

# CIS 4300 Project

## Final Report

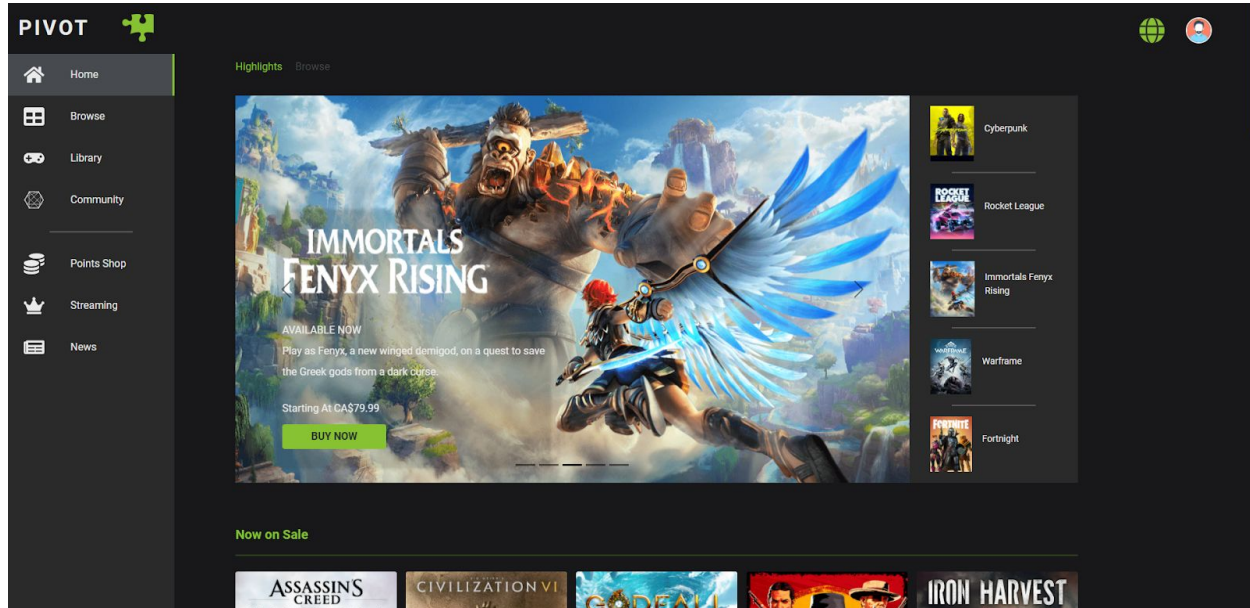


Image 1: Store page of the interface

For this project, I designed and implemented a web application interface corresponding to a hypothetical online games platform called *Pivot*. In its final form the application has been designed to be a hub for playing and collecting video games. The interface has been created from scratch using HTML, CSS and JavaScript, with the only framework used being “Bootstrap”, a CSS framework directed at front-end web development. I am a complete beginner to web development and spent some time learning HTML and CSS at the beginning when I started the project. I was able to vastly improve my knowledge and skills of web design and development throughout this project. More information on the process of creating this interface and its functionality will be described below, starting with the perceptual considerations and will end with notes and difficulties on my implementation:

### Perceptual considerations

#### 1. Colour:

For my design, I limited my colour palette to shades of two hues, gray and green. More descriptively, my entire design uses 6 colours in total, which might seem like a lot but 3 of these colours being shades of gray, #18181a, #2A2A2A and #474B4F, which are approximately “Woodsmoke”, “Nero” and “Abbey” grey, and 2 being shades of green, #61892F and #86C232, which are approximately “Yellow-Green” and “Crete” green respectively (But colour names are pretty subjective). These are the only colours used throughout the design with little deviation. Most text was using a font colour of

#ececec which is a shade of white, approximately “smoke white”, but some shade modifications were needed based on things such as image backgrounds.

