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Department of Computer Science

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Embedded Systems Group

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Introduction to Embedded Systems – Exercise Sheet No. 6 (On-line Sheet)

1. **Exercise:** *(4 Points)*
   Equip your Lego Mindstorm robot with a sound sensor and a light. Implement a LabView VI such that your robot moves straight forward slowly while the lamp is switched off. Furthermore, the robot should react on noise. If you clap your hand, the robot should behave as follows:
   - Your robot should perform a 360° turn.
   - While turning around, your robot should play a sound file of your choice (you can find some so-called .rso files on the NXT control unit that you can play via the built-in loudspeaker of your robot).
   - Simultaneously, the lamp should blink several times.

   After the robot has executed the above actions, it should continue by moving straight forward and expecting the next noise.

2. **Exercise:** *(6 Points)*
   Make your robot play golf. For that purpose, equip your robot with a light sensor, an ultrasonic sensor and a golf club. Place two holdings on the floor at a distance of approx. 60 cm, put a red and a blue ball in the holdings. Place your robot in the middle between the two holdings so that it approaches one of the two balls when moving straight forward. The direction of the robot, i. e. whether it points to the red or to the blue ball, should be arbitrary.
   Implement a LabView VI resulting in the following behavior of your robot:
   - Starting from its initial position between the two balls, the robot moves ahead until it is close enough to a ball to detect its color using the light sensor. In order to determine a suitable distance, make use of the ultrasonic sensor. Perform experimental measurements using the ultrasonic sensor to obtain a good value for this distance.
   - If your robot detects the blue ball, activate the gulf club and hit the ball.
   - If your robot detects the red ball, make it back off a little bit, then turn around by 180° and continue driving towards the other ball until you reach a suitable distance in order to put the blue ball into a virtual golf hole.

On-line processing: During the lab on Tuesday, June 24, in OH16 / U09

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