Description of Overall Test Plan

Our overall test plan is to break our testing into two parts, hardware and software. Our hardware testing will include testing for drive shaft, motors, drivetrain, sensors, and medicine dispenser. While the testing for the software will contain testing for the database, web application and robot's functionality. Then we will put these two elements together in order to test the robot as a whole and to ensure all aspects of the project are working properly.

Test Case Descriptions

Hardware Testing

M1.1	**Motor Test 1**
M1.2	Ensure the motors fit inside the robot's base.
M1.3	Test to see that the required motors are of the proper size.
M1.4	Inputs: Motor
M1.5	Output/Results: Motors fit correctly inside robot's base.
M1.6	Normal
M1.7	Blackbox
M1.8	Functional
M1.9	Integration

M2.1	**Motor Test 2**
M2.2	Ensure the motors ensure the motors are powered on via raspberry-pi.
M2.3	To test that the motors are compatible with the raspberry-pi.

M2.4 Inputs: Motors, breadboard, batteries and raspberry-pi.

M2.5 Output/Results: Motors power on and operate correctly. Motors can move in both directions and can move independently.

M2.6 Normal

M2.7 Blackbox

M2.8 Functional

M2.9 Integration

DS1.1 **Drive Shaft Test 1**

DS1.2 Ensure the drive shaft operates correctly with the motor.

DS1.3 This test ensures that the drive shaft moves correctly with the power input given from the motors.

DS1.4 Inputs: Motors (power: high, medium, low), drive shaft, and drive train

DS1.5 Output/Results: Drive shaft operates correctly given the power from the motors.

DS1.6 Normal

DS1.7 Blackbox

DS1.8 Functional

DS1.9 Integration

DS2.1 **Drive Shaft Test 2**

DS2.2 Ensure the drive shaft can handle the stress of the robot.

DS2.3 This test ensures the robot doesn't outweigh the drive shafts capabilities.

DS2.4 Inputs: Motors (power: high, medium, low), drive shaft, and drive train.

DS2.5 Output/Results: Drive shaft operates correctly given the power from the motors.

DS2.6 Normal

DS2.7 Blackbox

DS2.8 Functional

DS2.9 Integration

DT1.1 **Drivetrain Test 1**

DT1.2 Ensure the drivetrain is able to give proper power to the wheels of the robot.

DT1.3 This test ensures the drivetrain can move the robot given the power input from the motors and is able to turn given the input from the drive shaft.

DT1.4 Inputs: Motors (power: high, medium, low), drive shaft (movement: left, right, straight), and drive train.

DT1.5 Output/Results: Drivetrain operates correctly given the power from the motors, and movements from the drive shaft.

DT1.6 Normal

DT1.7 Blackbox

DT1.8 Functional

DT1.9 Integration

S1.1	**Sensors Test 1**
S1.2	Ensure sensors are able to detect an object from a given distance away.
S1.3	This test ensures the sensors are compatible with the rest of our robot's hardware and that the sensors are successful in detecting objects.
S1.4	Inputs: Object distances of 1 – 10 feet away from the sensors.
S1.5	Output/Results: Sensors are able to detect the object when the sensors are at least 4 feet away.
S1.6	Normal
S1.7	Blackbox
S1.8	Functional
S1.9	Integration

MD1.1	**Medicine Dispenser Test 1**
MD1.2	Ensure medicine dispenser operates correctly with the rest of the robot's hardware.
MD1.3	Ensures the medicine dispenser fits inside the robot and rotates correctly.
MD1.4	Inputs: Motor, and medicine dispenser
MD1.5	Output/Results: Medicine dispenser makes one rotation when the motor powers it to do so.
MD1.6	Normal
MD1.7	Blackbox
MD1.8	Functional

MD1.9 Integration

Software Testing

DB1.1 **Database Test 1**

DB1.2 Ensure all database queries execute correctly.

DB1.3 Ensures the insert, update, delete queries all execute successfully. This simulates how the web application would update scheduled delivery times.

DB1.4 Inputs: Insert, update, and delete queries.

DB1.5 Output/Results: The correct results are stored in the database after each query is executed.

DB1.6 Normal

DB1.7 Blackbox

DB1.8 Functional

DB1.9 Unit Test

DB2.1 **Database Test 2**

DB2.2 Ensure all database data is stored and can be recalled as needed.

DB2.3 Ensures the data is stored properly and all select statements effectively recall the necessary information.

