RoboSail: Activities and Programs to use / create

Basic Course

___ 1. Radio Control sailing

___ 2. Robot sailing exercise

___ 3. Arduino Tutorial 1 and 2 with a servo motor – ServoTeamName.ino

___ 4. Fill in Boat Calibration Worksheet using hardware test programs to investigate hardware:

   a. WindSensorTest.ino
   b. RCReader.ino
   c. RudderServotest.ino
   d. SailServotest.ino
   e. RCPassThrough.ino to check full system wiring

___ 5. Practice using the plastic sailboats to learn RoboSail frame of reference for sensor data.

___ 6. Use BoatCodeStarter.ino and create a practice program RudderFollowsWind.ino

___ 7. Develop algorithm for automatic sail trim

___ 8. Create code for automatic sail trim and call it AutoSail.ino

___ 9. Discuss ways to use sail lever on transmitter to switch between manual and automatic

___ 10. Develop algorithm and code for a manual/automatic sail trim switch and call it AutoSailSwitch.ino

___ 11. Human Sailing: sail to a Point of Sail using a fan

___ 12. Develop algorithm for automatic rudder for a given Point of Sail (POS)

___ 13. Create new code called AutoRudder.ino that sails to a given Point of Sail (POS)

___ 14. Create code that switches between manual and automatic rudder and call it AutoRudderSwitch.ino (using code from your AutoSailSwitch.ino code)

___ 15. Develop algorithm that makes the the boat gybe when appropriate (shortest path to new POS)

___ 16. Create shortest path/gybe code and add to AutoRudderSwitch

___ 17. Discuss ways to use the rudder lever to send Point of Sail cues to boat when in automatic rudder mode and develop algorithm.

___ 18. Create code to change direction (Point of Sail) by using cues from RC Transmitter and call it AutoRudderSwitchCue.ino

___ 19. Plan and code for regatta tasks or testing on the water

Advanced

___ 1. Use hardware test programs to investigate compass/accelerometer and GPS modules
    a. XYZAccel.ino for accelerometer as a “heel” sensor
    b. Compass programs to determine hardiron values and calibrate compass 1.
        i. compassBasic
        ii. compassCalibration
        iii. compassBasicwithCalibration
        iv. compassTest
    c. GPSTest.ino
___ 2. Develop algorithm for deriving “Absolute Wind Direction” from the compass and WindAngle
___ 3. Develop algorithm for calculating a desired POS from Absolute Wind Angle and desired Boat Heading (compass)
___ 4. Develop an algorithm for a cueing the boat to change compass headings
___ 5. Create code that makes boat sail to a given/cued compass angle instead of Point of Sail
___ 6. Develop algorithm for calculating a compass angle from your boat position (GPS) to a desired position (GPS).
___ 7. Create code to sail to a given GPS point and back
___ 8. Plan and code for regatta tasks or testing on the water

Regatta

___ 1. Demonstrate Regatta challenges on water
___ 2. Add up score for boat performance and get team ratings