# CS 4397: Embedded Computer Systems

## Fall 2021. Assignment 1. Due September 30, 2021

Consider a robot control system that controls a robot to enable it to walk along a road and cross a stream. The robot should use all the sensors available to it to move safely on the road and to determine when to cross the stream. When it is moving along the bridge to cross the stream, it should activate a mechanism to alert other entities that it is crossing the stream. For this assignment, provide the following information:

1. What sensors and actuators are needed in order to ensure that the robot will safely deliver the items to the customer?
2. Besides the data provided by the sensors, what other information is needed for the robot to safely cross the stream? For example, does it need to have a map information, does it need data to know the status of the bridge and the stream, etc.?
3. Describe the goal of the control system, including the functional and non-functional requirements specification for this robot control system.
4. Use the outside-in approach to decompose the robot control system into a set of tasks. The set of tasks should include those that address safety issues (e.g., the robot should not fall into the stream) as well as functional issues (e.g., ensuring that the robot will cross the stream within a specified time). 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.