IS 623: Information Systems Design and Development.

Project Deliverable - 5

E-commerce Marketplace for Print on Demand

TEAM 6

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Objective

The objective of print-on-demand, as mentioned in the document, is to establish an e-commerce marketplace called "Print n Purchase" that allows designers to showcase and sell their T-shirt designs while providing customers with an easy and convenient way to browse and purchase these designs. The platform aims to facilitate collaboration between designers and consumers, enabling them to create and select designs based on specific requirements. The document emphasizes the importance of information systems design and development principles in achieving this objective, including the effective implementation of the Systems Development Life Cycle (SDLC), system structures, requirement gathering, and project initiation and planning.

It concludes with an overview of the benefits of following these approaches and provides visual representations, such as Gantt charts, network diagrams, and data flow charts, to aid in project management and system analysis. Additionally, the objective is to integrate payment processing and Print on Demand T-shirt factory APIs into the web platform, ensuring seamless transactions and efficient production of custom-printed T-shirts. The overall objective is to create an online marketplace that supports the print-on-demand business model, providing a platform for designers to showcase their creativity and for customers to access a wide range of unique and personalized T-shirt designs.

Introduction to the Print-on-Demand

Our project aims to establish an E-commerce platform, titled "Print n Purchase", where designers can showcase and sell their T-shirt designs, while customers can easily browse and buy these designs. The platform promotes collaboration between designers and consumers, enabling them to create and choose designs based on specific requirements.
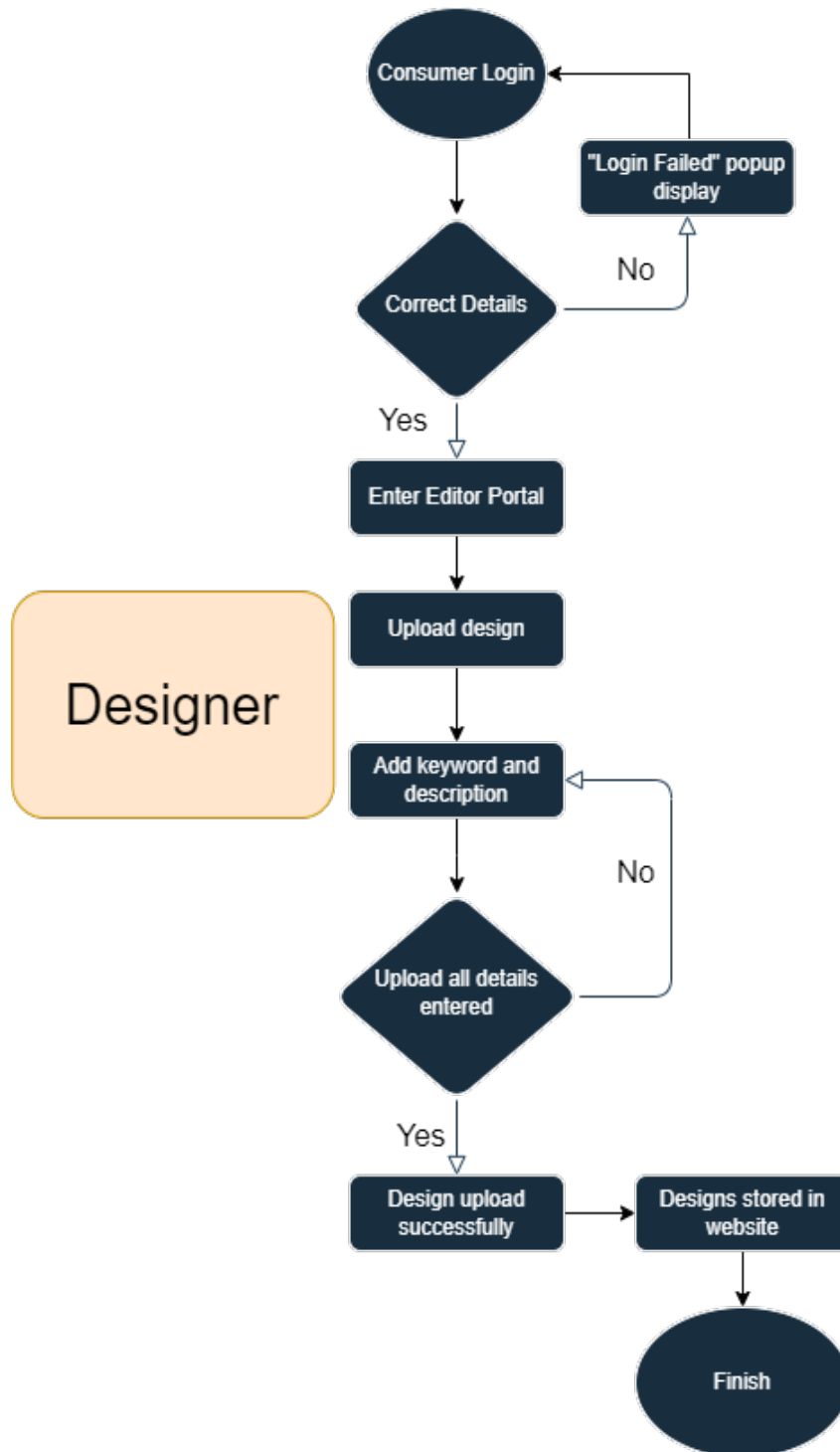
It emphasizes the key aspects of Information Systems Design and Development, such as the effective implementation of the Systems Development Life Cycle (SDLC), emphasizing the importance of system structure, requirement gathering, project initiation, planning, and management. Furthermore, the technical foundation of the project is rooted in a web platform that seamlessly integrates payment processing and Print on Demand T-shirt factory APIs.

The platform will consist of two primary modules: the Designer module for uploading and keyword-tagging designs and the Consumer/Customer module for browsing and purchasing. Additionally, a unique feature allows customers to post design requests, setting design challenges for participating designers.

We are considering the SDLC approach for the project by a clear step-by-step approach as we taught in class. We planned it clearly by identifying how important the SDLC approach is and how to overcome the pitfalls. Then the structure we would like to consider for the project. Then we gathered the necessary requirements that are to be considered for the project based on its need and necessity. And finally, the planning to execute the gathered requirements.

This step-by-step process will be briefed below.

Brief Designer Flow Chart

Brief Customer Flow Chart

Consumer Login

↓

Search through product with keyword "search"

