# Quiz – 4

**Instructions:**

1. Please consider the last two digits of your roll number to be KEY. For example, if your roll number is 22411, then your KEY = 11. If the last two digits is 00, then use KEY = 100.
2. This work must be done individually. No type of collaboration is permitted between the students. Please do not use any type of learning tools or external resources for the assignment. You are only allowed to use class notes and reference materials provided in the class.
3. Please submit the code and the written answer together in your final submission.

**MATLAB Code**

We consider an automotive radar with a KEY μs pulse repetition interval and 10% duty cycle. The pulse is coded by 16 bit polyphase sequence { +1,+1,+1,+1,+1,+j,-1,-j,+1,-1,+1,-1,+1,-j,-1,+j } where each bit length is of equal duration. The signal is upconverted to a carrier frequency of 77GHz. Assume two moving targets with the following parameters –

1. First target is located 100m away moving towards the radar with a velocity of 5m/s.
2. Second target is located 50m away from the radar moving away from the radar with a velocity of 2.5m/s.

Process the down-converted, digitized, baseband received signal to obtain the range-Doppler velocity plot.

**Written Component**

Are the targets resolved in range? Are the targets resolved in Doppler velocity? Are the targets resolved in both range and Doppler velocity? Are the targets within the maximum unambiguous limits of the radar along range and Doppler velocity?