

# New customized system for Threads & Beads

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## Project Sponsor Information

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Threads & Beads (T&B) is a clothing boutique specializing in customized clothing based in Coimbatore, India. It was founded in 2000. T & B has 10-15 employees and 150-200 dedicated clients with a revenue of 260,000 USD per annum. The working hours are from 09:30 IST to 18:30 IST, Monday through Saturday.

## Business Need

Threads & Beads (T&B) is a women's clothing boutique based in Coimbatore, India. They specialize in making bespoke and made-to-order garments for women of all ages. Currently, T&B collects, stores, and manages customer data manually using paper-based methods. The data captured includes but is not limited to name, address, contact information, references, body measurements, and anticipated delivery dates. During garment production, the designer manually calculates the final garment dimensions based on each customer's body measurements. Designers rely on their instincts for the calculation as there is no formal method of measurement computation. This results in inconsistencies in the production process leading to additional adjustments during the fitting sessions. Thus, causing needless rework, lower production volume, customer satisfaction, and revenue. It would be beneficial for T&B to implement a system that would eliminate inconsistencies, eliminate human error, improve customer satisfaction, and increase revenue.

## Business Requirements

- Make a template that stores all the new customers' information.
- Collect all the existing customer records using the same template.
- Improve fit for the customer by helping T&B designers calculate more accurate measurements.
- Analyze historical customer information to predict measurements and fit.
- Allow clients to choose the delivery method.
- Explore new techniques to capture customers' measurements.

## Business Value:

The highest priority is to implement a system that allows T&B designers to calculate final garment dimensions more accurately for customers. A system can minimize errors, increasing consumer satisfaction since garment redesign and remake iterations will be reduced. As T&B currently stores customers' information, the data gathered will be analyzed in order to make the fighting more effective by predicting future measurements based on historical records.

Moreover, during the peak wedding season in South India, it is difficult to commit to high volumes of orders with the current mode of operations. With a new system, the boutique can take up more orders, thereby increasing the company's overall revenue.

The implementation of this new system will result in the following benefits for T&B:

1. Increase Operational Efficiency - 30% of current production efforts are spent on unnecessary rework due to inconsistent calculations.
2. Increase Operational Efficiency - 15% of the fabric is wasted due to oversized measurements
3. Increase customer satisfaction - Customer churn is at 15% every time there is a major rework due to miscalculations.

Positive business outcomes could be as follows:

1. Increase production volume by eliminating upfront errors.
2. Reduce customer churn and increase customer satisfaction value resulting in repeat orders.

The new system anticipates increasing revenue by 34%, reducing customer churn to 5%, and decreasing fabric wastage by 9%.

## Use case diagram

The diagram shown in figure 1 illustrates the chain of use cases with boundaries present in this document. The use cases work as a chain since each use case goes one after the other. Additionally, in most use cases, the postcondition for one is the precondition for the next.

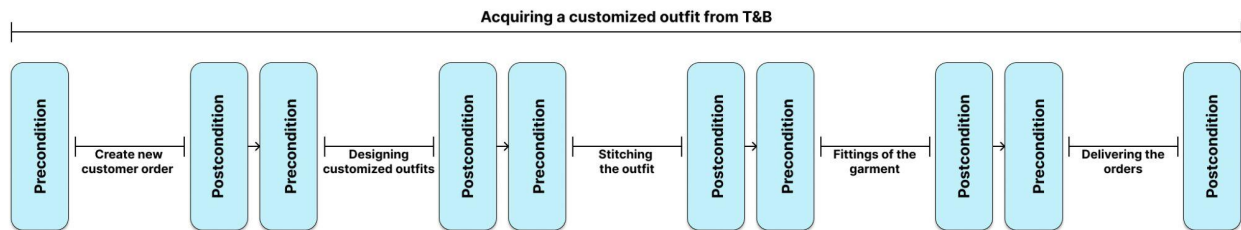


Figure 1 - chain of use cases with boundaries

## Individual use cases

Here are five use cases that describe the main tasks users must accomplish using the Threads & Beads (T&B) system. These use cases aim to understand how users view the process to ensure that the new system explicitly incorporates their insights within the design. Listed below are the five use cases described in this document:

1. **Create new customer orders (TB-1):** This is the first step customers must accomplish in order to purchase a T&B outfit: place an order for a new garment.
2. **Designing customized outfits (TB-2):** The designer sketches the outfit, and the Founder finalizes it.

3. **Sewing the outfit (TB-3):** A seamster is assigned an order by providing him with the precut fabric, final garment measurements, and design/pattern decided by the customer. The seamster then sews the garment to completion, which is quality checked by the designer.
4. **Fittings of the garment (TB-4):** Once the garment is ready, the designer first checks the outfit's readiness. The designer approves the outfit sewed by the seamster and schedules a meeting with the customer for the outfit trial. Post-trial, the customer either approves it or requests alterations.
5. **Delivering the orders (TB-5):** The outfit must be delivered after the customer and the founder approval the final garment.

Each use case is described in the following tables:

<b>Use Case Name:</b> Create new customer order	<b>ID:</b> TB-1	<b>Priority:</b> High
<b>Actor:</b> The customer		
<b>Description:</b> The customer placed an order for a new garment.		
<b>Trigger:</b> Customer wants to purchase a garment from T&B.		
<b>Type:</b> External		
<b>Preconditions:</b>		
<ol style="list-style-type: none"> <li>1. Customers need to be physically present at the store.</li> <li>2. The customer must have the fabric before placing the order. <ol style="list-style-type: none"> <li>a. The customer brings their fabric to the store.</li> <li>b. The customer purchases the fabric at the store.</li> </ol> </li> </ol>		
<b>Normal Course:</b>		
<ol style="list-style-type: none"> <li>1. The customer provides base information (name, address, email, and phone).</li> <li>2. Founder asks for the occasion(theme, color, work) and budget range.</li> <li>3. The customer selects the design to create the garment. <ol style="list-style-type: none"> <li>a. The customer brings references to create the outfit. <ol style="list-style-type: none"> <li>i. The customer decides what changes are needed on the reference design.</li> <li>ii. The customer decides to keep the reference design the same.</li> </ol> </li> <li>b. The customer does not have references. <ol style="list-style-type: none"> <li>i. The designers provide different options based on the customer's needs and tastes.</li> </ol> </li> </ol> </li> <li>4. The customer approved the idea for the final design.</li> </ol>		

<b>Use Case Name:</b> Create new customer order	<b>ID:</b> TB-1	<b>Priority:</b> High
<ol style="list-style-type: none"> <li>5. Measurements are taken from the customer.</li> <li>6. The customer will receive a preliminary cost estimate.</li> <li>7. The customer will be given an estimate of how long it will take to complete the order. <ol style="list-style-type: none"> <li>a. The customer accepts the estimated delivery date; proceed to step 7.</li> <li>b. The customer rejects the delivery date; returns to step 5.</li> </ol> </li> <li>8. The customer confirms the order.</li> <li>9. The customer determined the delivery option. <ol style="list-style-type: none"> <li>a. The customer decided to pick the final outfit in the store.</li> <li>b. The customer chooses the delivery-to-home option.</li> </ol> </li> </ol>		
<b>Postconditions:</b>		
<ol style="list-style-type: none"> <li>1. The customer must pay 25% of the total price for the garment.</li> <li>2. Adding customer information detail to the database.</li> <li>3. The designer is notified of the new order.</li> </ol>		

<b>Use Case Name:</b> Designing customized outfits	<b>ID:</b> TB-2	<b>Priority:</b> High
<b>Actor:</b> Designer and cutting master		
<b>Description:</b> The designer sketches the outfit, and the Founder finalizes it.		
<b>Trigger:</b> Customer has paid the advance amount for the final outfit		
<b>Type:</b> External		
<b>Preconditions:</b>		
<ol style="list-style-type: none"> <li>1. Customer details are added to the database.</li> <li>2. The customer must pay 25% of the total price for the garment.</li> <li>3. The designer is notified of the new order.</li> </ol>		
<b>Normal Course:</b>		
<ol style="list-style-type: none"> <li>1. The designer takes the costumes' reference for the outfit. <ol style="list-style-type: none"> <li>a. The designer makes the changes to the reference design.</li> <li>b. The designer replicated the reference design.</li> </ol> </li> <li>2. The designer starts sketching some ideas for the customer. <ol style="list-style-type: none"> <li>a. The customer approves the design.</li> <li>b. The customer asks for a redo with suggestions.</li> </ol> </li> <li>3. The designer finalizes embellishments.</li> <li>4. The designer calculates the final garment measurements.</li> <li>5. The cutting master cuts the fabric according to the customer's measurements.</li> </ol>		

6. After quality inspection by the designer, the nearly completed garment is sent to the seamster.

**Postconditions:**

1. The final garment measurements are calculated.
2. The designs and measurements are sent to the seamster for stitching.

<b>Use Case Name:</b> Sewing the outfit	<b>ID:</b> TB-3	<b>Priority:</b> High
<b>Actor:</b> The seamster and the designer		
<b>Description:</b> Seamster sews garments using precut fabric		
<b>Trigger:</b> Completion of outfit for customer fittings		
<b>Type:</b> External		
<b>Preconditions:</b> <ol style="list-style-type: none"><li>1. Obtained final garment measurements.</li><li>2. The fabric must be precut.</li></ol>		
<b>Normal Course:</b> <ol style="list-style-type: none"><li>1. The precut fabric is assigned to a seamster.</li><li>2. The seamster receives the final measurements and the agreed-upon design.</li><li>3. The seamster finds the appropriate thread for sewing the fabric.</li><li>4. The seamster sews the garment to near completion.</li><li>5. The seamster sends the garment for quality inspection to the designer.<ol style="list-style-type: none"><li>a. After a successful quality inspection, the nearly completed garment is returned to the seamster. Proceed to step 6.</li><li>b. After an unsuccessful quality inspection, the nearly completed garment is returned to the seamster.<ol style="list-style-type: none"><li>i. The seamster makes necessary alterations. Proceed to step 6.</li></ol></li></ol></li><li>6. The seamster completes the finishing touches.</li><li>7. The seamster irons the finished outfit and drops it in the stock room.</li></ol>		
<b>Postconditions:</b> <ol style="list-style-type: none"><li>1. The designer is notified of the completed outfit.</li><li>2. The completed outfit is dropped in the stock room.</li><li>3. The designer notifies the customer of trials.</li></ol>		

