Embedded Systems Cybot Interfacing Using Microcontrollers

Robot Sensors

• The class used C in weekly labs to develop applications to be run on an embedded system, a roomba robot with additional logic boards, as well as a final project where we developed an automated navigation program that allowed the robot to traverse an obstacle course to reach and stop on a specific part of the course.

I have included a copy of our final block diagram for the project as well as pictures of the roomba robot we programmed and an example obstacle course during the final project. Mars Rover Project **ADC Base Station** Converts analog data Robot Hardware Allows User to control actions of the from sensors to digital values Cybot and maps out environment based on information from sensors Sound Used to emit an audible **GUI Control** "alert" that the course has Allows User to issue finished. commands and see a better representation of Cybot commands and processed data This robot communicates with the base station to send/receive data and navigate the terrain. Uses Interrupts Cybot wheels Base Station software for data collection and prioritization Handles Cybot movement of commands. and rotation <u>UART</u> Handles communication between Cybot and GUI, receiving commands and sending object information to map Servo Motor handles rotation of sensors to allow for object detection in 180 degrees <<include> **Ping** <u>IR</u> **Bump PWM Drop** Sonar used for object Sensor used for object Used for controlled 180 Detects small objects Detects hole and edge of detection, distance detection, distance degree movement of the when bumped into boundary measurement and size measurement and size servo Interrupts & Input Capture: Used to detect clock edges to

determine object distances