↓

Add product to the cart

↓

Final cart web page

↓

Customer

Checkout? — No → Need to fill the details again

Yes ↓

Add payment details

↓ No

All mandatory details entered? — Yes → Product ordered successfully

↓

Receipt Generated
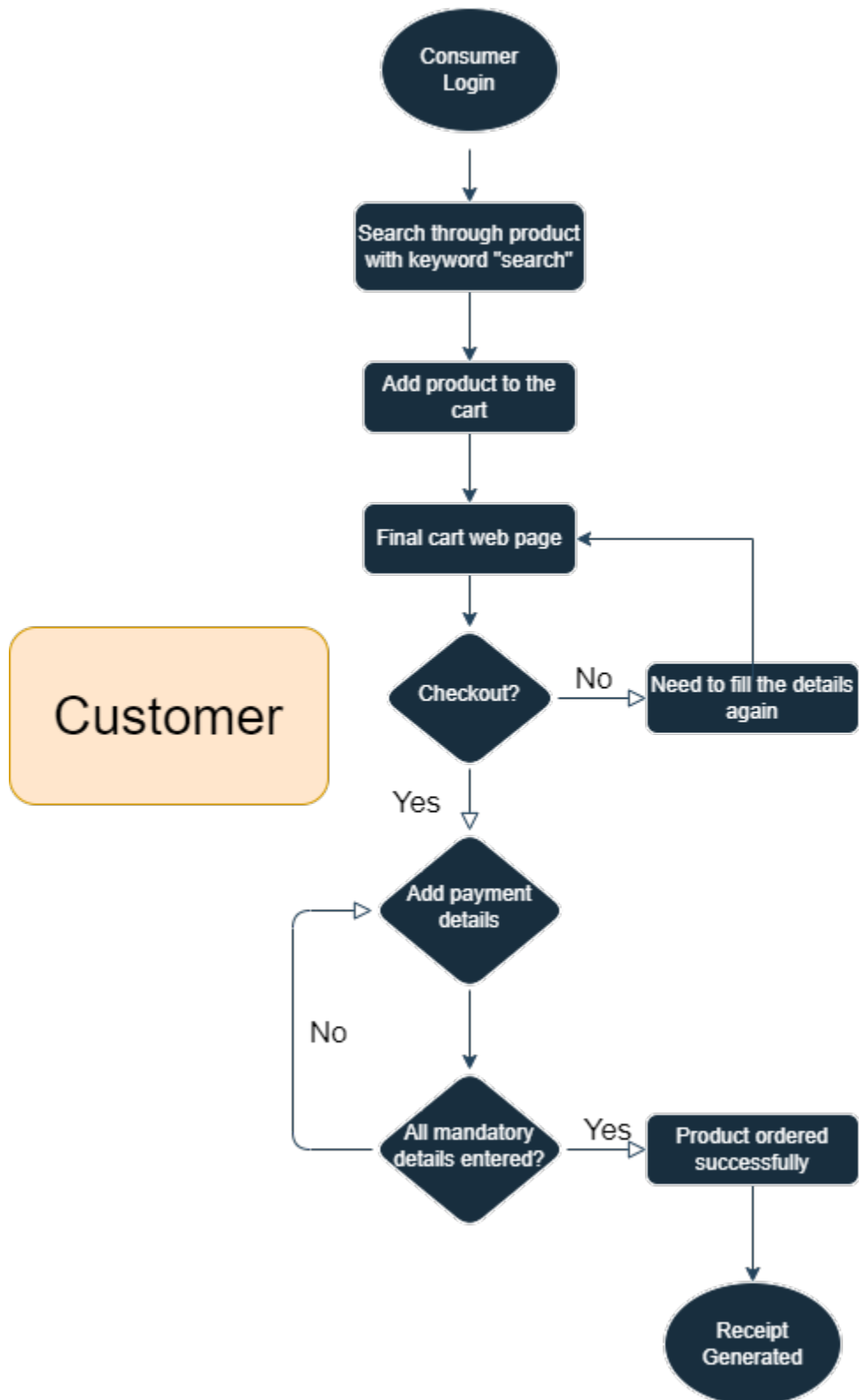
The Four Topic Choices

As mentioned, the four topic choices that could make the important building blocks for the project are -

    a) Importance and Successful implementation of SDLC

    b) System Structures and their importance in the project.

    c) Requirement Gathering and Prioritization

    d) Initiating and Planning Systems Development Projects

A brief about each of these is as follows:

1) Importance and Successful implementation of SDLC:

To have a successful software development process, there are several important points to focus on. First, ensure you have the right resources, including money and staff, to complete the project on schedule. The team should pick a development method that fits the project, like Waterfall or Agile. Regular team and stakeholder meetings are crucial to keep everyone aligned and to meet expectations. Everyone should work towards the same goal and plan for potential risks.

There are many pitfalls when we think about a process or an application development. To seamlessly reduce those is also important in an SDLC process.

2) System Structures and their importance in the project:

Process modeling and data flow diagrams are like blueprints for a house in a software development project. Just as builders need a clear plan before they start building, software developers need a clear picture of how information moves and how tasks connect. These tools help everyone understand how the system should work, from the big picture to the tiny details. They ensure that nothing gets missed and that everyone knows what's going on. It's a way to avoid mistakes, save time, and make sure the final software does what it's supposed to do.

3) Requirement Gathering and Prioritization:

For any system or application development, a structured plan is essential. This allows us to move forward with a clear direction towards our ultimate objective. Establishing a plan requires detailed requirements, enabling us to align with our budget constraints and necessities. Having a set path ensures ease in tracking progress. Furthermore, once

requirements are in place, they facilitate both the development and evaluation of the resulting product.

4) **Initiating and Planning Systems Development Projects:**

The SDLC method enables a holistic understanding of issues by examining all facets collectively, offering a wider viewpoint of challenges. The Agile methodology, with its cyclical nature, is especially beneficial as the project requires consistent enhancements based on frequent feedback. Throughout the SDLC process, we actively engage with both designers and customers, fostering a collaborative environment between teams and users. We'll ensure thorough documentation and prioritize risk management. This approach aids in the early detection of flaws or issues during the testing phase, allowing prompt resolutions. The segmented tasks simplify problem-solving and boost efficiency. Recognizing that our customer base will expand, and their demands will evolve, this strategy allows us to adjust to these shifting needs seamlessly.

Overview of the topics and their importance in the Project

1) **Importance and Successful implementation of SDLC:**

Breaking Down the Project

To build "Print n Purchase" from scratch, we'll have to divide it into a few parts to get it together. We'd have the total process in this manner, creating Shopify store to deliver the product to the customer, we have different process steps to complete the project which will be broken down into milestones. By setting clear goals and timelines for each section, we ensure nothing is missed.

Task Allocation

Every Milestone or task is made in order of priority based on requirements. We'd give each of these tasks a deadline. This way, everyone knows what they need to do and by when.

Iterative Approach

We are using an iterative approach for Print n Purchase. As UI customizations and different portals and webpages are involved, using an iterative approach always allows us to freely make changes based on the feedback or if something new comes to us we can easily incorporate it into our project.

Regular Check-ins

After creating milestones and adhering to the iterative approach, our team decided to share the tasks among us. We have set up different meetings to see how we are approaching the shared tasks and to ensure everyone is on the same Page. This helped us to be clear and have all our ideas in place.

Daily Updates

We also had a WhatsApp group to discuss our daily updates and quick calls to clear doubts and solve any small issues right away. It's like a standup to us to update everyday progress. This helped us a lot during the website creation as different people have different customization ideas.

Supplier Updates

We have tried different suppliers to check the quality of the products that they are delivering, shipping times and the varieties they are delivering. This helped us in picking the best suppliers for the customer base.

The Benefits

Following this approach means fewer errors and a better grip on our budget and ideas. This way we are all on the same page with constant updates about the project and resolve any issues that come up during the process.

2) System Structures and their importance in the project:

Blueprint for Development
Process modeling is an essential thing that can be taken from the SDLC standpoint. It gives us a clear idea of achieving PRINT and PURCHASE that should be built. Having a clear step-by-step structure helped our team understand their work and role. It made this project smoother and more organized.

Facilitates Communication

By visualizing the process, we had a clear image of the process and deadlines that we must meet, and rather than a document, visuals usually are easy to understand.