<b>Use Case Name:</b> Fittings of the garment	<b>ID:</b> TB-4	<b>Priority:</b> High
<b>Actor:</b> The designer and the customer		
<b>Description:</b> A final garment is stitched by the tailor and the customer is called for trials.		
<b>Trigger:</b> A final garment is stitched by the tailor and the customer is called for trials.		
<b>Type:</b> External		
<b>Preconditions:</b> <ol style="list-style-type: none"> <li>1. The designer is notified about garment readiness.</li> <li>2. The designer notifies the founder that the garment is ready.</li> <li>3. The designer notifies the customer of trials.</li> </ol>		
<b>Normal Course:</b> <p>1.0 The designer finalizes the garment readiness.</p> <ol style="list-style-type: none"> <li>1. The designer retrieves customer information. →</li> <li>2. The system displays the order details. ←</li> <li>3. The designer calls the customer for trials. →</li> <li>4. The customer approves the fittings. ←</li> <li>5. The founder confirms the order in the system. →</li> </ol>		<b>Information for Steps:</b> <p>Order ID</p> <p>Order Details</p> <p>Schedule Meeting</p> <p>Customer approval</p> <p>Proceed for Billing</p>
<b>Alternative Courses:</b> <p>1.1 Outfit fails to fit as per the customer's measurements.</p> <ol style="list-style-type: none"> <li>1. The designer retakes the measurements. →</li> <li>2. The designer updates the measurements in the system. →</li> <li>3. The designer notifies changes to the seamster. →</li> <li>4. The customer tries the outfit. ←</li> <li>5. The customer is not satisfied with the fittings. ←</li> <li>6. Return to Step 1.</li> <li>7. The customer approves the order. →</li> <li>8. Exit use case.</li> </ol>		<p>Modify measurements</p> <p>Update measurements</p> <p>Alterations</p> <p>Customer retrial</p> <p>Customer rejection</p> <p>Customer approval</p>



<b>Postconditions:</b>			
<ol style="list-style-type: none"> <li>1. The final outfit is approved by the customer or requires alterations.</li> <li>2. The garment is sent back to the seamster for alterations.</li> <li>3. Outfit must be packed and ready for delivery in the stock room.</li> </ol>			
<b>Summary Inputs</b>	<b>Source</b>	<b>Summary Outputs</b>	<b>Destination</b>
Order ID	Designer	Order Details	Founder
Schedule Meeting	Customer	Calculate Measurements	Seamster
Alterations	Designer	Approvals	Customer
		Billing	Customer

<b>Use Case Name:</b> Delivering the orders	<b>ID:</b> TB-5	<b>Priority:</b> High
<b>Actor:</b> The founder and the customer		
<b>Description:</b> Delivering the outfit after the approval from the customer.		
<b>Trigger:</b> After the founder notifies the customer that the order is ready.		
<b>Type:</b> External		
<b>Preconditions:</b>		
<ol style="list-style-type: none"> <li>1. Outfit must be complete and approved by the customer and the founder.</li> <li>2. Outfit must be packed and ready for delivery in the stock room.</li> </ol>		
<b>Normal Course:</b>		
<ol style="list-style-type: none"> <li>1. The founder receives the remaining 75% of the total payment from the customer.</li> <li>2. Customers select the delivery option. <ol style="list-style-type: none"> <li>a. Customer chooses to get the order home-delivered. <ol style="list-style-type: none"> <li>i. The customer confirms the delivery date.</li> <li>ii. The founder confirms the delivery address.</li> <li>iii. The founder informs and shares the details of customers with the delivery workers. Proceed to step 3.</li> </ol> </li> <li>b. The customer chooses to pick up the garment at the store. <ol style="list-style-type: none"> <li>i. The customer informs the pickup date and time.</li> <li>ii. The founder gives the final garment to the customer. Proceed to step 3.</li> </ol> </li> </ol> </li> <li>3. The founder shares the invoice's order with the customer.</li> </ol>		
<b>Postconditions:</b>		
<ol style="list-style-type: none"> <li>1. The customer received the final outfit.</li> </ol>		

# Context diagram

This diagram shows the Context level DFD of the Threads & Beads proposed system. The input such as new order, garment design, and garment assembly into the T&B system, comes from the external entities namely Customer, Designer, and Seamster respectively. The output from the T&B system goes to the mentioned external entities.

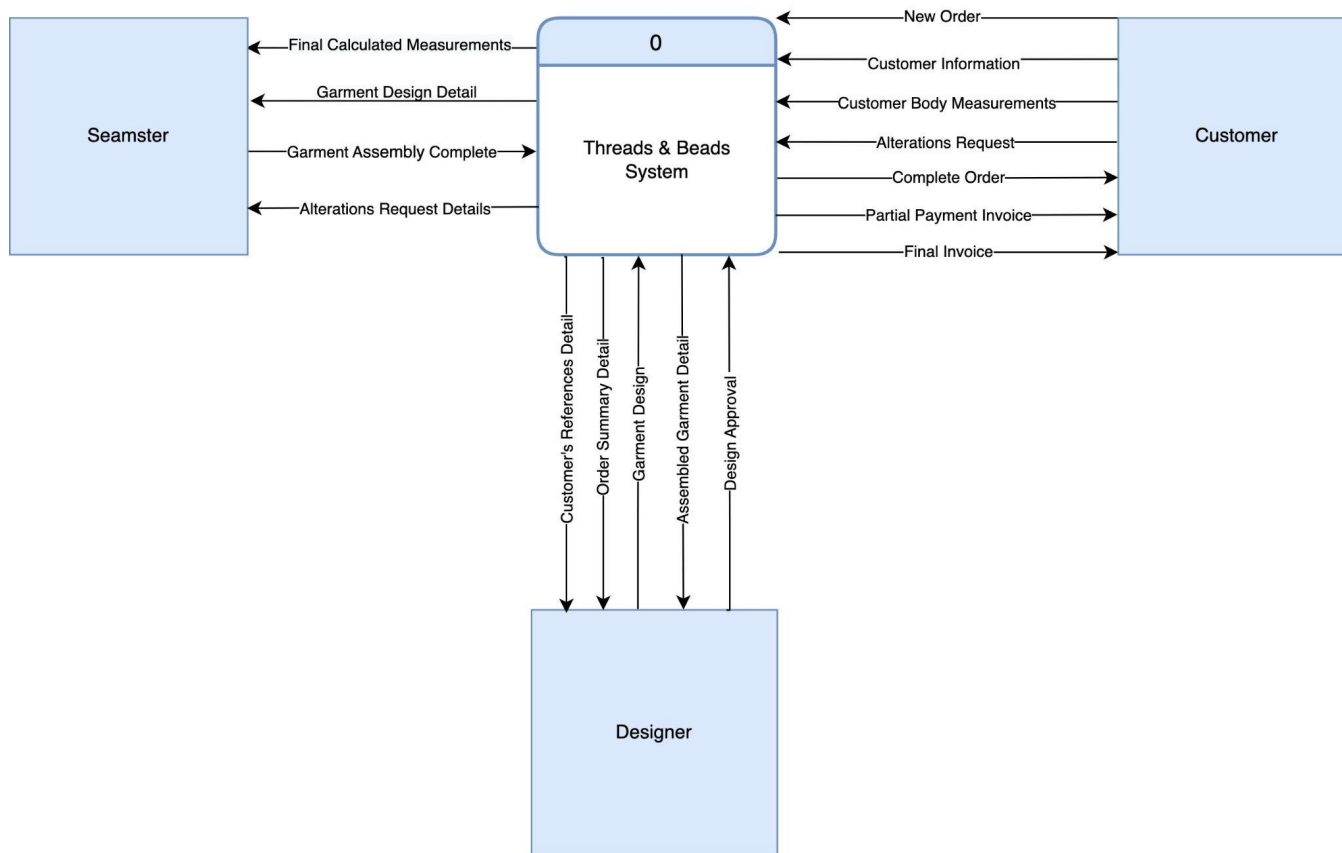


Figure 1 - Context level DFD diagram.

# Level 0 diagram

The level 0 diagram shows the same entities, inputs, and outputs as the context level but provides more information about what is inside the system and how the data goes from one process to another. Level 0 has four main subprocesses, which are the decomposition of the central process shown in the diagram above.

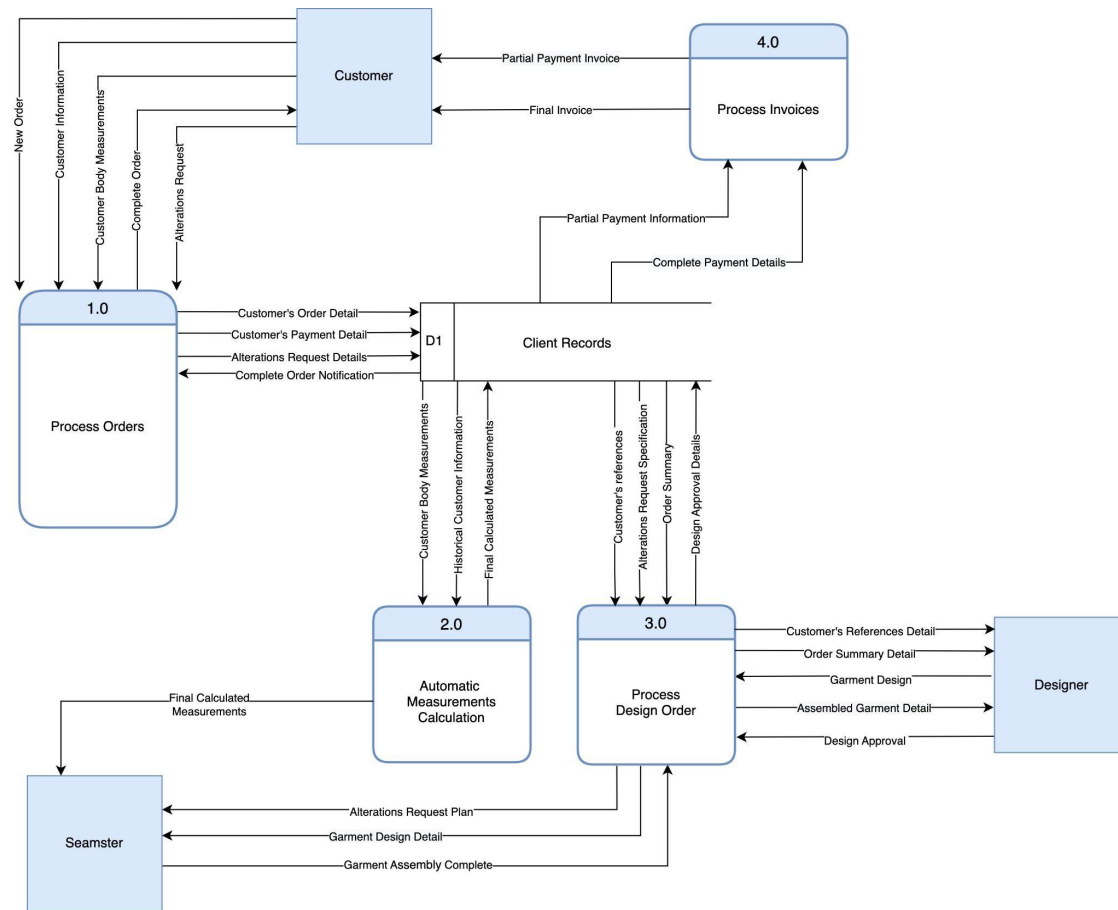


Figure 2 - Level 0 DFD diagram.

# Child diagram

Each process mentioned on level 0 DFD has a child diagram, as shown below:

## 1. Process order child diagram

This diagram shows the Level 1 DFD for processing an order. The customer places an order at the T&B store; the system will capture the details of the customer's name, address, phone number, email address, and body measurements. If the customer needs alterations, the details related to it will also be stored in the database. When the garment is ready, the system will notify the order has been completed.

