# CE 6308/CS 6396/EEDG 6308: Real-Time Systems

## Fall 2021. Assignment 2. Due October 28, 2021

Consider a railway control system that coordinates multiple trains so that each train can move safely and in a timely way from one railway station to another. Each train has a specific route and schedule. For example, one train has to move from Station A to Station C and then to Station K while another train has to move from Station E to Station C and then to Station J, etc. The system also includes the control of each train.

Based on your Assignment 1, identify all the inputs to the system and all the outputs of the system based on the set of sensors and actuators available on the railway system. Evaluate the capabilities and limitations of the set of available sensors and actuators in the context of the railway control system. The control system should enable each train to safely proceed to its next station, monitor the environment, stop in real-time if there are any critical problems, and reach the next station as soon as it is safe to do so without colliding with any obstacles, including other trains that may also be on the track at that time.

Decompose the robot control system into a set of tasks. The set of tasks should include those that address safety issues (e.g., a train should not proceed on the track if there is another train on the track) as well as functional issues (e.g., ensuring that the train will reach the next station within a specified time when it is safe to do so). Clearly describe the function of each task along with its characteristic (periodic, aperiodic, or sporadic), temporal parameters (e.g., period, relative deadline, etc.), and any dependencies. Identify a scheduling method for the system and show the schedule.