Data Flow Diagrams in SDLC

Gantt Charts in Project Management

Timeline Visualization

We used Gantt charts like calendars for our project. They showed us when each task should start, how long it should take, and when it should end. This helped our team to easily meet the criteria as a few of the developments are tied to one another.
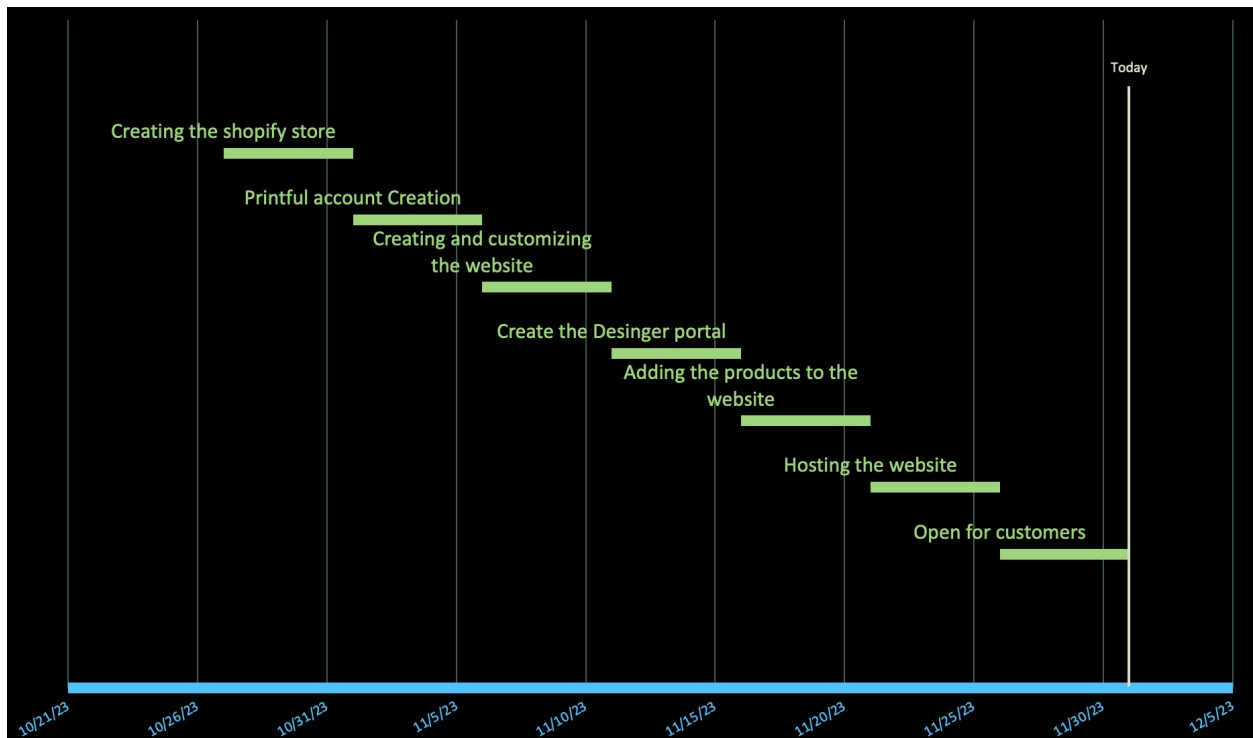

Diagram A: Gantt Chart for the Project based on Planned task

Task Name	Duration	Start	Finish
Creating Shopify Store	one week	10/21/2023	10/25/2023
Printful account creation	one week	10/26/2023	10/30/2023
Creating and customizing the website	one week	10/31/2023	11/5/2023
Create the designer portal	one week	11/5/2023	11/12/2023
Adding the products to the website	one week	11/12/2023	11/20/2023
Hosting the website	one week	11/20/2023	11/28/2023
Open to the Customers	one week	11/28/2023	12/5/2023

Screenshot B: Utilized Excel for the Gantt Chart

Resource Allocation

By laying out tasks on a timeline, we now had a clear idea of how our tasks overlap, and how we must deliver them. Our Product designs overlap with Printful websites, and as soon as the store is created, we need designs to be uploaded. Therefore, these kinds of things can be managed easily.

Network Diagrams in Planning

1. Interdependence Visualization: We utilized network diagrams to identify the sequence we have to follow, in the image, we can see how Printful account creating and Shopify web store creation are tied and followed to the designer portal and then adding websites and hosting are separated again ending with customer interactions. This sequence was identified using a network diagram.

2. Critical Path Identification: Through network diagrams, teams can identify the "critical path" – the sequence of tasks that determines the project's shortest completion time. This helps in prioritizing tasks and ensuring timely project completion.
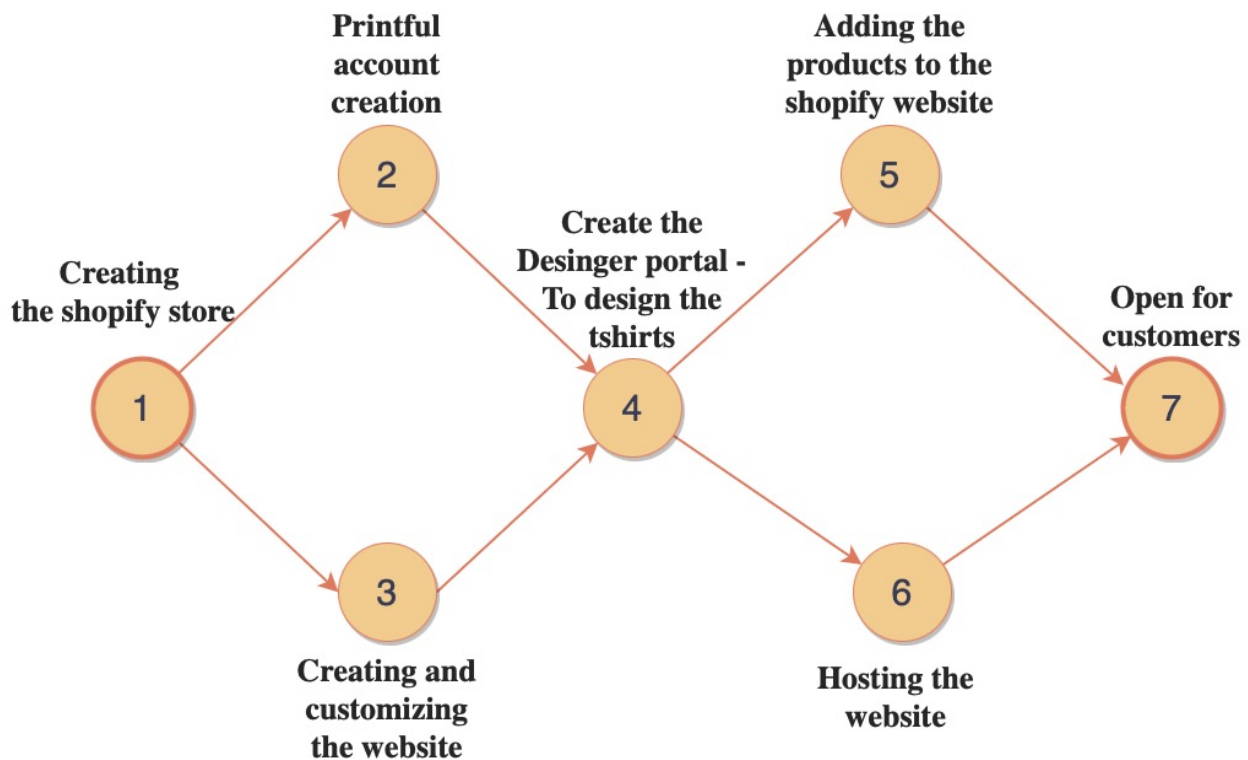
Diagram C: Network Diagram