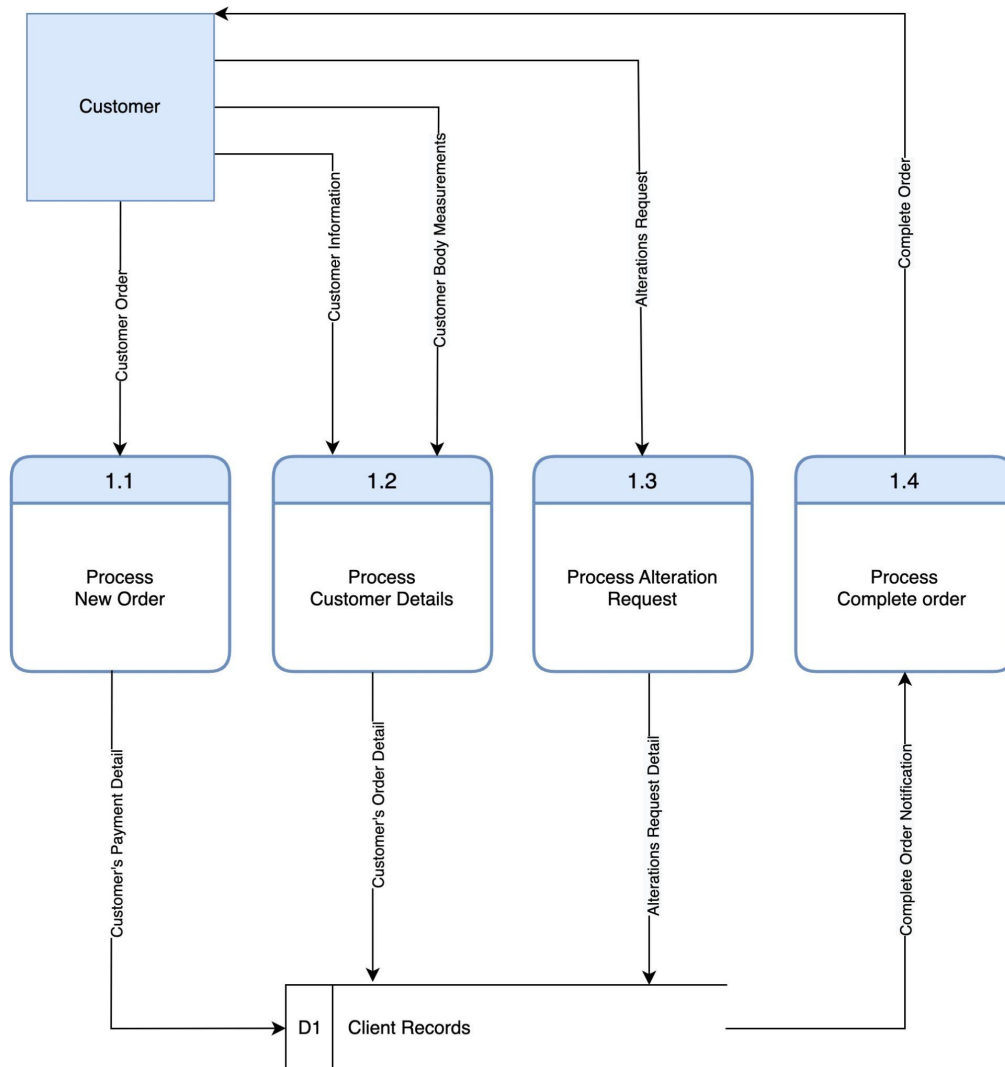


Figure 3 - Process Order Level 1 DFD

## 2. Automatic measurements calculation child diagram

This child diagram explains the inside of process 2, the calculation of the automatic measurement. As is shown in the figure below, the process must have the information related to the body measurement and the historical records from the customer, to be able to create the final measurement automatically.

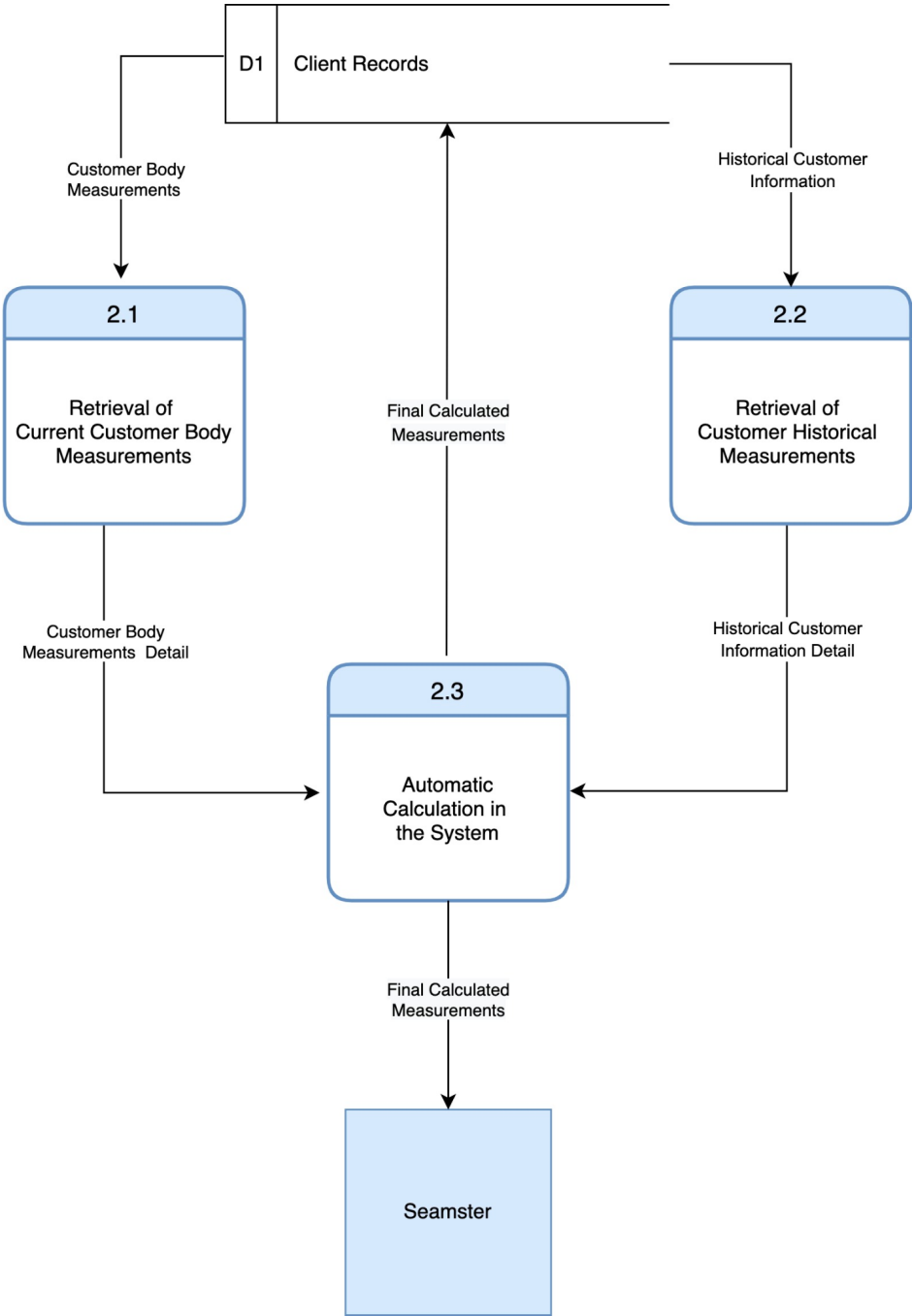


Figure 4 - Automatic measurements calculation level 1 DFD.

### 3. Designing order child diagram

This Child diagram explains the inside of process number 3, the designing order child diagram. As shown in the figure, firstly the customer's references and order summary are used for sketching the garment, after approval from the customer it goes near the seamster, and after sewing the garment it goes for inspection of the garment then the customer makes trails for the garment if there are any alterations or modifications it undergoes for alteration to the seamster.

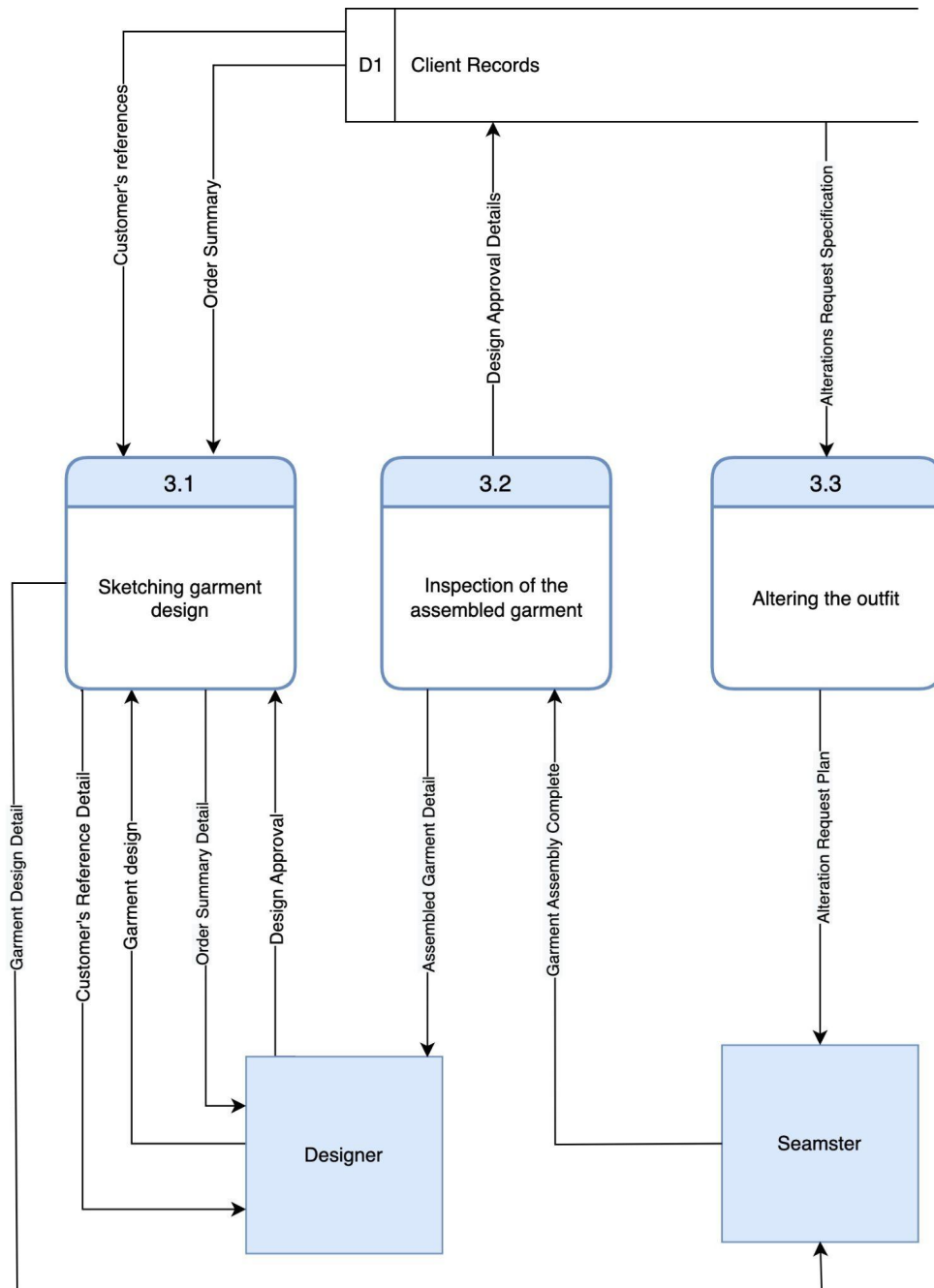


Figure 6 - Designing order level 1 DFD.

