Task 1.A description:

- Generating a stream of ethernet packets following specific configuration parameters read from a configuration file.
- Packet's Composition should follow the attached state machine in packetstateMachine.PNG attached.

Task 1.A requirements:

1. Generate a stream of ethernet packets and dump them in a file.
   (Hint: You can choose the appropriate file format to log the stream of packets and its IFGs in any clear format you prefer).
2. Read packets configurations from a text file, ex:"config.txt" attached.
3. Packets Generation Mechanism:
   a. Packets will be generated for a specific streaming duration.
   b. Packets are to be sent in bursts.
   c. Bursts will be sent periodically, till the end of streaming time.
   d. You can calculate the packets number to be sent from the parameters in the configuration file.

4. Packets should be 4-byte aligned, meaning that the preamble of the ethernet packet should start at multiples of 4-byte. (Hint: To align the start of packets, IFGs are sent as padding)

5. If the period or the total streaming duration have ended while an ethernet packet is being generated, the packet should be discarded and IFGs are sent instead.

6. You can consider that the IFG value = 0x07, Preamble Value = 0x55, SOF (Start of Frame) = 0xFD.

7. You should follow the length of fields as per the ethernet standard IEEE 802.3 and read about Ethernet frames and their content.

8. CRC should be calculated for crc_32 equation, you can read about CRC_32 and how to calculate it.

9. The program will accept the following two arguments:

   a. Configuration file: The relative or absolute path of the file.

   b. Output file: The output file name

10. The program should check that it has permissions to read or write any of the above file

Task 1.B description:

Generate a stream of “IQ Message type 0” eCPRI packets and dump them in a file as Task 1.A, following the same steps in Task 1.A.

Task 1.B requirements:

After finishing task 1.A:

1. Read about eCPRI protocol from the standard “eCPRI_v_2.0_2019_05_10c.pdf” attached

2. Support the IQ eCPRI packet (Message type 0) found in section 3 in the standard.

3. Modify the configuration file attached to use it to generate eCPRI packet, if needed.

Note:

- Feel free to insert any random or hardcoded data in the "IQ payload" instead of real data.
- You can reuse the code you have already written in Task 1.A.

General Rules:

1. Program should be written in python.

2. Your program will be evaluated on the code functionality, maintainability, and reusability.

3- Attach a report with the: code structure, and a sample with the generated packet format in bytes illustrating its structure.

4- A readme file with instructions on how to run the code and make sure the code will install the mandatory libraries.

5- A document to list all testcases you have used to test each task.