Data Flow Charts for System Analysis

Understanding System Flow

This data flow gives us an in-depth view of how every portal in our Print n Purchase Project works. The customer data flow shows us how the customer browser throughout e-commerce store to how anyone can buy the product. The Data needed for payment as well is displayed below.
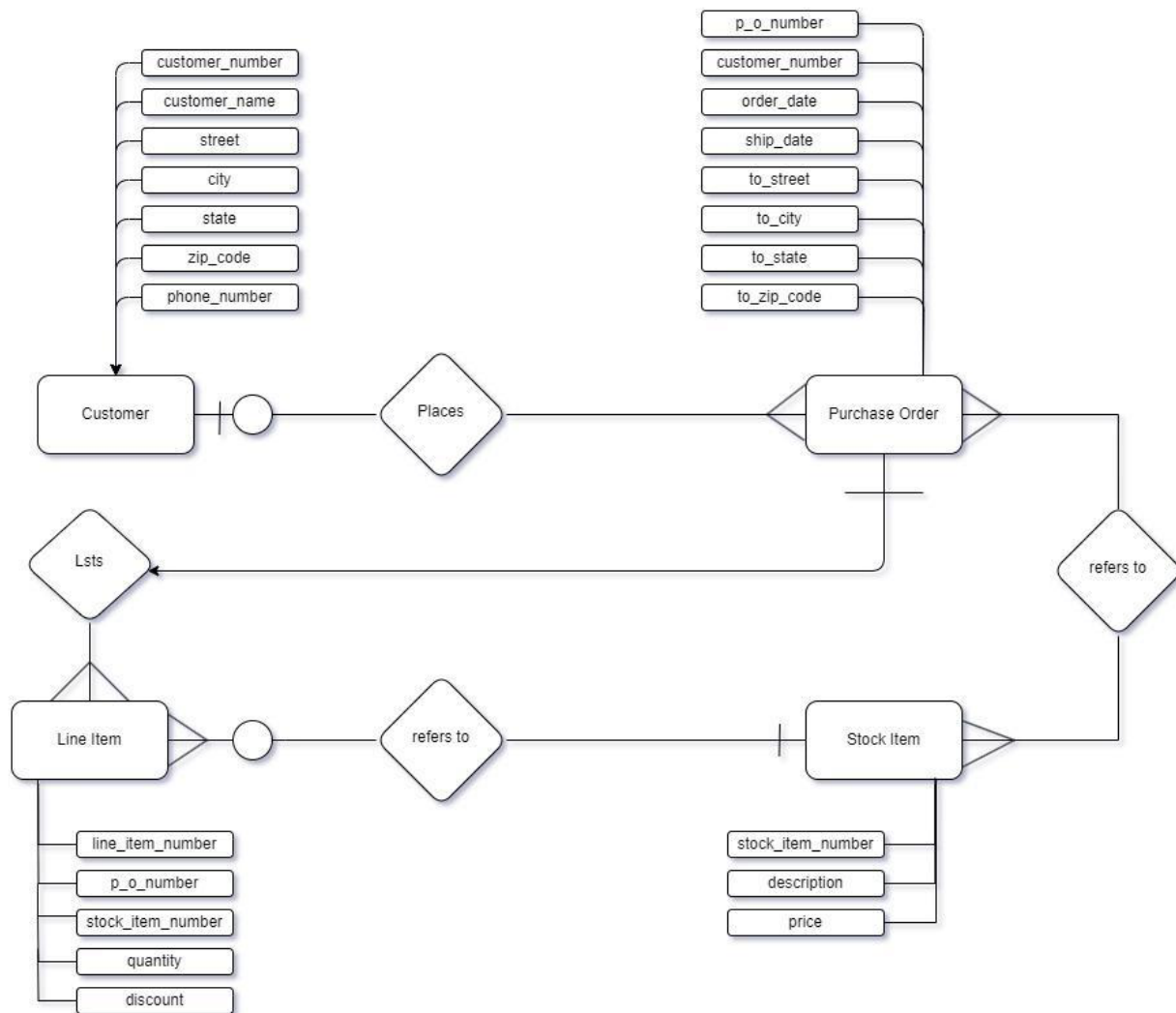

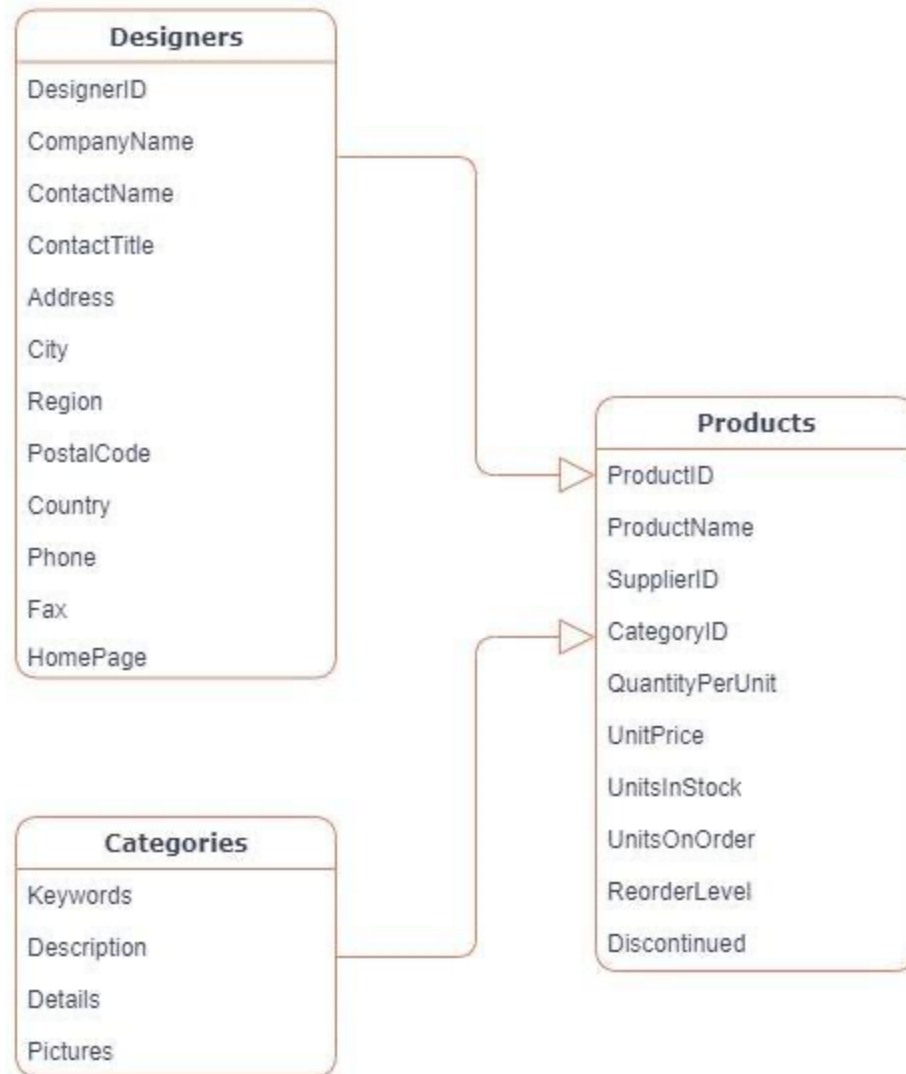Diagram D: Standard System Flow for Customers

Diagram E: Standard System Flow for Customers

Spotting Inefficiencies

By visualizing data movement, teams can identify potential bottlenecks or areas where data might get stuck. This proactive approach helps in designing efficient systems that are free from major flow disruptions.

3) Requirement Gathering and Prioritization:

For this website application, we would like to structure the requirements as follows:

We structured the requirements in natural language to avoid confusion and included acceptance criteria wherever possible in the requirements to have precise outcomes.