### 4. Process Invoice child diagram

This diagram shows the Level 1 DFD for creating an invoice. Customers must make a partial payment when placing an order with T&B. The shop manager will give the customer their partial invoice, which was generated by the system. The system will produce the final invoice once the order is prepared, and the last payment has been made.

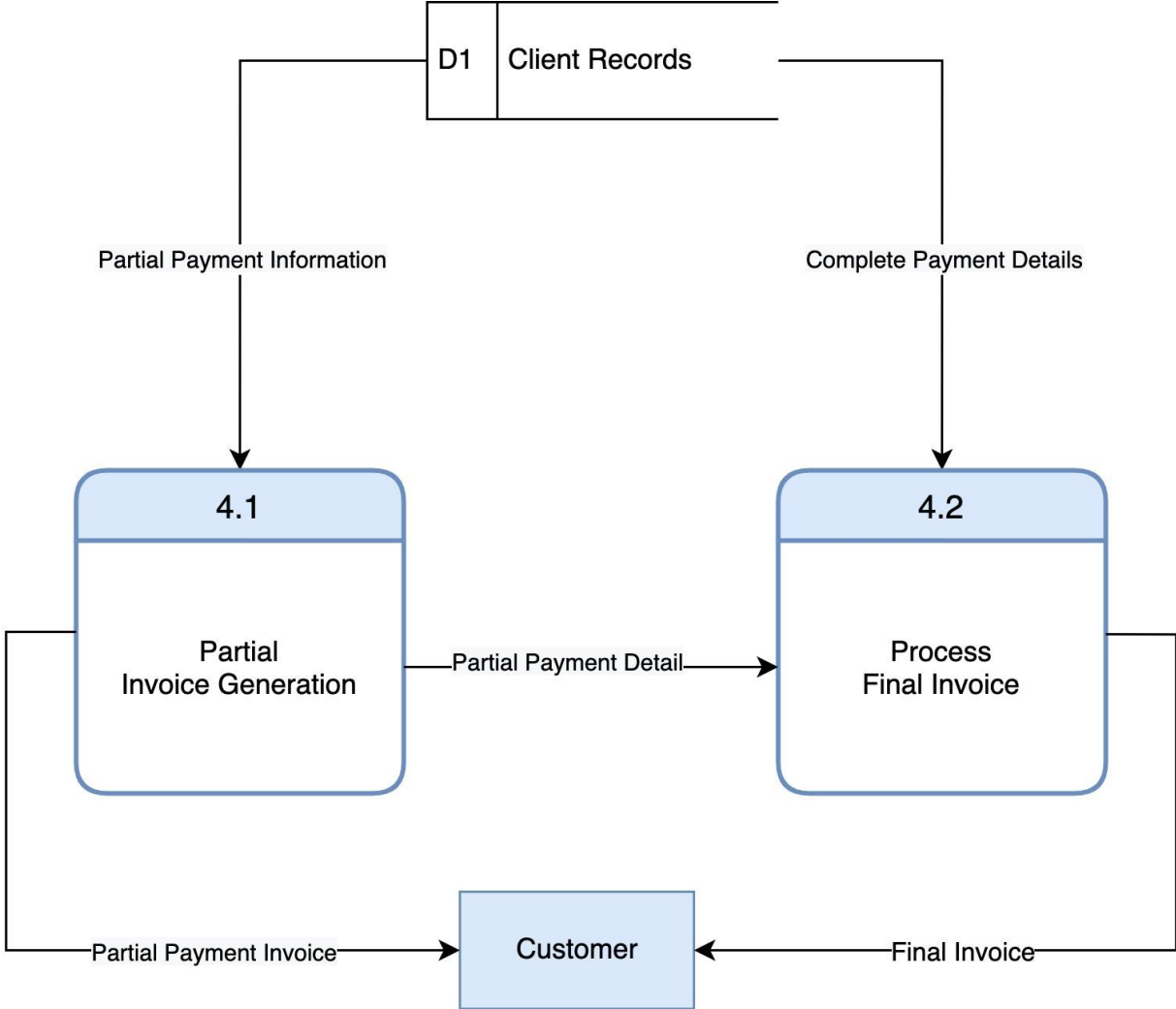


Figure 6 - process invoice level 1 DFD.

# Project requirements

## Functional Requirements

1. Garment Sales Management
  - 1.1. The system will enable garment sales order creation.
  - 1.2. The system will store customer information.
  - 1.3. The system will determine if the fabric is in stock.
  - 1.4. The system will display all customization options to the designer.
  - 1.5. The system will store the designer's sketches in its database.
  - 1.6. The system will create a final garment order once the designer and customer agree on some design.
  - 1.7. The system will process a customer deposit.
  - 1.8. The system will inform the customer that the garment is ready for trial and pickup.
  - 1.9. The system will process a customer's final payment.
  
2. Garment Alteration Management
  - 2.1. The system will notify the seamster if the alterations are required by the customer.
  - 2.2. The system will inform the designer once the alteration has been completed.
  - 2.3. The system will inform the customer that the garment is ready for trial and pickup once approved by the designer.

## Nonfunctional Requirements

1. Performance
  - 1.1. The system should be able to produce the garment measurements in under 5 seconds. The main intention is to minimize this time as much as possible, keeping it to a maximum of 5 seconds.
  - 1.2. The system should be updated with every new customer order.



## 2. Data integrity

2.1. Appropriate validations must be applied to ensure data integrity is maintained across the database.

## 3. Availability

3.1. The overall time the system should be available for the users is 90%. Keeping out the maximum 10% of the time for maintenance and system failures.

## 4. Scalability

4.1. The system should be scalable as well as expandable. This feature is necessary to cater to requirements based on the user's review after the initial deployment of the application.

## 5. Platform compatibility

5.1. The system should be compatible with different operating systems and their versions.

## 6. Stability

6.1. The system developed should be robust to a large number of user entries, it is important to ensure that the system does not crash or slow down.

## 7. Usability

7.1. The system should be made such that it can be used universally by all age groups. Accounting that the system must be designed considering that it is easy to use for everyone ranging from teenagers to old age people.

## 8. Security

8.1. The system must be secure, and the requests should not be made without permission.

- 8.2. The front end should be made secure to prevent intruder access.
- 8.3. The system credentials should lie with the founder and the designer themselves.
- 8.4. The codebase should be private and not accessible.

## Method: Interview information

The Customer Contact, Nisha Anthraper, has conducted three interviews to elicit the information for this document, deliverable 2. The interview was done with the founder, the designer, and the customer to understand all business perspectives. Below is gathering all the detail for each interview.

### Interview 1

**Person Interviewed:** Sheena Thomas, founder of T&B.

**Interviewer:** Nisha Anthraper

**Date:** Oct 13, 2022

#### **Purpose of Interview:**

- Understand overall business processes.
- Identify the pain points of the current system.

#### **Questions Asked:**

1. What happens when a new customer comes to T&B to place an order?
2. How different is the new customer process from an existing customer?
3. Do you oversee the production process directly?
4. Do you handle the paper-based database on a daily basis?
5. What happens when a customer is unsatisfied with the final outfit?

#### **Summary of Interview:**

The founder is actively involved in customer intake, the design process (for occasional outfits), and delivery.

The two biggest problems with the current system are:

- The miscalculation of final garment measurements (This happens when the designer is unaware of the customers' measurement history).
- T&B does not have an efficient system for communication of design and pattern to the production team (The details discussed with the customers are often missed).

**Open Items:**

- Schedule an interview with the Designer to understand the design process and miscommunication with the production team.

Interview 2

**Person Interviewed:** Geetha, Designer of casual clothing.

**Interviewer:** Nisha Anthraper.

**Date:** Oct 14, 2022

**Purpose of Interview:**

- Understand the designing and production process.
- Determine information required for the future system.

**Questions asked:**

1. What is the design process currently followed at T&B?
2. How are the design ideas and sketches communicated to the production team?
3. Who is involved in the production process? What is the required information?
4. How is the final measurement calculation done?
5. Describe the Fitting process.

**Summary of Interview:**

- The current system keeps only up-to-date data of customers, and the designers cannot look through archived data due to time constraints on each order.
- The designs are verbally communicated to the seamster (the seamster often forgets or misunderstands the details).

**Open Items:**

- Get customer information template.

## Interview 3

**Person Interviewed:** Megha Alex, a customer of T&B.

**Interviewer:** Nisha Anthraper.

**Date:** Oct 16, 2022

### **Purpose of Interview:**

- Understand the customer satisfaction factor.
- Identify pain points (if any).

### **Questions asked:**

1. How long have you been going to T&B?
2. What is the best feature of T&B?
3. What do you think T&B can do to improve?
4. What does customer satisfaction mean to you?
5. How would you rate T&B in terms of customer satisfaction on a scale of 1-10? (10 being exemplary service and product).

### **Summary of Interview:**

- Communicating with the founder when visiting T&B is important.
- For occasional outfits, the customers are happy to do up to 3 fitting sessions
- For casual outfits, customers expect the outfit to be perfect during the first fitting.

## Solution proposal 1: Centralized database with custom system

The proposed solution is a new customized software with a centralized database created specifically for T&B. The database will store data regarding new and old customer orders, calculate measurements automatically, display garment design details, and prepare invoices. Customer access to the system will be limited to T&B employees. The new software built will take body measurements as inputs and calculate the 2D garment measurements. The working of the software is discussed in detail in this document.

A major advantage of the system is that it can calculate the final measurements of the garment based on historical customer information and body measurements since the store

almost always works with recurring customers. Since the system is based on machine learning, it is also possible to automatically calculate measures for new customers even without documented information in the database.

As a result of the proposed system, human errors will be eliminated, fitting sessions will be reduced, and customer satisfaction and revenue will increase. In addition to simplifying tasks for employees, the system also allows them to spend more time on more important tasks. Therefore, the major functions of the new system are:

- Calculate measurements automatically.
- Store data information about the client and the garment design.
- Creation of invoice.

## Feasibility analysis

### Technical feasibility analysis

Technical feasibility is a crucial aspect which states if the technical aspects of the new solutions can be realized or not. It discusses what technology is currently used by the business, what will be the new developments and how the business will benefit from it, what technologies do similar business use and what will be the labor requirements to implement the new system.

#### Present Scenario

Currently Threads and Beads do not use any technical resources to manage their business. The orders and customer body measurements are taken manually and are recorded in a physical register. The final garment measurements are manually calculated by the designer before forwarding them to the seamster. This process is time-consuming and has a higher chance of human errors. Since this is a boutique there are reiterations of the outfit which requires calculating the body measurements again.

