

Round Details

Round 1: Pattern Detection & Reconstruction

In this round, participants are provided with sequences or symbolic outputs generated from an unknown source. Their task is to analyze the data to identify patterns, regularities, and redundancy present in the source output. Based on their observations, participants must infer the underlying rule or model that generates the sequence and write pseudocode to reproduce the same output. This round relates to the source modeling aspect of information theory, where understanding patterns and predictability helps in estimating redundancy and designing efficient source coding schemes.

Round 2: Encoded Output Analysis

Participants are given outputs produced by unknown encoding or compression schemes. Using principles of source coding, they must analyze the encoded data, determine the possible encoding technique, and reconstruct the original message. Participants are also expected to explain the reasoning behind their decoding approach by relating it to concepts such as entropy, symbol representation, and coding efficiency. This round emphasizes how information is represented, compressed, and transmitted efficiently using coding strategies.

Round 3: Behavioural Reverse Engineering

In the final round, participants are provided with input–output pairs generated by a “black-box” system that performs an unknown transformation on the input data. Students must study the relationship between the inputs and outputs to deduce the underlying algorithm or transformation process. They then design pseudocode that replicates the system’s behaviour. This round reflects the information processing and transformation aspects of communication systems, where signals pass through encoding, processing, or channel operations that modify the original information.