Business Requirements: We would like to discuss the goal and budget here.

a) We as a team, would like to have a Web-based UI application that can incorporate, Seller and consumer requirements following the functional and Non-functional requirements provided in the SRS document.

b) We as a team would like to have a flexible approach that should be ready for changes in requirements if needed after the beta and end-user testing.

c) The project will be limited to $XXX budget given the requirements.

Interface Requirements: These are related to the UI of the application.

a) The web application should be compatible with all the available web browsers.

b) The web applications should be compatible to view in different devices like Mobile, Computer, and Tablets

Functional Requirements: These define the functionality of the application.

1. **Web UI Functionality:** Basic website Functionality requirements-
   a) The website should have 3 web pages - Homepage, Login Portal, Cart and Checkout.
   b) The website should be able to load in less than 5 seconds on all the platforms.
   c) The login page should be connected to a secure database server to store the user and seller details.
   d) The search results should load based on relevance - it should display the relevant products matching the searched keyword.
2. **Consumer Functionality:** Basic consumer functionality requirements-
   a) As a user, I should be able to search for a product on the homepage with a keyword-based search.
   b) As a user, I can scroll through the products and add them to my cart.
   c) As a user, I can use the login page to successfully log in and check the previous orders and save the cart.
   d) As a user, I can check the cart and complete the order.
3. **Seller Functionality:** Basic seller functionality requirements-
   a) The seller portal should have all the Consumer functionality.
   b) As a seller, I can upload my designs into my portal, add names and descriptions, and publish the design.

Non-Functional Requirements: Requiremental constraints that are not associated with functionality.

1. **Performance Constraints:** Requirements dealing with the performance of the application.
   a) **Response time:** The response time of the system should be less than 5 seconds which includes search result generation, log-in portal access, generating the images after the design upload is completed and the checkout process once the cart is finalized.

b) **Security:** The log-in, saved payment details, address information and other necessary confidential information should be securely stored and no one other than the user should have authentication access.

c) **Storage:** The secure storage and website server storage should have enough to incorporate 10,000 images and 5,000 user information.

2. **Life cycle:** Life of the application and scheduled maintenance requirements -

a) **Reliability** (downtime): The website should be down for maintenance and updates once a month based on the time when there are fewer user interactions.

3. **Operating constraints:** Operational features for future -

a) **Scalability**: The web application should be designed in such a way that it can be scalable in future based on the users and data storage increases.

4. **Economic Constraints**: Economic flexibility of the product owner-

a) **Budget:** No technical limitations as per the software or approach but the project should be completed under the defined budget.

Other Necessary Requirements:

1. **End-User requirements:** After the beta-testing and End-user testing, the application should be flexible to apply the requirements as per the end-user needs.

For example: As an end-user, I would like to have an option to save the cart and continue shopping the next time I log -in. As a user, I would like to save an out-of-stock product so that I can get notified about it when it is available.

2. **Regulatory requirements:** All the legal details about account security, data privacy, and secure storage are mentioned here.

This would be an ideal structure I would follow to gather the requirements that are necessary for the project design.

Prioritization and Supervision: After we've set up the requirements, the next big step is to decide which ones are most important. We might not be able to do everything on our list, so we'll start with the most crucial stuff. This helps us stay on budget and make sure we get the most important things done first. Then, if we have time and money left, we can tackle the other items on our list. It's also super important to keep an eye on how things are going. We need to make sure that everything we plan is being built and tested properly. This way, we're sure that our main goals for the project are being met.

4) Initiating and Planning Systems Development Projects:

This is the approach we discussed before project creation started.

Chosen Approach and Reasoning: Our team believed the agile approach was the right fit for this project. We're aiming to develop a platform for Designers and Customers. This portal should not only promote networking but also enable Easy browsing and provide

feedback to the designers. With the eventual growing number of customers and changing needs, the iterative nature of agile makes it the best choice.

Phases and Outcomes:

Creating the Backlog: We'll start by pinpointing our main objectives, challenges, and desired solutions. For us, the goal is to have a portal and a UI to browse through the T-shirts, and for designers, it will be to upload their designs. We'll break this down into smaller tasks such as UI design and backend integration, resulting in a roadmap and feature list.

Sprint/Project deadline Planning: We'll segment our tasks, rank them by priority, and form a product backlog. For instance, a top priority might be the UI design. Our team will then estimate the effort required for each task and commit to completing certain items during the sprint.

Development Phase: The prioritized tasks for the week will be developed and reviewed. Developers will build the UI based on set requirements, while testers ensure these are met. The primary result will be tangible features like the Homepage and Designer Portal.

Daily Standups: We'll have frequent short meetings to discuss progress, address challenges, and ensure everyone is aligned. This fosters better team coordination and early defect detection.

Review & Retrospection: Post-sprint, the team will evaluate the completed work and strategize improvements for subsequent sprints. For instance, if we've finished the Designer portal, we'll assess potential enhancements or address any issues encountered. The outcome is a showcase of what was achieved and a plan for process refinement.

Deployment: Upon reaching certain milestones, with all features thoroughly tested, we'll launch the product. This provides users with a preliminary version of the platform to test its functionality.

Feedback Loop: As we release incremental versions, we'll continuously gather user feedback. This allows us to refine our product based on user needs, ensuring we're always aligned with their expectations. The result is a product that's shaped by and tailored for its users.

Statement of the project

When we talk about the project, the main things we need to discuss here are the Investment and Inventory, Customer Needs and liking, Platform for Designers, and Scalability and flexibility. Print and Purchase is a project that utilizes and incorporates the above-mentioned ideas that are commonly faced in the modern era of entrepreneurs.

Print and Purchase being an E-commerce website, utilizes the powerful features of already well-made features from Shopify. It is a portal for entrepreneurs to host their e-commerce websites. Combining this with the t-shirt printing suppliers is the main idea of the project. It solves the investment risks as start-up cost for this is relatively less compared to developing the websites from scratch and building blocks upon it. Inventory space is not needed as the suppliers are taking care of the products here in the idea. So, Print and Purchase follows a hassle less inventory free, and Low risk investment approach.

With the growing population and changing mindsets, everyone is deeply varying these days. Outfits are one of the common basic needs for everyone. Providing the accessories based on the liking of the customer and having a satisfied customer means more growth towards the project. This is one of the things considered in this project. Also providing work for the designers for their creative designs and creating opportunities is the secondary goal on which the project is created.

Utilizing the features of an e-commerce store helps reduce the risks of scalability. Online web and cloud are the future of this world where we have the freedom for expansion. Keeping that in mind, we implemented the idea on the web, and it is scalable as the customers grow. Also, flexibility is the other thing that is important in any project. Print and Purchase is flexibly made where we can utilize the suppliers that have good ratings, flexible payment options for the customers, and can deliver throughout the continents. Through these features, we are creating a great base online for the customers and designers to design, implement, and purchase based on their liking.

In this modern era, print and purchase not only solves the budget-related issues for the investment but also provides a platform for designers to develop and grow, a store for customers, and a place that is flexible and scalable in the future based on the requirements.

Project Process Flow

Here for starters, I'm using Shopify - Shopify is an online platform that makes it simple for anyone to create and manage their online store. It's like a tool kit for e-commerce, where you can design your store, organize your products, accept payments, and keep track of orders, all in one place. People use Shopify because it's user-friendly; we don't have to be a tech expert to set it up to start and see how the business is working before we start on an expert custom-built website. Small businesses love it because it offers customizable templates to make their store look unique. Plus, Shopify handles things like security and web hosting, which takes a big load off the shoulders of store owners. It's popular because it's like having a personal assistant for our online e-commerce, helping you sell your products to customers worldwide.

