Module 2: Answers

1. What is the farther distance the Jet sonar module can measure?

4-5 meters

2. Tablets and cellphones can detect whether they are being used in a portrait or landscape orientation. What sensor is used to detect this?

gyroscope

3. What does a gyroscope measure?

Rate of angular rotation about an axis.

4. The Jet encoders can detect 3200 ticks per revolution. If a wheel has moved 1000 ticks forward and Jet has 6" wheels. How many inches has the robot moved forward?

5.89 in.

5. Explain why the motors cannot be directly connected to the Jetson TK1.

The motors require a higher current than the pins on the Jetson can supply. The h-bridge shield can supply the current to run the motors.

6. How do you read the encoder values?

The encoder values are published to ROS topics /left_encoder and /right_encoder.

7. Describe the reason for the 6-pin connector on the Jet motors.

2 pins are used to run the motor. The other 4 pins are for the encoder: Vcc, ground, and 2 encoder pins.

8. Describe the reason for the 4-pin connector on the sonar module.

2 pins are Vcc and ground. 1 pins is to trigger the sonar pulse. The final pin is for measuring how long it takes for the sound to reflect back.

9. You would like to measure how bumpy or smooth the ground is that Jet is running on. What sensor would be best suited for this?

Accelerometer

10. What is gyroscope drift?

Over time, a gyroscope will accumulate error and drift away from the actual position.