I chose these colours mainly because I wished to create a theme of “Gaming”. The reasoning for this is because, although my colour palette is unique, a lot of other well known media platforms use similar colour pallets to convey the same theme, platforms such as Twitch, Steam, Epic Games, Ubisoft, and very famously Nvidia (steal like an artist!). Green, as a colour, is everywhere. It’s the most common colour in the natural world and, interestingly, web design. With its power, and a variety of meanings such as reliability, safety, balance, growth, it runs out to be the second most used colour after blue in web design. Green is a mixture of yellow and blue. It takes optimism of yellow and emotional calm of blue and together has a strong emotional impact on the viewers. Gray as a background colour is unobtrusive and the range of gray lies between two non-colours - black and white. Gray is a cool, neutral and balanced colour and dark charcoal gray communicates some of the strength and mystery of black. For web design, It helps to point out the content and make the design feel connected and “complete”. Shades of green and dark grey is a colour combination that looks strong and impactful. It’s an assured and confident mixture that symbolizes vitality and a certain degree of maturity.

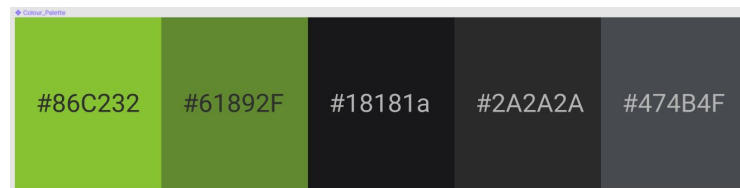


Image 2: The colour palette used in the design

## 2. Emotional Variables:

My design tries to convey a very fun and upbeat feeling. The design is for a gaming platform, which means it essentially a site for entertainment, but it's also an online store, so the design tries to reinforce emotions of coolness and desire in the viewers in an attempt to keep them on the site for as long as possible. Also mentioned when talking about my colour choices above, green is a colour that conveys optimism and stands for reliability and balance. On the other hand, gray is timeless and darker shades of gray invoke mystery and strength. All together, my design tries to hold the users attention with its coolness and fun.

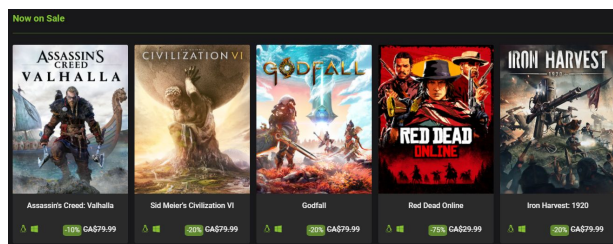


Image 3. Law of Symmetry and Similarity

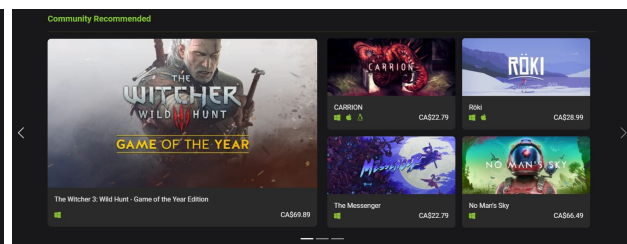


Image 4. Law of Proximity and Closure

### 3. Gestalt Principles:

My design incorporates several Gestalt principles and these are many areas throughout the design where these principles are used:

- ❑ The **principle of symmetry** is used throughout the design. An example is shown in *image 3* with the different game cards. There are 5 games shown in total with a balance of 2 on each side with 1 in the middle. The purpose of the law is to balance visual items on the page so that they look pleasing to the eye.
- ❑ The **law of similarity** is used to group similar elements regardless of the proximity to each other. My use of this law can be seen in *image 3* and *image 4* where the game cards have very similar design aesthetics that easily donate them as similar or in a group.
- ❑ The **law of proximity** refers to how close elements are to one another. I apply this law by grouping game cards and other interface elements close to each other to have a strong proximity effect. The games and other elements are grouped close to one another to make it obvious that they are together. A good example of this is my different sections for the games, from the “Now on Sale” to “Community Recommended”. The game cards themselves look similar but are grouped together in two separate sections that show which cards belong to which section based on the proximity.
- ❑ The **common fate** and the **law of continuity** are two separate principles but share some similar concepts. Common fate is when grouped objects have the same trend of motion and are on the same page, while Continuity is when objects are perceived as lines that move along the same paths. When the user scrolls down the page or clicks on the “load more” button in the streaming section, the principle of common fate is applied when the elements move in the same direction (either up or down depending on the scroll or down when new items are loaded onto the page). On the browse page for the games, all the game cards are displayed in a downwards column with each right after another, this shows the principle of continuity as the game cards are visually in a line. Other examples of these principles can be seen in other places such as the store carousels that move in the same direction.
- ❑ The **law of closure** can be seen in *image 4* where the items in the section obviously make a clear rectangle. It’s the idea that your brain will fill in the missing parts of a design to create a whole.

