Video Compression (H.264)

Construct a team of 4 members and work **together** on the following task:

Implement the **main profile** of the H.264 encoder/decoder using MATLAB (or C, C++, Python). There are other profiles in the H.264 standard, but you are required to implement the main profile only based on the **ITU-T Rec. H.264 (05/2003) standard**.

Deliverables:

1- Your own developed H.264 main profile encoder and decoder using MATLAB (or other language) code. The correctness of the code will be graded. The main tasks include:

   a. Motion estimation and compensation (temporal model),
   b. Transforming and quantizing the frames or their estimated residuals (the spatial model)
   c. Entropy coding using arithmetic code. In H.264 (main profile), an advanced version of the arithmetic code is used known as Context Adaptive Binary Arithmetic code (CABAC). Implementation of the basic arithmetic code (as in the lectures) is required, while the full CABAC algorithm will be considered as an extra bonus.
   d. Encoding with the exact frame structure indicating the H.264 code parameters (will become clear after you read the standard, or a textbook on H.264). The decoder should be able to parse the frame header and extract the relevant parameters needed for decoding.

2- Your code should be modular, readable, and re-usable. This will also be graded.
3- A documentation of your code is required. In the documentation you should explain clearly all your used modules (functions) and their corresponding inputs, outputs, internal variables, etc., and how they map to the compression algorithm.
4- A sample video with and without compression.

Deadline:
Sunday 24/11
11:59 PM