**Memo**

To: Professor Pisano

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Subject: Scan It! Pack It! Arrange It! - Final Testing Plan

1. **Required Materials**

Hardware:

* iPhone & MacOS Development Device
* One 20”x20”x20” FedEx Box
* Two 8”x8”x8” Fedex Box
* Five 12”x9”x6” Fedex Box

Software:

* Scan it Pack it iOS Application
  + LiDAR Scanning
  + Cloud Computing Backend
  + Schematic Generation and Display

1. **Setup**

The Final Testing Plan will cover all the Minimum Viable Product requirements of the application, as well as any additional features added post-MVP. The MVP includes: Automatic Determination of Dimensions and Automatic Packing Schematic Generation. Additional features include: Session History, Manual Input, Container Presets and Dimension Conversion.

In order to test the MVP, several boxes were purchased from FedEx, allowing us to test the Scanning function on each box as well as the Packing function after all boxes are scanned. One large box is used as the container, while 7 smaller boxes are used to demonstrate the schematic. The scanning will be demonstrated first on the Container, and then on the following 7 Boxes. When all the boxes are scanned, the cloud-backend will be queried to get the schematic data, which will then be displayed on the screen for the user.

The additional features do not require any special setup. These features can be showcased alongside the MVP testing, while the Session History can be demonstrated after the initial MVP testing.

1. **Pre-testing Setup Procedure**

Scanning

1. Build the application onto an iPhone 12+ Pro device
2. Build the boxes with tape, ensuring shape
3. Organize the boxes with clear numbering
4. Mirror the iPhone screen onto the Mac Display

Packing

1. Build Container, without taping the top
2. **Testing Procedure**

Scanning

1. Select the Container Size 20”x20”x20” from the Container Presets in Manual Input
2. Return to Home Screen
3. Perform one scan on an 8”x8”x8”
   1. Measure two points for Length
   2. Measure two points for Width
   3. Rotate Box
   4. Measure two points for Height
4. Change the Measurement Unit to inches
5. Perform second scan on an 8”x8”x8”
6. Repeat scans for five 12”x9”x6” boxes
7. Test Reset All & Reset Current measurement buttons

Packing:

1. After all measurements are taken, select Finish Adding
2. View the Step by Step schematic on the screen
3. Place boxes into the Container as directed on the screen

Manual Input

1. Manually input all dimensions from a test case
2. Demonstrate ease of use for adding and removing boxes
3. Send to packing backend to generate schematic
4. **Measurable Criteria**

The criteria for successful running and output is as follows:

1. The user should be able to accurately scan box dimensions using LiDAR in a +/-5mm error range
2. Dimensions should accurately change between inches and centimeters based on settings
3. Cloud Computing Backend should return the packing schematic coordinates in <1s
4. The schematic generation should successfully display all input objects and the container. The placement of objects should be clear and user-friendly and the schematic must be rotatable for clarity.
5. User Interface should be intuitive and buttons should be self explanatory

1. **Score Sheet**

| **Scanning & Input Mode** | | |
| --- | --- | --- |
| Test # | Test Component | Correct? (Y/N) |
| 1 | Container Presets are accurate |  |
| 2 | Scanning is efficient and accurate |  |
| 3 | Manual Input is intuitive |  |
| 4 | No dimensions are accidentally overwritten |  |
| **Result** | | % |

| **Packing Schematic** | | |
| --- | --- | --- |
| Test # | Test Component | Correct? (Y/N) |
| 1 | Step-by-step placement of boxes into container |  |
| 2 | Displays unfitted items to user |  |
| 3 | Packing tutorial is intuitive & easy to understand |  |
| 4 | Packing tutorial demonstrates optimal packing arrangement for given container and input boxes |  |
| **Result** | | % |

| **Packing Schematic** | | | |
| --- | --- | --- | --- |
| Test # | Object Size (inch) | Container Size (inch) | Correct? (Y/N) |
| 1 | Box 1 - 8 x 8 x 8  Box 2 - 8 x 8 x 8  Box 3 - 12 x 9 x 6  Box 4 - 12 x 9 x 6  Box 5 - 12 x 9 x 6  Box 6 - 12 x 9 x 6  Box 7 - 12 x 9 x 6 | 20 x 20 x 20 |  |
| 2 | Box 1 - 240 x 35 x 47  Box 2 - 25 x 20 x 22  Box 3 - 10 x 15 x 2  Box 4 - 14 x 17 x 5  Box 5 - 50 x 20 x 35  Box 6 - 50 x 20 x 35  Box 7 - 18 x 4 x 13  Box 8 - 22 x 20 x 27  Box 9 - 30 x 2 x 8 | 30.48 x 30.48 x 45.72 |  |
| **Result** | | | % |