#### New Developments

In order to overcome the problem mentioned above, Threads and Beads will implement a new automated system that calculates the final measurements for the outfit based on their history and current measurements. In the apparel industry, anthropometry (mostly related to

body measurements), has been combined with customers' preference data to design apparel products. Body measurements are mainly used for drafting pattern pieces, generating grading and sizing rules, helping make manufacturing decisions, customizing clothing, and assisting in selecting a size to purchase.

The steps involved to compute the final garment measurement will look like this:

1. Assembling customers historical body measurement data to form a dataset for training of the automated model. If this is not enough to calculate a size accurately, extra data points can be added from sizeUSA 3D body dataset.
2. Combining primary and secondary body measurements to build a 3D body image dataset for all the combinations. This step is performed to build a reference sizing standard for the outfits Threads and Beads produces.
3. Analyze on 3D body datasets to:
  - Produce 2D measurement list
  - Predict unknown representative measurements with known measurements

The methods used to perform the above calculations are - Data Preparation, Regression modeling and Model selection.

4. Extract measurements from 2D images.
5. Compare auto 2D method with manual garment calculation and 3D measurements.

The calculated body measurements will be used to draft two-dimensional basic outfit pattern pieces.

#	Measurement	SS definition	[TC] <sup>2</sup> definitions
1	Bust girth	Horizontal circumference measured across the bust points, under the arm pits and around the back.	Taken along the surface of the body and bridges over the hollows between the busts.
2	Hip girth	(Hip circumference) Maximum girth between the Back Waist Point and Crotch levels. (Seat circumference) Horizontal circumference at the most prominent rear point between the waist and crotch.	(Hips full) A horizontal slice usually measured at the height where the circumference is the greatest between the crotch and the waist, but the placement of the hips may be changed with the parameters. (Seat) Taken at the height where the buttocks protrude most to the rear.
3	Under bust girth	Horizontal circumference taken below the bust. (Horizontal waist) Horizontal circumference between small of back level and 4cm above it.	One option is to measure on a horizontal plane pass the underbust points.
4	Waist girth	(Narrow waist) Horizontal circumference taken at the narrowest torso point between the chest and hips when viewed from the front.	The shortest circumference around the torso within the limits set by the user defined parameters.
5	Height (Stature)	(Subject height) Height from floor to top of subject (hair is seen as a "surface" and is included).	-
6	Foot length	Length from the back of the heel to the farthest toe tip.	The distance along the center line from the back of the heel to the tip of the toe sticking out farthest to the front. The line does not run to the toe farthest to the front but the toe is projected onto the line and the length is the distance from this point to the back of the heel.
7	Hand girth	-	-
8	Head girth	Circumference above the eyes.	This is measured in a plane that goes through a point 10mm above the eyebrows in the front and a point in the back that is farthest from the point in the front.
9	Inside leg length	(Inseam) Length from the crotch point down the leg to the floor. (Crotch height) Vertical distance from the floor to the Crotch point.	(Straight down) Can also be used to measure crotch height. (To inside of foot) Follows the inside of the leg like a tape measure would.

10	Neck girth	(Collar circumference) Neck column circumference taken approximately at the larynx.	(Shirt collar) The measurement for a dress shirt collar.
11	Under arm length	Straight distance from the armpit point to the wrist.	Coat sleeve set to “armpit to wrist”.
12	Arm length (outer arm length)	Straight distance from the shoulder point to the wrist.	Coat sleeve set to “shoulder point to wrist”.
13	Back neck to wrist length	(Sleeve length) Distance from back neck point over the shoulder point to the wrist.	Shirt sleeve set to “Back of neck – over should to wrist”.
14	Weight	-	-
15	Calf girth	Maximum leg girth above the ankle and below the knee.	The largest circumference between the knee and the smallest part of the leg above the ankle.
16	Ankle girth	(Actual ankle circumference) Circumferences of the left and right ankle bones. (Ankle circumference) Circumference taken at the averaged height of both ankle bones	The horizontal tape measurement taken at the average of the inside height and the outside height.

*Measurement definitions in Size Stream programs.*

*Image credit - <https://www.sizestream.com/>*

To bridge the gap between the user and the system, it is necessary to develop a front-end application to enter the body measurements. If this application is not developed, the user will have to run the entire code from a code editor which requires professional technical skills.

## Database

In order to manage and store customer’s information, a database system will be implemented. Software used to store the customer information and customer’s body measurements - PostgreSQL. The ERD diagram in the previous deliverable (D3) elucidates more on how the database is structured.

## Beyond the scope

Implementation of three-dimensional body scanners to collect body measurements.

1. Is the project feasible within the limits of current technology?: The new solution will be well within the limits of current technology. This algorithm has been implemented by



various fashion brands to ensure contact-free outfit trials with 3D body scanners. However, we will be limiting the implementation to get 2D outfit garment measurements.

2. Does the technology exist at all?: Yes the technology exists.
3. Manpower - Programmers, testers, and debuggers: This solution will be outsourced from another company. Since this is a clothing boutique, the employees lack the technical skills to develop and implement this software.
4. Software & Hardware requirements: Device Specifications.

<b>Processor</b>	Intel Core i5 or higher
<b>RAM</b>	8 GB or greater
<b>Storage</b>	250 GB or more
<b>Input Devices</b>	Mouse & Keyboard

Browser compatibility

<b>Browsers</b>	<b>Version</b>
Safari	11 and above
Chrome	64 and above
Firefox	59 and above
Edge	50 and above
Opera	51 and above
OS versions - Android	5 and above
OS versions- iOS	10 and above

5. Does the technology have the capacity to handle the solution?  
Yes, this technology has the capacity to handle the implementation of the software.

## Economic feasibility analysis

### One-Time Costs

These costs will be incurred for setting up the system for Threads and Beads. The costs will include procuring the computing system(monitor, CPU, keyboard, mouse, printer), development of the application, training, manual records of data feeding into the system, and furniture for the setup.

Estimates:

Below are the estimates for setting up the proposed solution for Threads and Beads.

Item	Estimate (in USD)
Outsourced Development Cost	\$1500
Data Conversion - Manual Records to be filled into the system	\$200
Computing System	\$750
Internet Connectivity Setup	\$20
Printer	\$100
Initial Training	\$250
Furniture(Desk)	\$100

Total estimate for setting up the system: Approx. \$2920 USD.

### Recurring Costs

These are costs that Threads and Beads will have to spend on the supplies needed to print the invoices and to keep the system running.

Estimates:

Below are the estimates for supplies and annual maintenance of the system:

Item	Estimate (in USD)
Maintenance of the system	\$200
Printer Supplies(Ink, Paper)	\$100
Internet Plan	\$100

Total estimate for recurring costs annually would be approximately \$400.

### Tangible Benefits

This system will help Threads and Beads to save designers time in taking body measurements and will help them to be more creative in designing garments. By adopting this solution, Threads and Beads can take more customer orders, and hence it will increase their revenue.

### Estimates:

Designers at Threads and Beads are on a monthly \$300 salary, on average the designer attends up to 3 clients on a monthly basis. The designer's time is spent calculating body measurements, designing the garment, and rechecking the measurements after sewing. By using this system, the designer can save time, and attend to up to 6 clients on a monthly basis, i.e 3 new clients per month, 36 new clients per year. Each client on average spends \$1000 for designing and sewing the garment. Threads and Beads can have increased revenue by \$36000 annually.

### Intangible Benefits

Intangible costs would be if the designers are unhappy with this new implementation their morale would go down and would not work effectively.

Some intangible benefits are listed as follows:

1. Enhanced User-Experience: The new customers will like how Threads and Beads are calculating their body measurements with algorithms and keeps track of their body measurements historically.

2. Better reputation for Threads and Beads: By adopting this system, Threads and Beads will have more popularity amongst its competitors in and around the town.

## Organizational feasibility analysis

The organizational feasibility analysis examines whether the system proposed will be accepted by its employees and incorporated into its ongoing operations. Five points have been considered to create this analysis: schedule, politics, change management, legal concern, and how it will work. The analysis results are presented below:

### Schedule

The expected time to implement the system is 6 months. The following timeline have been considered to determine the deadline for the system's implementation:

1. Meeting with the development team to understand Requirements: 1 month
2. Development & Implementation - 3 months
3. Data Conversion (Manual Records into the system) - 15 days
4. Usability Testing - 1 month
5. Training and Onboarding for Designer & Founder - 15 days

The possible constraints of the schedule:

The system cannot be implemented during business seasons such as weddings season or special festivals such as Diwali and Christmas which is during the month of November and December.

### Politics

The primary responsibility that the system will have are related to tasks that the team of T&B has openly expressed they wish to automate in order to have more time to spend on other responsibilities. Furthermore, employees will not be expected to block or sabotage the project since the system will save time on activities that do not require technical expertise. Incorporating a new system will also improve not only customer satisfaction due to the precise measurement calculation but will likewise increase employees' satisfaction by allowing them to spend more time on their most important tasks.

In terms of dynamic power changes, the responsibility of each employee will remain the same since the system will not affect the organization's dynamic. The system will only be responsible for creating invoices, storing information regarding customers' details and information related to the garment, and generating automatic garment measurements.

### Change management

The designers and founder are the principal employees impacted by the new system implementation, and the seamster will also be involved in the process, although its interaction with the system will be minimum.

### Designers

The designers are responsible for manually calculating the final garment measurement, which is a process that will now be automatic with the implementation of the proposed system. During the gathering information phase, the designers expressed in the interview that manually calculating each garment's dimension takes longer because it is not a precise way to do it, resulting in less time to design the actual garment. The manual garment calculation also leads to potential mistakes that can reduce customer satisfaction overall, a risk factor in T&B current way of work. Therefore, with the implementation of the new system, the designers can spend more time on the garment's design from conception to final styling. By using the system, designers will also be able to create more accurate patterns since garment measurements will be more precise.

Furthermore, it will be possible for the designers to elaborate a larger number of garments, allowing the store to receive more customers and increase production volume, as well as increase the designers' satisfaction with their job.

### T&B Founder

Another job that will change is the founder's responsibility. Currently, the founder is responsible for gathering and saving the customers' information and creating all the invoices. Since T&B makes everything manually, the founder has room to store records and also invoices copies. The founder has stored information from 10 years ago, meaning that the number of files is huge and is increasing with every new sale. Having the records digitally within the system will allow the company to find the information faster, which is one of the main things where the founder spends most of her time. By digitizing the information, the founder can also spend more

time and pay attention to other areas, such as the company's finances and developing new strategies to find new customers to increase production volume; topics that the founder has expressed she wishes to have time for.

It is expected that the designers and the founder, who already have expressed their interest in reducing the time spent doing the tasks explained above, will openly accept the changes that the implementation of the system will entail. Since other employees, like seamsters, are not likely to have their primary responsibilities changed by interacting with the system, it is not expected to receive any project blocks for them. The only new change is that now the seamsters must add the information regarding any additional modification to store the data in the database and have a more detailed profile from each customer.

Furthermore, the system will allow data to be more accessible and visible, customer records will be more secure, invoices will be generated automatically, and most importantly, the calculated measurements will be more accurate.

