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CSC 232 Lab 1

Academic Honesty Statement:
"I affirm that I have not given or received any unauthorized help on this assignment, and that all work is my own."

Work Done in Lab:

During the lab we accomplished the following

- Develop a CMake file
- Learned proper terminal usage.
- Debugged CMake File and C++ code
- Learned to access and manage ROS messages system and collect odometry data

Questions:

1.

$$\begin{pmatrix} x' \\ y' \\ \theta' \end{pmatrix} = \begin{pmatrix} x \\ y \\ \theta \end{pmatrix} + \begin{pmatrix} -\frac{\hat{v}}{\hat{\omega}}\sin\theta + \frac{\hat{v}}{\hat{\omega}}\sin(\theta + \hat{\omega}\Delta t) \\ \frac{\hat{v}}{\hat{\omega}}\cos\theta - \frac{\hat{v}}{\hat{\omega}}\cos(\theta + \hat{\omega}\Delta t) \\ \hat{\omega}\Delta t \end{pmatrix}$$

    1.
        a. x = .25*t
        b. y = 0
        c. yaw = 0
        d. v = .25
        e. w = 0
    2. d
    3. d
    4.
        a. x =
        b. y = 0
        c. yaw = 0
        d. v = .25*sin(t)
        e. w = 0

5.
    a. x = 0
    b. y = 0
    c. yaw = sin(t)
    d. v = 0
    e. w = sin(t)

2. All data figures are located in the Data Figure folder included with the source code.

3. The Bumper is in the topic turtlebot_node::sensor_state

```
//Bumper subscriber.
    ros::Subscriber bumperSub = n.subscribe<turtlebot_node::TurtlebotSensorState>
("/turtlebot_node/sensor_state", 1000, bumperCallback);
```