

# ELECTROTHON

## SIGNAL PROCESSING

# Batanatham's Dilemma

## BACKGROUND:

Batanatham, Batman's cousin, finds himself in a precarious situation. He is stranded on one of the peaks of the Kodaikanal hills, surrounded by enemies who are rapidly closing in from all sides. In this dire situation, his pet bat, Subramani, comes to his aid to determine the distance of the surrounding peaks.

## PROBLEM STATEMENT:

You are provided with the audio that Subramani used to echolocate, as well as the audio he received in return. Your task is to analyze this data and determine the distances of the peaks in front of Batanatham.

Based on your findings, should Batanatham glide away or call his butler Alfred Reddy, for help?

# SCORING CRITERION:

1. Identify the Number of Mountains Present (**15 sparks**): Determine how many mountains are in Batanatham's vicinity.
2. Determine the Attenuation Factor (**40 sparks**): What is the attenuation factor that each wave has suffered during its travel?
3. Identify the Distance of Each Mountain from Batanatham (**40 sparks**): Calculate the distance from Batanatham to each identified mountain.
4. Should Batnatham glide away or call his butler Alfred Reddy for help (**5 sparks**): Given he can only glide 500m.

**NOTE:** The speed of sound waves in Batanatham's environment is 450 m/s.

# DELIVERABLES:

- 1. CODE:** Python or MATLAB file in which you have written the code.
- 2. CALCULATION:** A pdf where you have done calculations on paper if any and theory of your approach.
- 3. FINAL ANSWER:** A pdf where you will submit the final answers.

**NOTE:** Name the project in the following format:- SIGNAL\_YOUR-ROLL-NUMBER\_NAME