Throughout this course we have seen that an embedded system uses its input/output devices to interact with the external world. In this chapter we will focus on input devices that we use to gather information about the world. More specifically, we present a technique for the system to measure analog inputs using an analog to digital converter (ADC). We will use periodic interrupts to sample the ADC at a fixed rate. We will then combine sensors, the ADC, software, PWM output and motor interfaces to implement intelligent control on our robot car.

Learning Objectives:

- Develop a means for a digital computer to sense its analog world.
- Review digitization: Quantization, range, precision and resolution.
- Extend the Nyquist Theorem to cases the ADC is used to sense information.
- Study the basics of transducers: conversion of physical to electrical.
- Use an optical sensor to measure distance to an object.