DB2.4 Inputs: Select queries.

DB2.5 Output/Results: The select statements recall the necessary stored database delivery times.

DB2.6 Normal

DB2.7	Blackbox
DB2.8	Functional
DB2.9	Unit
WA1.1	**Web Application Test 1**
WA1.2	Ensure ‘Call Robot Now’ button requests the robot
WA1.3	Ensures the web application’s ‘Call Robot Now’ button kicks off the robot delivery process.
WA1.4	Inputs: Click the ‘Call Robot Now’ button.
WA1.5	Output/Results: The code for the robot delivery process initializes.
WA1.6	Normal
WA1.7	Blackbox
WA1.8	Functional
WA1.9	Unit
WA2.1	**Web Application Test 2**
WA2.2	Ensure ‘Schedule Delivery Time’ button schedules a delivery time.
WA2.3	Ensures ‘Schedule Delivery Time’ button executes the correct query to store the associated delivery time in the database.
WA2.4	Inputs: Click the ‘Schedule Delivery Time’ button.
WA2.5	Output/Results: The query to store the delivery time is executed.
WA2.6	Normal

WA2.7 Blackbox

WA2.8 Functional

WA2.9 Unit

WA3.1 **Web Application Test 3**

WA3.2 Ensure web application contains the correct scheduled times at startup.

WA3.3 Ensures the web application recalls the correct scheduled delivery times and displays them on startup and when the page is refreshed.

WA3.4 Inputs: Web application startup and refresh.

WA3.5 Output/Results: The correct delivery times are displayed.

WA3.6 Normal

WA3.7 Blackbox

WA3.8 Functional

WA3.9 Integration

General

F1.1 **Functionality Test 1**

F1.2 Test for robot's movements.

F1.3 Ensures all movements of the robot work correctly.

F1.4 Inputs: Forwards, backwards, left, right.

F1.5 Output/Results: The robot is successfully able to navigate in the correct direction.

F1.6 Normal

F1.7 Blackbox

F1.8 Functional

F1.9 Integration

F2.1 **Functionality Test 2**

F2.2 Test for robot's ability to iterate the medicine dispenser.

F2.3 Ensures the medicine dispenser rotates one time when the robot arrives at the desired location.

F2.4 Inputs: Robot arrives at desired location.

F2.5 Output/Results: The robot is successfully able to iterate the medicine dispenser one time once it arrives at the end location.

F2.6 Normal

F2.7 Blackbox

F2.8 Functional

F2.9 Integration

F3.1 **Functionality Test 3**

F3.2 Test for robot's ability to travel to end user.

F3.3 Once either the desired delivery time hit or the user requests delivery the robot is able to navigate from the home position to the end user.

F3.4 Inputs: Robot's start location, user's end location, and delivery time

F3.5 Output/Results: The robot is successfully able to navigate to the end user and avoid obstacles along the way.

F3.6 Normal

F3.7 Blackbox

F3.8 Functional

F3.9 Integration

F4.1 **Functionality Test 4**

F4.2 Test for robot's ability to return back to the home position.

F4.3 Ensures the robot is able to return back to the home position after the medicine has been delivered..

F4.4 Inputs: Robot's home location, and user's location.

F4.5 Output/Results: The robot is successfully able to navigate to the home position and avoid obstacles along the way.

F4.6 Normal

F4.7 Blackbox

F4.8 Functional

F4.9 Integration

Test Case Matrix

	Normal/ Abnormal	**Blackbox/ Whitebox**	**Functional/ Performance**	**Unit/ Integration**
M1	Normal	Blackbox	Functional	Integration
M2	Normal	Blackbox	Functional	Integration
DS1	Normal	Blackbox	Functional	Integration
DS2	Normal	Blackbox	Functional	Integration
DT1	Normal	Blackbox	Functional	Integration
S1	Normal	Blackbox	Functional	Integration
MD1	Normal	Blackbox	Functional	Integration
DB1	Normal	Blackbox	Functional	Unit
DB2	Normal	Blackbox	Functional	Unit
WA1	Normal	Blackbox	Functional	Unit
WA2	Normal	Blackbox	Functional	Unit
WA3	Normal	Blackbox	Functional	Integration
F1	Normal	Blackbox	Functional	Integration
F2	Normal	Blackbox	Functional	Integration
F3	Normal	Blackbox	Functional	Integration
F4	Normal	Blackbox	Functional	Integration