#### Legal concerns

Since T&B is based in India, regulations in this country have been considered in order to understand if the new system may violate any critical law. The result of the analysis is positive, which means that any law will be broken when T&B implements this new system.

Nevertheless, it is important to obtain permission from the customer to store their data in the system, understanding the risk that may be associated with this since their data will now be stored in a database, although it is well known that this is a very safe method of storing information.

#### Will it work?

The proposed solution is highly likely to solve the main problems T&B is experiencing right now since the system is focused on creating the garment measurement automatic with information that T&B can gather from customers and for the data that the organization has already stored. With more accurate measurements, customers will be able to have a more suitable garment. As a result, customers' satisfaction will increase regarding the process in general and with the final product. Moreover, the new system will also support the founder and

the designers to spend more time in other areas that require more attention in order to improve customers' experiences by creating more satisfactory products.

However, there are some scenarios where the solution might not solve the entire problem or delay the process. For example, the work chain could be delayed if the calculated measurement takes longer than expected, and even if the system works perfectly, the final measurement calculation would be incorrect if the designers introduce the wrong body dimensions measurement from the user.

## Alternative solutions

Two alternative solutions have been developed in order to make a comparison to determine which is the most accurate for T&B's problem. Each alternative solution is explained below.

### Alternative 1: Fitting Preference Scale Template

A **Fitting Preference Scale** is a paper-based document that enables the customer to decide their fitting preference for a particular garment based on a scale that is devised by T&B. It is presented to a customer after collecting their body measurements. Customers can choose how well-fitted or loose they want their garment to be. The scale is shown in inches with a range of one inch to four inches. The scale collects the customer's preference based on the following measurements: Chest, Waist, and Hips.

Chest

1	1.5	2	2.5	3	3.5	4
---	-----	---	-----	---	-----	---

Waist

1	1.5	2	2.5	3	3.5	4
---	-----	---	-----	---	-----	---

Hips

1	1.5	2	2.5	3	3.5	4
---	-----	---	-----	---	-----	---

*A simple representation of the Fitting Preference Scale*

How it differs from the proposed solution:

- This scale mitigates the precise final measurement calculation done by the designer since customers choose their fit preference.
- This system resembles a ready-made model.
- It avoids the need for the customer preference history.
- This system will be made by T&B internally.
- It is a low-end solution since it adequately solves the problem of final measurement calculation.
- It is a low-tech solution since it does not require any technology.

Where it falls short:

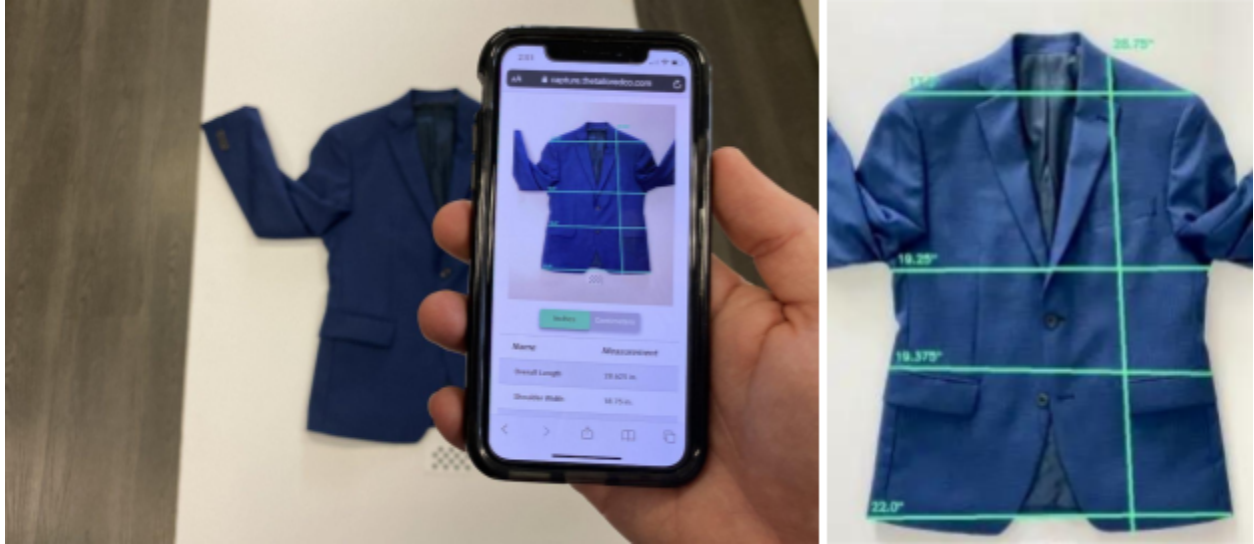
- Customers might need help understanding the scale. This requires the designer's involvement which adds time to the order process.
- Not all measurement preferences are captured in the scale.
- It does not guarantee perfect fitting.
- Additional time required from the customers might impact customer satisfaction negatively.

## Alternative 2: AR Measurement App

An **AR Measurement App** captures final garment measurements by taking a picture of an existing well-fitted garment. T&B customers are asked to take a picture of their existing well-fitted garment; the app captures the final measurements and sends them to T&B. The designer will use these measurements in the fabric-cutting process. This system significantly reduces the final measurement calculations done by the designer.

In addition to capturing measurements, the app features customer profiles that save customer information, invoice and order history, order notification, and payment portal. The app also allows designers to post their sketches to the Design Vault, which customers can go through for inspiration or select a preferred design for their next garment and they can discuss with the designer if they want any modifications in existing designs or explain the designer about the customer desired design.





Images taken from <https://www.thetailoredco.com/app-for-clothing-measurements/>

How it differs from the proposed solution:

- Significantly reduces the designer's time to calculate the final garment measurements.
- It avoids the need for customer preference history.
- AR measurement app already exists in the market and can be bought by T&B. However, the design and development of the proposed app will be outsourced since additional features, such as customer profile and design vault, are required.
- It is a high-end solution as it solves more than the problem at hand.
- It is a high-tech solution due to the use of augmented reality and cloud storage technologies.

Where it falls short:

- The measurement captured by the app might not always be accurate.
- There will be a steep learning curve for the customers of T&B, which might affect customer satisfaction negatively.
- This system requires all customers to use the app.
- The technologies involved will result in a higher cost and will take longer to implement.

## Alternatives Matrix Information

### Criterion 1: Accurate measurements calculation

**Type (requirement, risk, constraint, or other):** Requirement

**Description:** This criterion accounts for the accurate calculation of the final garment measurements of the customers of T&B. Accurate measurement calculation is required for a well-fitted garment.

**A low rating (1) would mean:** Multiple alterations are required for a garment due to inaccurate measurement calculation.

**A high rating (5) would mean:** A well-fitted garment delivered to a customer without any alterations.

### Criterion 2: Customer dissatisfaction

**Type (requirement, risk, constraint, or other):** Risk

**Description:** This criterion measures the feedback from the customers regarding the service and the overall garment result, regarding the fittings and design of the product.

**A low rating (1) would mean:** The customer is dissatisfied with the outcome since the garment dimensions are inaccurate, and the product does not fit correctly.

**A high rating (5) would mean:** The customer is very satisfied with the final result. The garment fits perfectly, and the customer has no negative feedback about the result. Customer service can lead to high satisfaction and a high rate of recommendations.

### Criterion 3: Employee dissatisfaction

**Type (requirement, risk, constraint, or other):** Risk

**Description:** This criterion measures, for each solution, how well employees are using the solution and how well they are trained for it. This criterion also measures if the solution allows employees to reduce time in the measurement calculation process.

**A low rating (1) would mean:** Employees are unsatisfied with the new solution, it takes them a long time to learn how to use it, and they make mistakes when using it.

**A high rating (5) would mean:** The employees are pleased and satisfied with the solution since it takes less time to train and it is easy to use; therefore, they rarely make mistakes in the garment's creation. Moreover, the solution allows them to spend more time doing other tasks.

## Criterion 4: Increasing production volume

**Type (requirement, risk, constraint, or other):** Requirement

**Description:** If the solution works out as expected, the production frequency of the outfits will be increased, thereby producing more revenue for the business.

**A low rating (1) would mean:** The production volume has not increased compared to the previous year.

**A high rating (5) would mean:** The production volume has significantly increased compared to the previous year.

## Criterion 5: Return on investment

**Type (requirement, risk, constraint, or other):** Risk

**Description:** This criterion explains the risks related to Threads and Beads investments, they will have to know how to manage their investment expenditure for better returns. Each proposed solution has a different recurring cost associated with each solution, which may provide a different ROI.

**A low rating (1) would mean:** The solution has little to 0, and a negative ROI.

**A high rating (5) would mean:** The solution has a high ROI.

## Final Matrix

The final matrix is shown below, and it also can be found in the following link:

[+ Fantastic Five - Alternatives matrix result](#)

## Alternatives Matrix Result

Evaluation Criteria	Weight	Solution 1: Centralized database with custom system	Score (1-5)	Weighted Score	Alternative 1: Fitting Preference Scale Template	Score (1-5)	Weighted Score	Alternative 2:AR Measurement App	Score (1-5)	Weighted Score
Criterion 1: Accurate body measurements calculation	40	Final garment measurements are automatically calculated by the system.	5	200	The final garment measurements have to be calculated based on the fitting preference scale causing human errors.	3	120	Final garment measurements are captured by the AR App, avoiding any calculations.	5	200
Criterion 2: Customer dissatisfaction	15	As the garment now has more accurate measurements and fits better, customers are more satisfied.	5	75	The customers need to be more involved, which isn't ideal for some customers who don't have the time for it or	3	45	Since customers can decide on their favorite garment to take the picture, they will be pleased with the final garment	5	75

					don't want to get too involved.			dimensions result.		
Criterion 3: Employee dissatisfaction	15	Easier to use and less time-consuming for the employees to train; therefore, they are less likely to make mistakes and can focus on other tasks.	5	75	Employees are not pleased because they have to spend more time explaining to customers how to complete the template.	2	30	Although it takes a little training to understand how the app works, employees are happy since they receive accurate measurements.	4	60
Criterion 4: Increasing production volume	20	Since the time taken to get accurate garment measurements will be reduced, the production volume will be increased.	4	80	This solution does not increase the outfit's production as the garment calculations are done manually by the designer.	1	20	Total time taken to calculate the final garment measurements will be significantly reduced as the measurements will be received via the app.	4	80

Criterion 5: Return on investment	10	This solution has a one-time cost, but all the records will be present in the system for automated calculation, which will save designer's time to calculate.	4	40	High returns as it costs very less to take printouts of the fitting preference scale.	5	50	This solution is very expensive, and ROI will be less as it will take time for customers to adopt the solution.	2	20
<b>Totals:</b>	<b>100</b>			<b>470</b>			<b>265</b>			<b>435</b>

## Physical Process Models

A Physical Data Flow Diagram holds all the information (entities, data flows, data stores, and processes) as a logical Data Flow Diagram with additional details about the implementation of the system. This includes

- Actual specific technology used
- Format of the information flowing
- Human Interaction with the system.

For our project, we have converted the logical Level 0 data flow diagram into a physical data flow diagram.

