

Workshop:	Computers in Control
Tutors:	David Davidson
Pre-requisites:	Elementary acquaintance with computer programming
Necessary equipment:	Some means of displaying PowerPoint slides Desk space for ~5 laptops (with access to mains power supply) Floor space to run some small Lego robots
Class Size:	~20 students, 4 students per group per laptop
Duration:	~ 2hours

The workshop aims to describe the application of computers to control real-world systems using sensors to determine the state of the system and actuators to change its state.

The workshop will begin with an introduction to sensors:

switches (bump sensor)

proximity sensors (infra-red; ultrasound)

light sensors

and explain how the sensor output is transformed to a numeric value that can be processed by the computer.

Typical computer controlled actuators will be discussed:

solenoid

stepper motor

dc motor

The principle of how a number value can be transformed into a control signal that drives the actuator will be explained.

The second part of the workshop will illustrate computer control techniques using a programmable Lego robot (5off, one per laptop). The robot will be equipped with simple sensors (bump and light) and actuators (dc motors) which drive and direct the robot. The students will program the robot to react to its surroundings with simple "behaviours". This part of the workshop will also illustrate some general aspects of object oriented programming.