs by exploring how they make optimal choices at each step. Students learned how these decisions involve selecting appropriate vertices and edges, and how such strategies can be used to efficiently solve graph-based problems.

## Exploration:

It was quite amusing to watch students come up with new strategies to make connecting roads easier and actively debate different approaches and outcomes. The discussions were lively, with students comparing ideas, questioning each other's logic, and refining their strategies.

## Problem 1:

A city is divided into 7 different areas, and some areas can be connected by roads. The task is to plan the road network in such a way that every area is reachable from every other area, while using the minimum number of roads possible.

## Strategies used:

1. There should be at least 1 edge for each node.
2. Make one central node.

## Problem 2:

A well-developed city has 7 areas that are already connected by many roads. The task is to remove certain roads such that all areas still remain connected.

### Strategies used:

1. Start with crowded vertices.
2. Check node connectivity after each elimination.
3. Observed that the minimum number of roads is: (number of areas - 1)

## Problem 3:

A city has 7 areas, and roads can be constructed between them, each with a certain cost. The task is to create roads so that every area is connected to the others, while ensuring the total cost of construction is minimum.

### Strategies used A:

1. Start with a node.
2. Select a cheap neighbor.
3. Remove the redundant.
4. Repeat

### Strategies used B:

1. Start with an edge, and arrange them in ascending order.
2. Select cheap ones and check connectivity before adding.