**Customer:** The customer is a human entity separated by a dotted line in the diagram. New customers enter their information such as name, phone number address, gender, and age via an input form presented to them when they come in to place a new order. In the next step, the founder adds the order details - a type of outfit, outfit reference that the customer brings in, delivery date, and advance payments in the customer's profile. After this, the designer takes the body measurements and the Founder adds them to the system via an input form.

**Designer:** The Designer is a human entity, hence separated with a dotted line in the diagram. The designer discusses with the customer for his/her references to sketch the outfit. The designer will take the customer references and finalize the design. After finalizing the design, the designer will proceed to the next step i.e if the customer is a new customer, the designer will take the body measurements and send them to the seamster along with the order summary detail.

**Seamster:** The Customer is a human entity separated by a dotted line in the diagram. The seamster will sew the garment after receiving the order summary detail, body measurements, and garment design detail after completion of the garment seamster will inform the designer verbally then the designer will inform the customer about the garment. The customer proceeds for trials of the garment if there are any modifications or alterations the seamster gets notified about the changes and the seamster proceeds for modification of the garment.

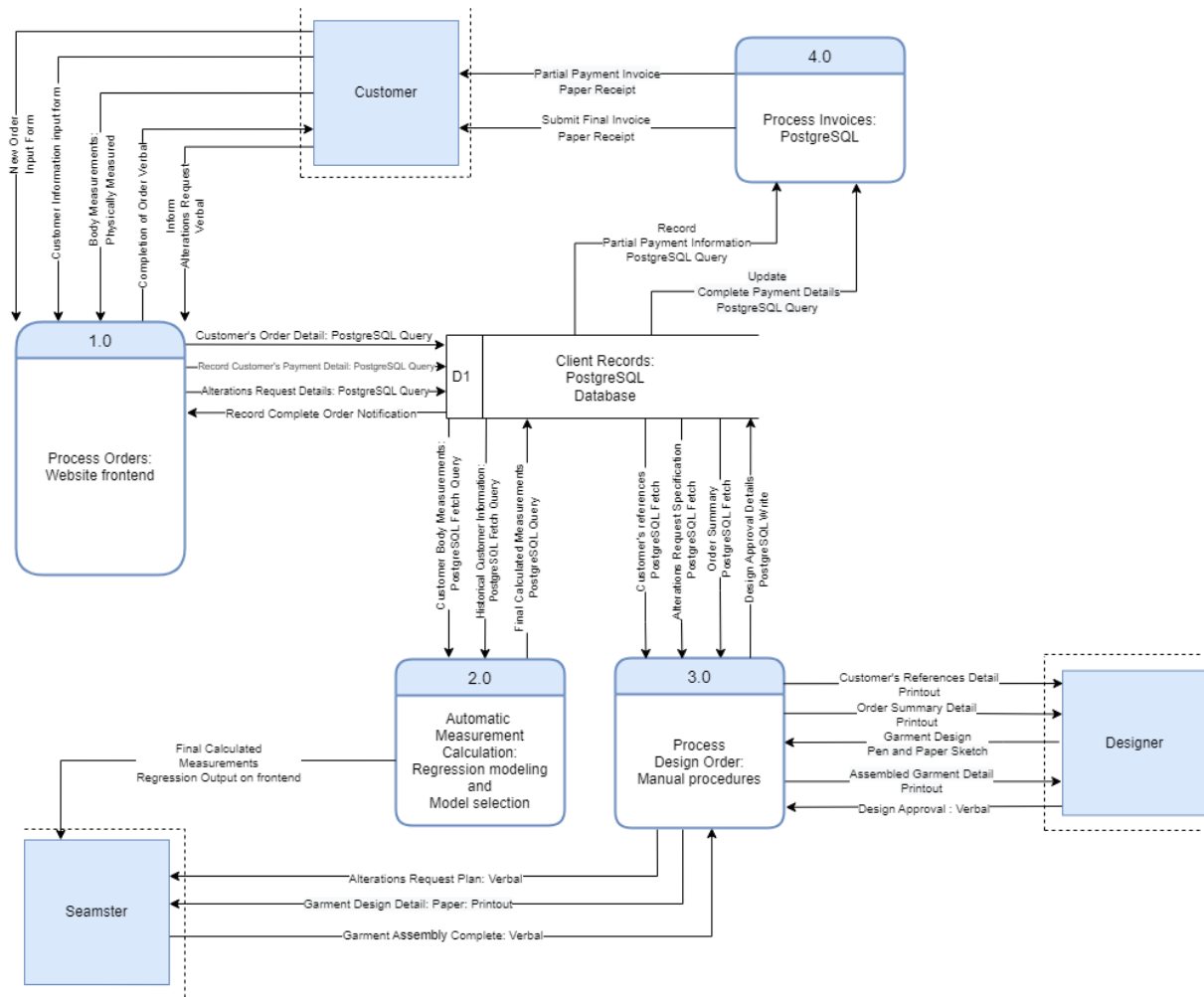


Figure 1 - Physical Process Models

The above physical DFD consists of three human entities: customer, designer, and seamster. If the customer is new to T&B then the customer enters their information and the information entered will be stored in the PostgreSQL database. The order details, body measurements, customer design references, payment information everything is entered and manipulated in the database. The measurement calculations are automated by using the machine learning methods like regression modeling and model selection. The design process of the orders is a manual process whereas the designer will send the customer references detail printout which is retrieved from the database along with the order summary detail printout. After



the completion of the garment, the information is communicated verbally to the designer then the designer will inform the customer and the customer comes for trials if there are any modifications or alterations the communication is done verbally to the seamster. The partial and complete payment information is both stored and updated in the database.

## Interface Structure Diagram

The interface structure design helps to understand the basic components of an interface, how the elements are linked to each other, and how they function. An ISD, or interface structure diagram, illustrates what screens make up an interface and how users move through them. Figure 2 shows the ISD we have created for T&B's system. There are three main options that the founder or employee can click on in this interface structure diagram: **dashboard, billing, and customer profile.**

On the **dashboard**, we can see the most important elements that compose the system: review customers, create new orders, and view orders in progress. All these options are clickable and send the user to a new screen. On the dashboard, the user can see a preview of the order in progress with their status and is also able to visualize the number of orders, the income, and information related to the expense. On the dashboard, it is also possible to see a calendar with the next appointments and the delivery days to track what comes next.

The **billing screen** allows the user to view information related to paid and pending orders, as well as review payment history to see when the customer made payment. Finally, on the **customer profile** screen, the user can navigate through the customers' information, review order records, see the body measurements, and tier personal information such as phone number, email, full name, previews order, etc. Since the customers' profile is one of the most important sections that the system has, it is possible to end up in this section coming from multiple ways, for example, we can search for a customer profile from the customer profile screen located in the main menu, or we also can have access to search for a customer profile from the dashboard, clicking on the review customers button and later, clicking on the search customer profile.

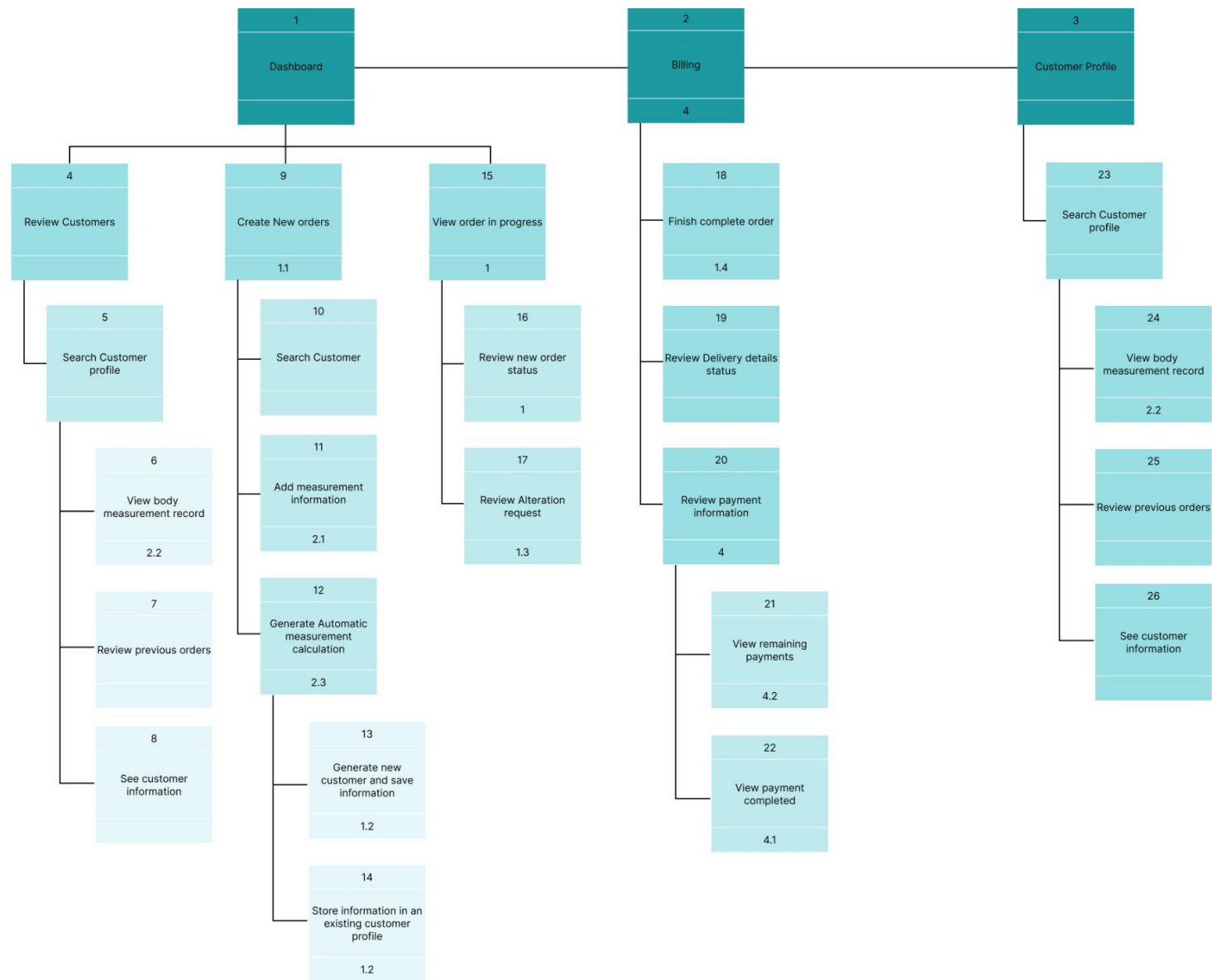


Figure 2 - interface structure diagram for T&B.

# User Interface Design

## Conventions and Standards

### Design Principles:

In the user interface design creation for the T&B application, we have started following two of the interaction design rules, visibility, and consistency. Those two rules are important when it comes to designing an interface since it allows the users to comprehend what to do next, making the learning process also more straightforward. Visibility refers to the fact that the design is simple to understand, while at the same time, achieving all the requested functionality, making it easier for the user to use. Consistency refers to the idea that all the elements within the interface are alike, meaning that the user will spend more time using the interface for its main functionality rather than learning how to use it. To achieve consistency, we have used the same typeface and color in the interface; however, we have used different fonts to emphasize the most important information.