Our Project advantage over other business models:

Low-Risk: As we are starting with little money and generally, we don't buy anything beforehand it is a low-risk investment for starters.

Image: Full Process Image

Below is step-by-step process flow for the project:

Shopify account creation: The first step in the process is to create a Shopify account. Go to www.shopify.com and you'll see the sign-up page. Login to get started.

Image 1: Shopify login page

This is the Shopify homepage that will be appearing after our login. We'll see an "ADD APPS" option in the bottom left corner. Click on it and open a new web browsing tab.
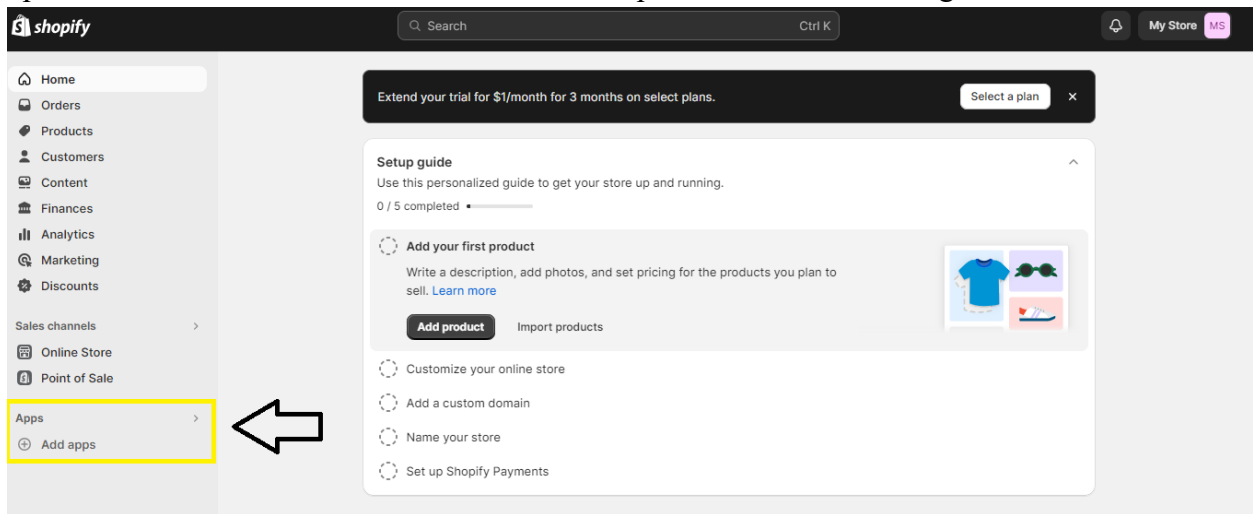

Image 2: Shopify Home Page

Printful: Printful is our get-go for the t-shirt suppliers. We'll be utilizing Printful to send out designs to the suppliers. Head on to www.printful.com and create an account. Now, you'll see the homepage below of our Printful account.

Now click on "Add Product" and select a desired product, in this case, we'll be selecting T-shirts. It will allow us an option to create the template of the desired T-shirt.
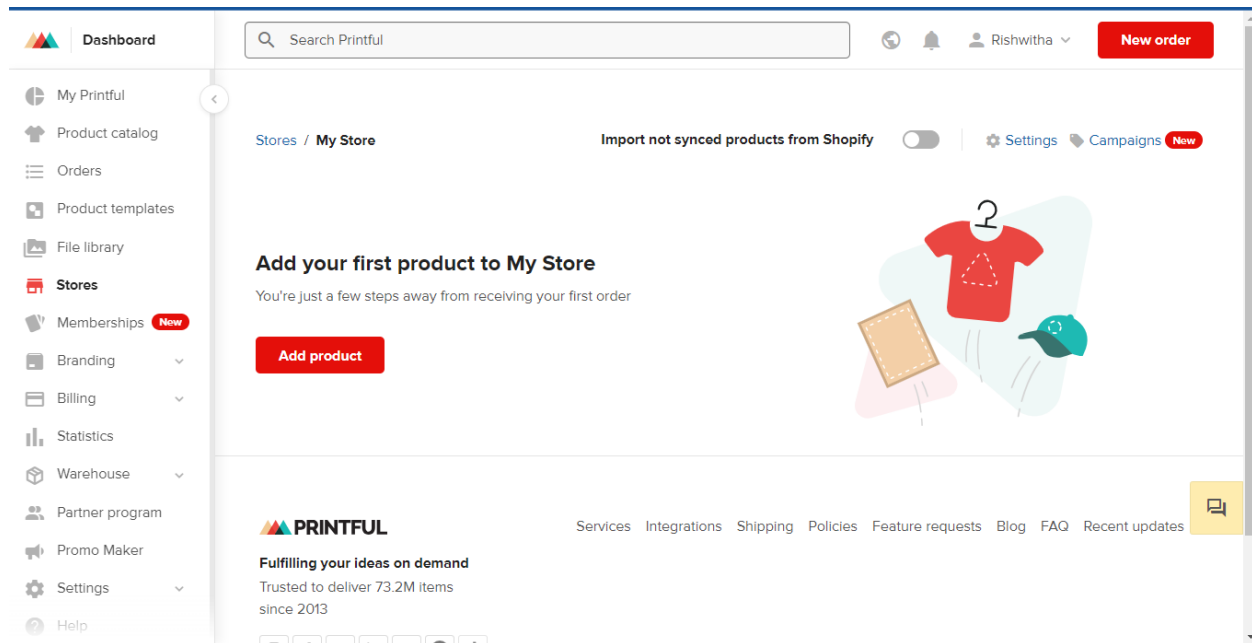
This is the product template creation page. We'll create a t-shirt design that can be used to upload in Printful thus giving the product. We can save it as the template by clicking the option in the bottom right corner.
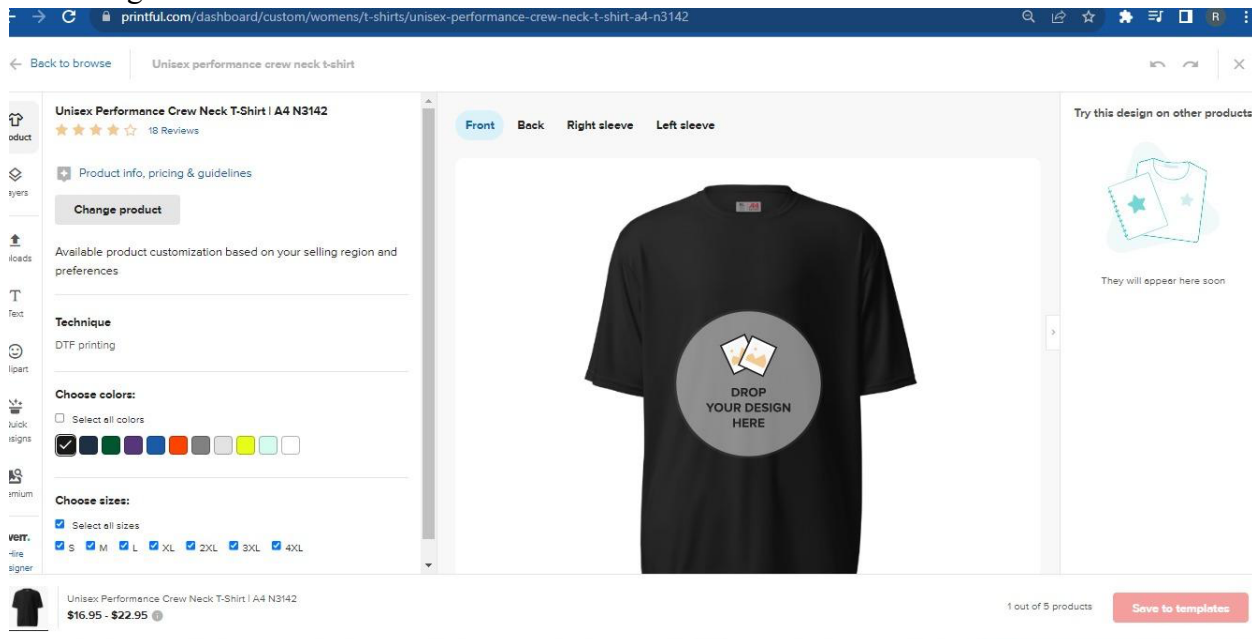
Now create a design, A sample design is created below which will be used for the sample product that we will be showcasing in the document.
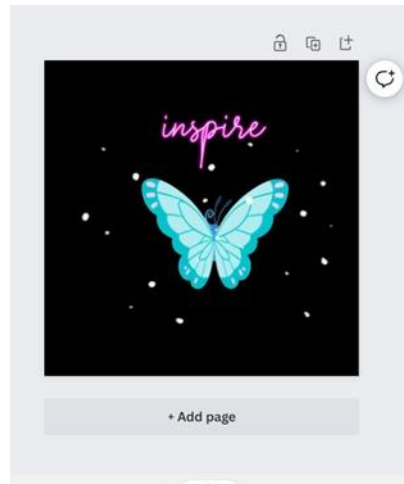
Once the design is uploaded the template will look something like this. These are sample products created using the image provided.

