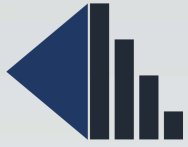


THE ANNUAL TECHNICAL FEST OF ELECTRONICS ENGINEERING DEPARTMENT OF IIT (BHU)

# UDYAM'21



**Silence**

**Laboratories COMMNET**

## **Problem Statement for Round 1**

The Monster Association, led by Orochi, has finally come out of the shadows. Chaos reigns the cities as numerous heroes are injured and the Hero Association is spread thin. The S class hero Drive Knight was leading the investigation about the whereabouts of the Monster Association, but he went AWOL, just after transmitting three encoded messages to the nearest hero, who happened to be Genos.

Genos, through rudimentary analysis of the messages, found out that the first message was a map listing all the monster hotspots of the city under siege, and the second message was the name of the city. The third message had an important hint for cracking the first message, but it was password-protected, and its password was in the second message. Help Genos extract the required information from the messages, so that he can request Saitama's help in defeating the Monster Association.



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## Files :

There are three files -

- a. **mod.mat** has a columnwise bit stream which represents the map of the city in the form of a square binary image with 400x400 dimensions. It has been modulated using one of the PSK modulation processes. Modulation was done using carrier frequency of 50 kHz, Pulse duration 0.1 ms, sampling rate of  $5 \times 10^5$ .
- b. **compressed.txt** has the name of the city and password for hint.pdf. Huffman encoding was used to compress the file. It also has a hint for decoding the Huffman code.
- c. **hint.pdf** has a hint for finding out the coordinates of monster hotspots. It is encrypted and its password is in the first file ( Location.mat)

## Tasks :

Your tasks are -

- a. Solve compressed.txt and get the name of the city from compressed.txt and also get password to open hint.pdf
- b. Hint.pdf has tool-hint to solve mod.mat
- c. Find the coordinates of the centroids of monster hotspots from Mod.mat



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## Scoring :

Complete at least one task for a certificate. Partial scoring is applicable.

Scoring is as follows :

i) Quiz - 15%

ii) PS 1 : 40%

iii) PS 2 - 45%

## Submission :

Send your answers via mail with subject

**"COMMNET | PS1 | SOLUTION SUBMISSION | <TEAM NAME>"**

to [dhhasmukhbhai.ece18@itbhu.ac.in](mailto:dhhasmukhbhai.ece18@itbhu.ac.in). It should contain -

1. Team information. i.e. Team name, team members, branch of each student along with Roll No.
2. Summary of extent of the problem statement you were able to solve with names of tools/software used.
3. A text file containing the coordinates (keep it blank if you weren't able to find it) and the name of the city (keep it blank if you weren't able to find it) Name this text file as "answer.txt".
4. Matlab scripts/other programming files you used for the tasks with *EASY TO UNDERSTAND EXPLANATION*.

Deadline - 5 PM, 11 April, 2021

Files needed -

[https://drive.google.com/drive/folders/1Au1m\\_dbGCJrGnsbiwZvC\\_meB-i-wKKV8p?usp=sharing](https://drive.google.com/drive/folders/1Au1m_dbGCJrGnsbiwZvC_meB-i-wKKV8p?usp=sharing)