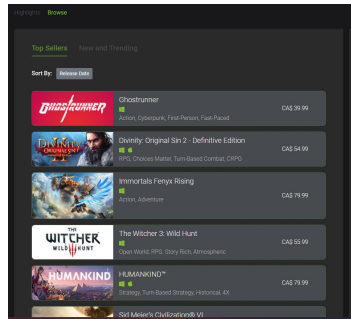


Image 5. Law of Continuity

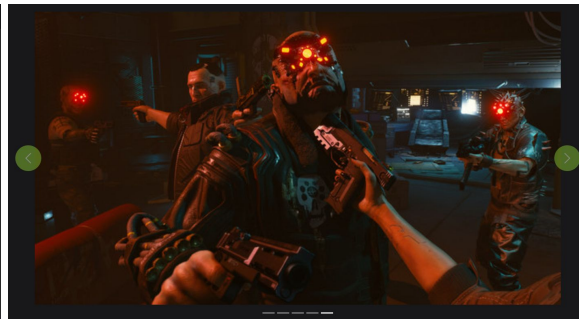


Image 6. Common Fate

#### 4. Attention and Memory:

My design draws the user's attention using colour and position. The interface avoids cluttering and bombarding the user with too much information. The colour palette is limited and the design focuses on simplicity and elegance, leaving lots of space on the sides and between areas of focus. Each change in "section" is obvious because of the clear labels to ensure the user can tell when an area of interest ends. Everything is easy to find and clearly labeled and divided.

My website makes extensive use of images as a way of communicating with the user. Game studios put a lot of work into making their games stand out, so game images and icons do a far better job of giving the user information compared to making the user read text. Images and Icons are far more memorable compared to text and I try to use the human ability to recognize objects as much as possible. Usually, more than half of the game cards display an image of the game with the other area left being used to display what platforms the game runs on (also using icons) and the price of the game. The design targets the users long term and short term memory, first by trying to look memorable through the colour choice and layout and also providing the user with a lot of information through the game image to possibly recognize games they want or see something they like. Seeing the cards will at least be passed into the user's short-term memory.

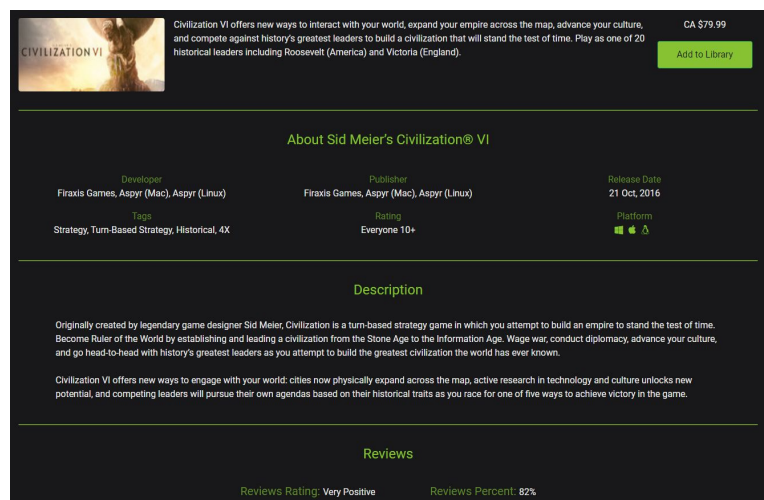


Image 7. Example showing clear labels denoting each section

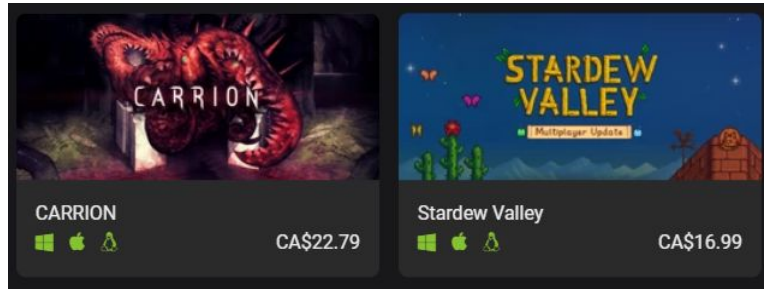


Image 8. Game Cards

## Goals

The goals for my interface can be broken down into the usability goals and user experience goals. Firstly, The usability goals for my system were trying to make it effective, efficient, safe, learnable and memorable. Each part of the system might aim for different goals. Regarding user experience, my system aims to be satisfying, enjoyable, aesthetically pleasing, entertaining, and helpful.