In the design, we also decided to choose a **column grid** to improve the visibility of the information. As a result of the grid, the interface has more consistency when it comes to displaying information and maintaining the platform's organization.

### Usability Goals:

The usability goals that were crucial for the application were Learnability and Memorability. This was due to how efficient and quick the system needed to be for usage. Learnability measures how easy a system is to learn how to use or the time taken to learn a task. The UI designed for T&B has a simple layout which makes navigating through the system easy to understand and user-friendly. The menu and the secondary buttons are accompanied by icons that make it easy for the user to learn what each menu item or button refers to. Memorability measures how easy it is to remember how to use the system, or do a task, once learned. Due to the simplicity of the UI design and the good learnability quotient, the users will find the system easy to interact with it post necessary training. The consistency of design elements in the UI, such as the placement of the search bar, buttons, and menu panel on the

left and the visibility of the most important pieces of information in the central panel on all screens, provides a good and easy user experience.

Metaphors & Icons:

An interface metaphor is a collection of user interface images, actions, and procedures used in user interface design that take advantage of the unique subject knowledge that users already possess. The interface metaphor serves the objective of instantly providing the user with information on how to interact with the user interface. The user's attention and enhanced visual interest are what make icons most successful. They assist people in finding their way around a page. If you use icons excessively, they will just serve as decoration. They are frequently diluted when used for website navigation. Highly frequent, very straightforward, and appealing metaphors that are easy for users to navigate were included in the T&B UI design.

User Experience Goals:

The user experience goals for the T&B application can be Helpful, Satisfying, and Motivating. The application screens designed for T&B accomplish the tasks that the designer and the founder had asked for. The information on each screen helps the target audience to understand and complete their tasks. Also, the application will boost the motivation of the founder and the designer, who will be content and satisfied with their work.

Style Guide

- **Color:** T&B's existing color palette - Magenta (hex 8E0190) and Dark Grey (hex 1E1E1E).
- **Typeface:** Inter

Heading Font Size	24pt	Bold
Sub Heading Font Size	20pt	Semi Bold

Body Font Size	16pt	Regular
----------------	------	---------

Button Font Size	14pt	Regular
Button Size	255px by 42px	124px by 42px
Button Color	Magenta (hex 8E0190)	Dark Grey (hex 1E1E1E)

When using an application, going to a website, or opening software, the user interface (UI) design is probably the first thing you see. It oversees aesthetics and adds to the general usability of a product. It's essential for companies and creators to educate themselves with UI design best practices because UI may make or break a user's experience. We have used common elements and made them predictable and also easy to navigate in order to maintain consistency.

## Screens' Design

### Screen 1: Dashboard

The dashboard is the first screen the user (*founder or designer*) views upon logging into the system. The menu panel on the left lets users navigate the system with ease and log out of the system after use for security. The central panel of the dashboard gives an overall view of the critical stats such as Income, Expenses, and Orders, helping users keep track of T&B's daily activities. Below the stats widget is the list of orders currently being processed by T&B. The header of the central panel shows today's date and houses the CTAs to add a new customer or order.

The panel on the right has the search bar on the header. The search inputs include: *search by name* or *search by invoice number*. The calendar that shows the user's appointments is added to the right panel, and new appointments can be added by clicking on the date. The customer information and reason for the visit are mentioned to allocate internal resources efficiently. The calendar can also toggle to show upcoming deliveries by date.

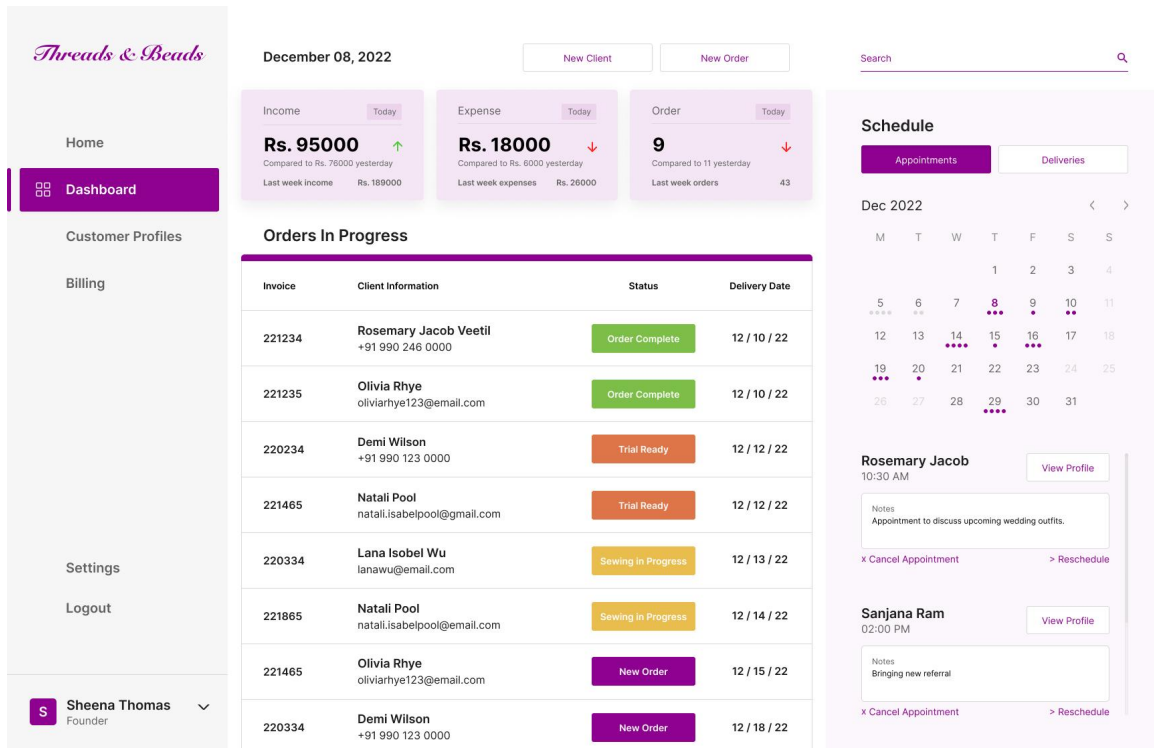


Figure 3 - Screen 1: Dashboard

## Screen 2: Measurement Log

The measurement log screen is the input screen where the user adds the customer's body measurements - which are manually taken by the designer. This page is navigated through the customer profile menu item present in the list of menus on the left side. A customer's profile can also be searched specifically from the search bar. The design sketch is uploaded on the right side for the seamster's reference. The body measurements from here are fed into the algorithm that runs in the backend, and the final measurements are displayed on the next page.

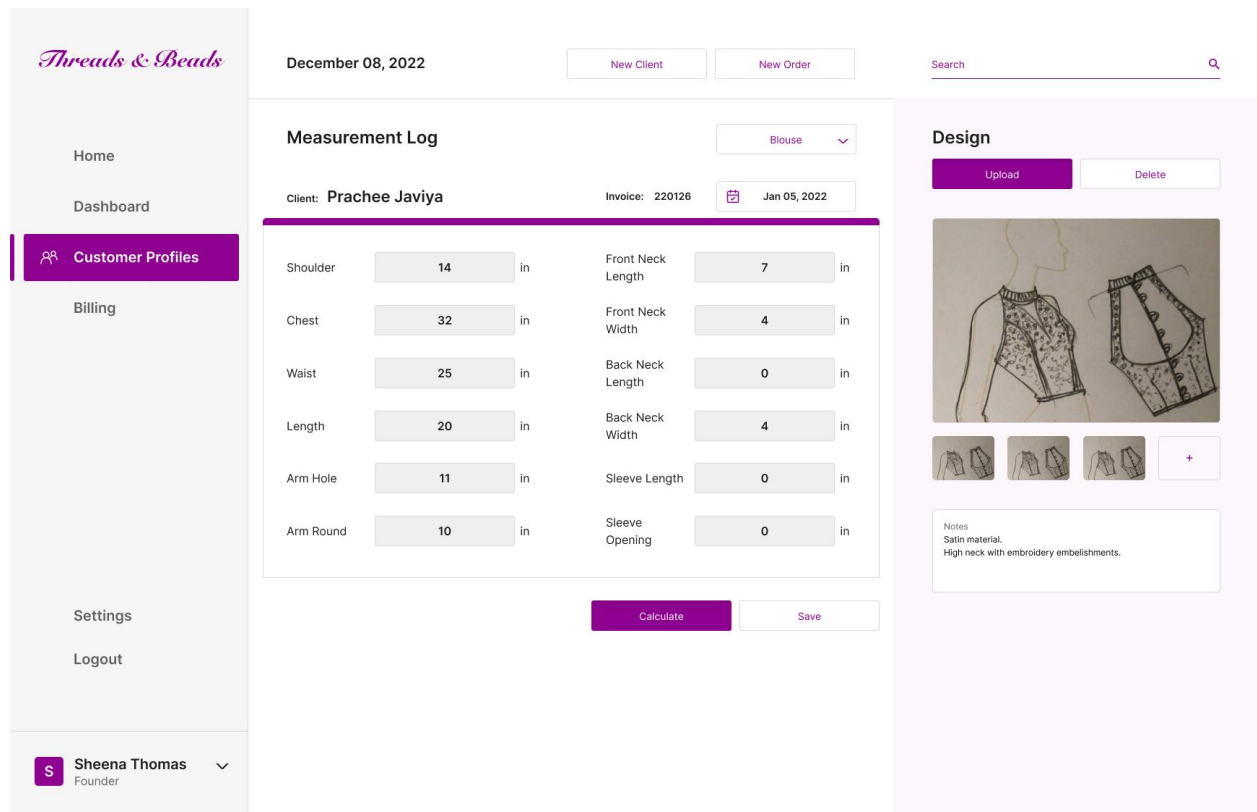


Figure 4 - Screen 2: Measurement Log

### Screen 3: Measurement Calculation

The measurement calculation screen is the output of the previous screen, i.e., the Measurement Log. Here, the calculated measurements are displayed on the screen; the calculation happens in the backend. The designer or founder can take a printout of the calculated measurements, design references, and notes, which will be handed over to the seamster. The screen also allows the user to save the details and take action sometime later. The users can also go back to edit the measurements if needed via the “Measurement Log” button.

*Threads & Beads*

- Home
- Dashboard
- Customer Profiles
- Billing
- Settings
- Logout

S Sheena Thomas  
Founder

December 08, 2022

New Client
New Order

Search 🔍

### Calculated Measurements


client: **Prachee Javiya**      Invoice: 220126      Delivery: 01 / 05 / 23

Shoulder	-	14.5	+	in	Front Neck Length	-	7	+	in
Chest	-	34	+	in	Front Neck Width	-	4	+	in
Waist	-	27	+	in	Back Neck Length	-	0	+	in
Length	-	20	+	in	Back Neck Width	-	4	+	in
Arm Hole	-	12	+	in	Sleeve Length	-	0	+	in
Arm Round	-	10.5	+	in	Sleeve Opening	-	0	+	in

Blouse

Measurement Log
Print
Save

### Design



Notes  
Satin material.  
High neck with embroidery embellishments.

Notes for Seamster  
Fabric prone to stretch.

Figure 5 - Screen 3: Measurement calculation