Media

Once we are done customizing the product with the desired design, we can then finalize it. It will go to the checkout where it will provide us with the t-shirt pricing and supplier charges. It is shown in the below image. Different t-shirt sizes will be provided. We can then add the custom price which adds on top of the Printful price when displaying that product. Now once we are set, the product will be added into the store.

Variant By size	Printful price Range varies by color, size, and fulfillment location	Retail price How much customers will pay	Estimated revenue Retail price minus Printful price
All variants	$17.95 $16.09 with Printful Growth	$20	$2.05 $3.91 with Printful Growth
S	$17.95	20.00	$2.05
M	$17.95	20.00	$2.05

Once we click set, the product will be added to the store as shown below.


Now head on to the previous tab, click on the add app, and add the Printful store to our Shopify e-commerce store which can then be converted into a website. After adding it, the products in the Printful store are displayed as shown below.
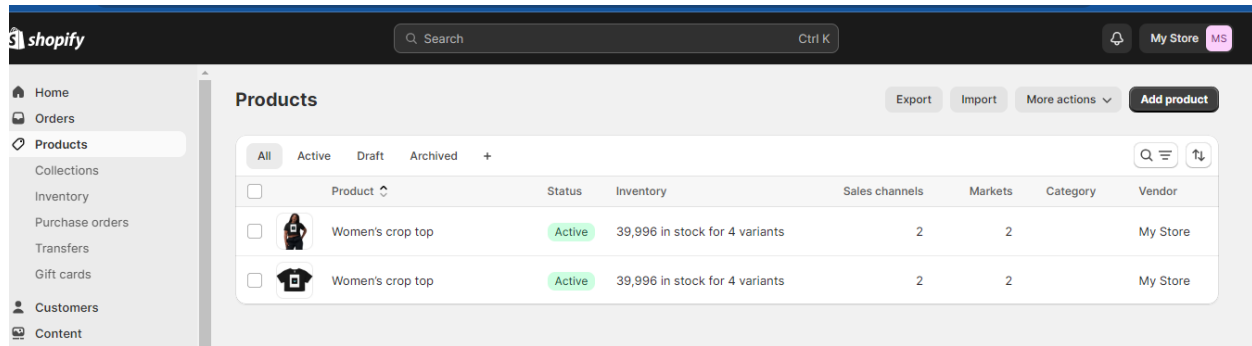
Then we can finalize the products and finish the getting started menu to display our website. We can choose freely from the wide variety of themes that are available in Shopify. Below is a sample model of the website that was created. This is the website that is hosted: www.designdev1.myshopify.com
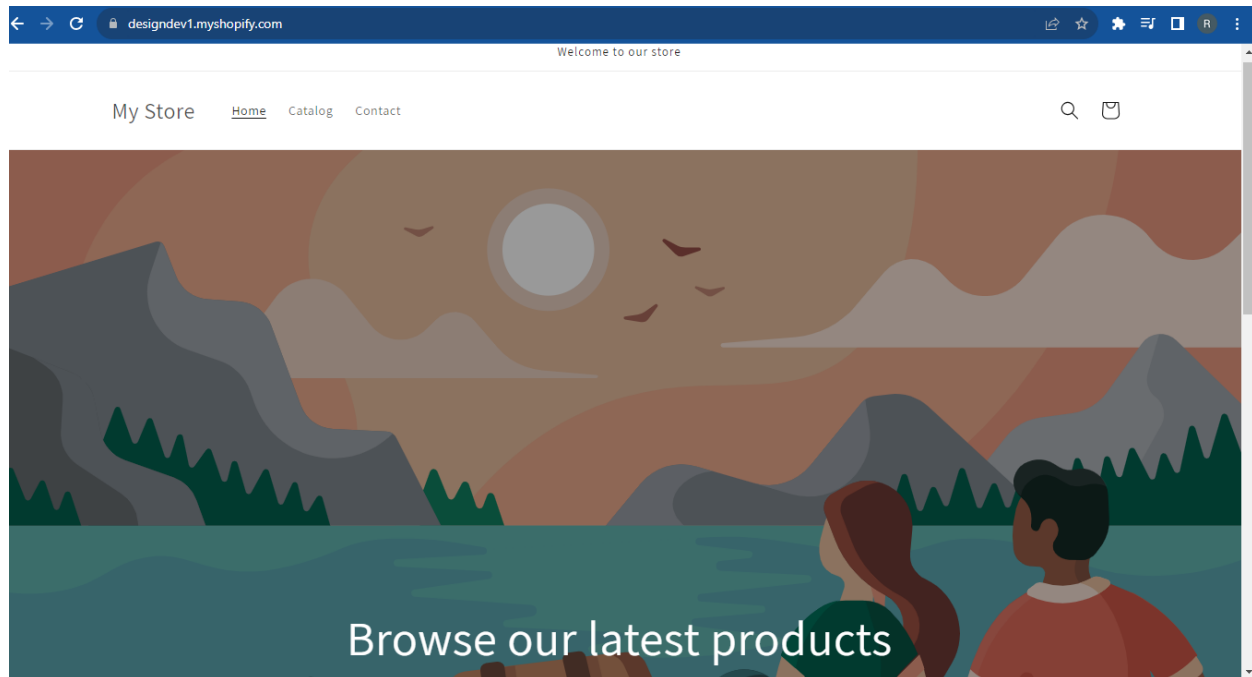
If we go into the products tab, we can see our t-shirt designs readily available for purchase. Payment settings are added in the Shopify store itself. Now, the customers will visit the website, and can also browse the product using the keyword. From here on, they can go to check out and buy the project in the usual manner.
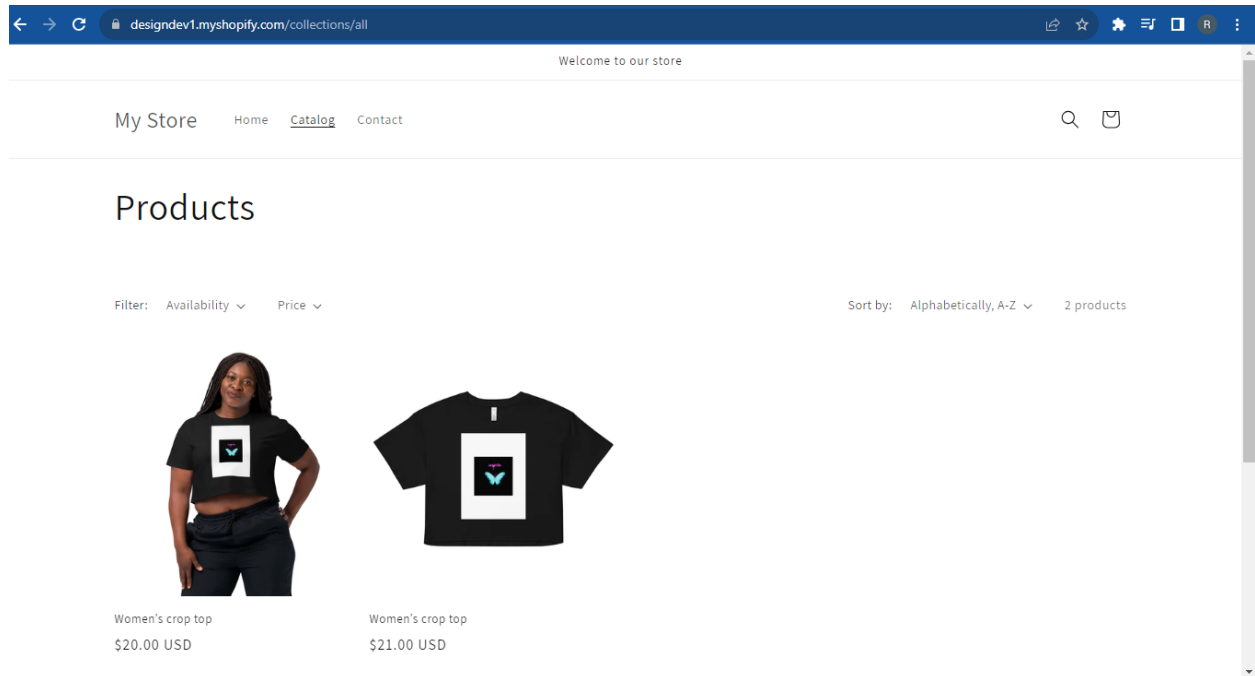
Summary