The original plan for the system was to create a hub for users to collect games to play, it could be used as a go between to other stores to get a better deal or the users could use the application itself to buy the games. My interface does indeed achieve this goal by fulfilling the functionality of allowing users to buy games which are then added to their library. At its core, the system is doing what it was designed to do, although some aspects of the original plan had to be modified such as true functionality for hosting streams, but that was more of an auxiliary functionality and does not make the system unusable. As for efficiency, although my design choices try to keep the users attention and have them stay within the system as long as possible, my design stays true to being efficient by minimizing the time wasted for user actions. I try to minimise the number of steps and consequently the number of clicks to commit to different tasks. Regarding my safety goal, my system was designed to actually minimize possible situations where errors can occur. Although called a safety goal, it does not actually jeopardize user safety, when I mean by the goal is that I attempt to not even allow the user to make mistakes wherever I can. This can take the form of limiting actual user input, such as keyboard input, and instead giving them pre-created options to choose from. User input that must include typed text is vetted before any actual actions are taken. The system has been designed to be easy to pick up, it's essentially an online store and library and because of my choice of using icons and images, most aspects of the system are recognizable for anyone who is a common visitor of the web. The primary tasks of the system are also easy to learn quickly and easily because of the clear labeling throughout the system. Memorability has also been achieved as the system is designed to be frequently and most of its information passing to the user is done through icons, images, manus, etc. Users who use my system most likely also use other platforms such as Youtube, Nvidia and Steam, so retention of steps to carry out tasks should also not easily be forgotten.

User experience goals can be very subjective and therefore not easily measured. To reiterate, my system aims to be satisfying, enjoyable, aesthetically pleasing, entertaining, and helpful. I would say that I fulfilled all if not aspects of each goal. The system itself was designed to be helpful to users

wishing to collect games, while I aimed to make the system as aesthetically pleasing as possible. The system was also meant to be satisfying, enjoyable and entertaining to use, but those aspects are hard to measure without solid user testing.

## Who are your users?

My platform aims to welcome all users regardless of age group. More specifically, my system is a media platform for gaming, so my system is aimed at users who play video games. But practically, most users will be teens, young adults and adults because like other content streaming platforms, *Pivot* aims to have a lot of content, but the quality would vary a lot, and not all of it is age-appropriate. While it can have plenty of family-friendly games like Rocket League and Sid Meier's Civilization VI, it will also have games where the main draw is the graphic violence and explicit content, like Grand Theft Auto V. Any user's goal for visiting my system would be either to browse for games and look for information regarding some game that interests them or to do the above and also buy games to collect. The system goals mentioned in the previous section aim to allow the user to fulfil their tasks in an efficient and enjoyable manner. Technically, I myself would be a user for this system, as the developer and maintainer. Most people using my system will be classified as primary users as their goals and tasks for interacting with the system are most likely to view and collect games, which are the primary functionalities of the platform. In an aim to be more open to all types of users the design incorporates aspects of design that take user factors such as using large and coloured buttons, icons, and simple interfaces into account. My current design is aimed at users with intermediate and expert experiences with similar systems.

## How might you gather requirements and what are your assumed requirements?

I would gather requirements through consultation with the stakeholder of my system, namely, the users who will be using the platform. For end users, data gathering methods would be required. Requirements would also need to be separated into functional, data environment/context of use, user characteristics and usability requirements. Three methods I could use would be interviews, questionnaires, and observation. I would do a mix between structured and open-ended interviews if possible to collect qualitative data. The purpose for the interviews will be more than just collecting data, but also get an idea of what users want/need from such a system and for me to verify assumptions but also allow for some exploration of ideas. Another way to gather requirements that I would use would be questionnaires, this will allow me to gather a lot of information from large and dispersed groups of people. Questionnaires would be good for collecting qualitative and quantitative data and also reach far more people compared to interviews and observation. The final method is tied into the interviews, observation. Some interviews could be used to introduce the users to the design and ask them to follow steps to complete tasks, the purpose would be to gather qualitative data. Observation would be a good method to gain insights into how the user reacts to the design, what they like/dislike and other useful information.

