

## Mini Project I: General signal generator

It is required to implement a general signal generator that has the following specifications:

1. When the program starts the program asks the user for the following parameters:
  - a. Sampling frequency of signal.
  - b. Start and end of time scale
  - c. Number of the break points and their positions (i.e. the points that the signal definition rule changes).

Example: The signal is defined from -2:0 as a DC signal and from 0:2 as ramp the user will enter that the number of break points =1 and the position at  $t=0$ .

2. According to the number of break points the program asks the user at each region to enter the specifications of the signal at this region Which are:
  - a. **DC signal**: Amplitude.
  - b. **Ramp signal**: slope – intercept.
  - c. **General order polynomial**: Amplitude-power – intercept.
  - d. **Exponential signal**: Amplitude – exponent.
  - e. **Sinusoidal signal**: Amplitude – frequency – phase.
  - f. **Sinc function**: Amplitude – center shift.
  - g. **Triangle pulse**: Amplitude – center shift- width.
3. Display the resulting signal in time domain.
4. the program asks the user if he wants to perform any operation on the signal
  - a. **Amplitude Scaling**: scale value.
  - b. **Time reversal**.
  - c. **Time shift**: shift value.
  - d. **Expanding the signal**: expanding value
  - e. **Compressing the signal**: compressing value
  - f. **Clipping the signal**: upper and Lower clipping values
  - g. **The first derivative of the signal**.
  - h. **None**
5. Display the new signal in time domain

***Submission regulations (Read carefully):***

1. You should solve **in a group** of (4) students.
2. Each group should submit a softcopy report including screenshots for the output of the code, m file of the project and hardcopy report during the discussion.
3. Submission deadline and discussion: within the 10<sup>th</sup> week starting 13/4/2024.
4. Copied codes will take **zero**
5. Any group may be asked to explain any step in the program and his/her report in the discussion.