The "Print and Purchase" project is a strategic response to the contemporary challenges faced by entrepreneurs in the e-commerce landscape. By seamlessly integrating the established features of Shopify with the innovation of t-shirt printing suppliers, the project offers a unique solution that minimizes start-up costs and simplifies inventory management. This approach not only reduces investment risks but also provides entrepreneurs with a hassle-free, inventory-free platform to kickstart their online ventures.

Acknowledging the ever-changing preferences of a diverse consumer base, "Print and Purchase" places a strong emphasis on customization. Recognizing outfits as a fundamental need for everyone, the project aligns itself with customer satisfaction by tailoring accessories to individual preferences. Moreover, the project serves a dual purpose by providing a creative outlet for designers, offering them a platform to showcase their talents and fostering opportunities for growth in the design community.

The strategic choice of utilizing an e-commerce giant like Shopify as the foundational platform is a key component of the project's success. Shopify's user-friendly interface, customizable templates, and comprehensive features empower entrepreneurs to create and manage their online stores efficiently. By handling critical aspects such as security and web hosting, Shopify allows entrepreneurs to focus on their products and customer experience, further enhancing the appeal of "Print and Purchase."

One of the project's distinct advantages over other business models is its low-risk investment approach. Starting with minimal capital and avoiding upfront purchases, the project enables entrepreneurs to test the waters before making substantial financial commitments. This aspect, coupled with the scalability afforded by online and cloud-based solutions, positions "Print and Purchase" as an attractive option for those looking to enter the e-commerce space.

In summary, "Print and Purchase" not only addresses budget constraints but also serves as a dynamic, customer-centric, and forward-thinking solution in the modern e-commerce landscape. By combining technology, customization, and a low-risk entry point, the project stands out as a versatile platform that caters to the evolving needs of both entrepreneurs and consumers in the digital age.

Conclusion

"Print n Purchase" by itself stands as a paradigm-shifting venture in the e-commerce and design industries by solving the problems associated with it and providing opportunities in this digital age. In this modern era, this entrepreneurial model utilizes the Shopify infrastructure and associates with T-shirt printing suppliers, this project greatly reduces the investment risks and eliminates the possibility of physical inventory.

Print and Purchase revolves around the growing number of consumers where personalization and uniqueness are defined by the apparel. They are highly valued these days. This platform allows diverse customers to get the products of their preference but also provides a space for designers to showcase their ideas, and creativity and a place for them to generate income. This is the project's goal and a cornerstone for the project's growth strategy.

This platform's foundations are made with a future thought as scalability and flexibility are a part of this approach. As the expanding online markets, it is created to adapt based on the customer base and utilize the technical advancements. By providing the flexibility to choose from diverse suppliers, payment options and global reach ensures that "Print n Purchase" can evolve without any hassle to the changing demands in the market and incorporate the newest technical trends.

In conclusion, "Print n Purchase" is not just a low-risk investment solution. It is a forward-thinking platform that ensures designers and their development enhance customer experiences and is readily scaled and adapted in the modern-day digital marketplace. As it matures, "Print n Purchase" promises to be more than just an e-commerce site; it aspires to be a thriving community for creative expression and a testament to the limitless potential of innovative digital entrepreneurship.

Artifacts

High-quality product images:
- Use professional lighting and photography equipment to capture clear, well-lit images.
- Show your products from all angles, including close-ups and lifestyle shots.
- Use a consistent background for all your product images.
- Consider using 360-degree product views to allow customers to zoom in and inspect your products from every angle.

Variety of product options:
- Offer a wide range of products that appeal to a diverse audience.
- Consider popular items like t-shirts, hoodies, mugs, phone cases, and tote bags.
- Expand your product offerings to include niche items that cater to specific interests.
- Offer different colors, sizes, and styles of each product to accommodate different preferences.

User-friendly design:
- Prioritize simplicity and intuitiveness in your website's design.
- Implement a clean and organized layout that guides customers through the shopping experience.
- Ensure easy navigation with clear menus, search functionality, and product categorization.
- Optimize your website for mobile devices to cater to the growing mobile shopping trend.

Strong brand:
- Develop a unique brand identity that reflects your company's values and personality.
- Create a consistent visual branding style, including a logo, color palette, and typography.
- Incorporate your branding elements consistently across all platforms, including your website, social media, and packaging.
- Cultivate a strong brand voice that resonates with your target audience.

Effective marketing:
- Utilize social media platforms to connect with your target audience and promote your products.
- Employ email marketing to nurture leads, announce new products, and offer exclusive promotions.

- Implement search engine optimization (SEO) techniques to improve your website's visibility in search results.

- Consider running targeted advertising campaigns to reach potential customers who are actively searching for products like yours.

Print-on-demand fulfillment partner:
- Research and compare different print-on-demand fulfillment partners based on factors such as product quality, printing options, shipping rates, and customer service.

- Choose a fulfillment partner that aligns with your business needs and values, ensuring a seamless and efficient order fulfillment process.

- Establish clear communication and expectations with your fulfillment partner to maintain a smooth partnership.