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Description of Overall Test Plan

Our testing strategy will include many tests to ensure functionality runs smoothly, both with individual components, as well as cross-component features. We will do tests on the communication protocol to ensure both the phone and the tap are publishing messages and receiving messages properly through the broker. We will test the database functionality as well as the user profile age requirement. For the hardware, we plan on testing all the hardware components to ensure they act properly in insolation. These tests will change as needed as we continue to build our project.

Test Plan Descriptions

Software Test Cases

MQTT1.1 Phone MQTT Publish
MQTT1.2 This test will ensure that the phone is sending MQTT messages to the broker.
MQTT1.3 The phone will send its MQTT messages to the broker as specified in the communication protocol. We can check with the broker to ensure the correct messages are being sent.
MQTT1.4 Inputs are button presses on the phone
MQTT1.5 Expected outputs are the correct messages being sent over to the broker according to the communication protocol
MQTT1.6 normal
MQTT1.7 blackbox
MQTT1.8 functional
MQTT1.9 integration

MQTT2.1 Phone MQTT Subscribe
MQTT2.2 This test will ensure that the phone is receiving MQTT messages from the broker.
MQTT2.3 The phone will receive its MQTT messages from the broker as specified in the communication protocol. We can check to ensure the phone reacts correctly to messages it receives
MQTT2.4 Inputs are messages in the tap_return topic
MQTT2.5 Expected outputs are the phone updating keg data

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MQTT2.6 normal
MQTT2.7 blackbox
MQTT2.8 functional
MQTT2.9 integration

DB3.1 Database functionality
DB3.2 This will ensure that the data is stored properly and accessible.
DB3.3 A database to store user preferences and kegerator information history
DB3.4 Kegerator status values
DB3.5 All of the information that has been put in regarding kegerator status
DB3.6 normal
DB3.7 whitebox
DB3.8 functional
DB3.9 unit

UP4.1 User Profile (Good Age) functionality
UP4.2 This will ensure that the user profile is set up and working properly. It will ensure the age verification that is needed to use the app.
UP4.3 The test will use a profile with an acceptable age and test to make sure the user is able to make a pour
UP4.4 A profile with an acceptable age
UP4.5 The user is able to access the pour function
UP4.6 normal
UP4.7 blackbox
UP4.8 functional
UP4.9 unit

UP5.1 User Profile (Bad Age) functionality
UP5.2 This will ensure that the user profile is set up and working properly. It will ensure the age verification that is needed to use the app.
UP5.3 The test will use a profile with a non-acceptable age (under 21) and test to make sure the user is NOT able to make a pour
UP5.4 An underage profile
UP5.5 The user is NOT able to access the pour function
UP5.6 abnormal
UP5.7 blackbox
UP5.8 functional

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UP5.9 unit

Hardware Test Cases

MQTT6.1 Tap MQTT Publish
MQTT6.2 This test will ensure that the tap is sending MQTT messages to the broker.
MQTT6.3 The tap will send its MQTT messages to the broker as specified in the communication protocol. We can check with the broker to ensure the correct messages are being sent.
MQTT6.4 Inputs are actions with the tap
MQTT6.5 Expected outputs are the correct messages being sent over to the broker according to the communication protocol
MQTT6.6 normal
MQTT6.7 blackbox
MQTT6.8 functional
MQTT6.9 integration

MQTT7.1 Tap MQTT Subscribe
MQTT7.2 This test will ensure that the tap is receiving MQTT messages from the broker.
MQTT7.3 The tap will receive its MQTT messages from the broker as specified in the communication protocol. We can check to ensure the tap reacts correctly to messages it receives
MQTT7.4 Inputs are messages in the tap_return topic
MQTT7.5 Expected outputs are the phone updating keg data
MQTT7.6 normal
MQTT7.7 blackbox
MQTT7.8 functional
MQTT7.9 integration

P8.1 Pump Actuator Function
P8.2 Verify that once a signal is received the keg pump is activated to dispense the liquid.
P8.3 After pinning the pump actuator(s) to the Raspberry Pi (or Arduino connected) verify the actuators activate with enough force in an appropriate time frame.

P8.4 Firmware message from Raspberry pi
P8.5 Actuator moves as expected
P8.6 normal
P8.7 whitebox
P8.8 functional
P8.9 integration

P9.1 Spout Actuator Function
P9.2 Verify when the keg is signaled to pour the spout is extended into the cup prior to the pour starting.
P9.3 After pinning the spout actuator(s) to the Raspberry Pi (or Arduino connected) verify the actuators activate to extend the spout to it's full length and retract the spout all the way to it's starting position reliably
P9.4 Firmware message from Raspberry pi
P9.5 Actuator moves as expected
P9.6 normal
P9.7 whitebox
P9.8 functional
P9.9 integration

P10.1 Refrigerator Function
P10.2 Verify the temperature measured is the actual temperature being maintained within the keg storage area.
P10.3 Use a 3rd party temperature measuring tool to verify the temperature set on the thermostat is accurate and holds steady over time.
P10.4 Firmware message from Raspberry pi
P10.5 Temperature reads as expected
P10.6 normal
P10.7 whitebox
P10.8 performance
P10.9 unit

P11.1 Quantity-by-Weight Function
P11.2 Verify the kegerator is able to accurately read the remaining amount of liquid left in the keg.
P11.3 After calibrating the total weight of a full keg ensure the weight measure apparatus is accurate

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P11.4 Firmware message from Raspberry pi
P11.5 Weight reads as expected
P11.6 normal
P11.7 whitebox
P11.8 performance
P11.9 unit

Test Case Matrix

	Normal/ Abnormal	**Blackbox/ Whitebox**	**Functional/ Performance**	**Unit/ Integration**
MQTT1	Normal	Blackbox	Functional	Integration
MQTT2	Normal	Blackbox	Functional	Integration
MQTT6	Normal	Blackbox	Functional	Integration
MQTT7	Normal	Blackbox	Functional	Integration
DB3	Normal	Whitebox	Functional	Unit
UP4	Normal	Blackbox	Functional	Unit
UP5	Abnormal	Blackbox	Functional	Unit
P8	Normal	Whitebox	Functional	Integration
P9	Normal	Whitebox	Functional	Integration
P10	Normal	Whitebox	performance	unit
P11	Normal	Whitebox	performance	unit