I myself am the type of person to use this system and so believe that my assumptions for the system are a good start without actually having been able to do real requirements gathering. Some of my assumptions for the system requirements are:

1. The majority of the users will be under 40.
2. The system will display games and their prices to the user.
3. The system must let the user buy games and add them to their library.
4. The system must have access to the user's owned games.
5. The system must have access to the price of the games.
6. The system must have access to the description about the games.
7. The system should have access to the platform the games can run on.
8. The system must allow the user to view game information.
9. The system must allow the user to search for and filter games.
10. The system must be simple to use to reduce wait.
11. The system must be memorable for frequent users.
12. The system must be able to deal with errors appropriately and efficiently.
13. The system could have access to popular and trending youtube videos
14. The system could display interesting and popular news articles from major gaming presses.

What different tasks does the system perform and what scenarios have you considered?

The system performs several tasks of interest to possible users. Some of the tasks are listed below and are also shown in **hierarchical tasks analysis** form father down:

1. Navigate to the browse page.
2. Filter for games.
3. Open a game's store page.
4. Navigate to the user's library.
5. Buy a new game.

**Some scenarios that I have considered:**

**Scenario #1:** George, a regular user of gaming platforms, wants to start buying his favourite games to build his collection on Pivot. He wants to buy this new game that showed up on the front page after watching its trailer. He opens the homepage for the website and clicks on the game he just finished watching the trailer. He then starts the purchase process by clicking on the add to library button on the game's store page. He fills in his billing information and completes the process by clicking the complete checkout button.

**Scenario #2:** Peter, who is an avid gamer, is looking for some new games to play in his spare time after school and decides to search for something on a recently released new platform. He opens the homepage for the website and looks through the front page for something interesting. Not finding what he wants, he clicks on the browse link in the site navigation. Once on the page he notices filter options

for the list of games and decides to look for games under 10 dollars, but not free as Peter likes to support developers. He sets the price of the search to 10 dollars and excludes free games from the result and clicks filter. He looks at the results and finds what he is looking for and opens the game page.

## Hierarchical Tasks Analysis

### Task #1: Navigate to the browse page.

0. Navigating to the browse page.
  1. Go to the website homepage.
  2. Open the browse page.
    - 2.1. Click "Browse" at the top of the home page.
    - 2.2. Hover over the left navigation and click "Browse".

Plan 0:

- Do 1 - 2

Plan 2:

- If at the top of the page, then do 2.1
- If not at the top of the page, then do 2.2

### Task #2: Filter for games.

0. Filter for games.
  1. Go to the website homepage.
  2. Open the browse page.
    - 2.1. Click "Browse" at the top of the home page.
    - 2.2. Hover over the left navigation and click "Browse".
  3. Change the filter options to taste.
  4. Click the Filter button.

Plan 0:

- Do 1 - 2 - 3 - 4

Plan 2:

- If at the top of the page, then do 2.1
- If not at the top of the page, then do 2.2

### Task #3: Open a game's store page.

0. Open a game's store page.
  1. Go to the website homepage.
  2. Click on any game.
    - 2.1. Click on a game from the homepage.
    - 2.2. Open browse and click on any game.

Plan 0:

- Do 1 - 2

Plan 2:



- If game of interest is on the homepage, then do 2.1
- If looking for a specific game then do 2.2, then do 2.2

**Task #4: Navigate to the user's library.**

0. Navigating to the library page.
  1. Go to the website homepage.
  2. Hover over the left navigation and click "Library".

Plan 0:

- Do 1 - 2

**Task #5: Buy a new game.**

0. Open a game's store page.
  1. Go to the website homepage.
  2. Click on any game.
    - 2.1. Click on a game from the homepage.
    - 2.2. Open browse and click on any game.
  3. Click on the add to library button.
  4. Fill in the billing information.
  5. Click on the complete checkout button.
  6. Click on the Done button

Plan 0:

- Do 1 - 2 - 3 - 4 - 5 - 6

Plan 2:

1. If game of interest is on the homepage, then do 2.1
2. If looking for a specific game then do 2.2, then do 2.2

**What prototyping did you do, and what are some examples?**

For prototyping, I followed a 2 step process of brainstorming my design through many sketches and then created a semi-high fidelity prototype using Figma. The design process was pretty quick due to time constraints and I had to extrapolate my design choices from the sketches and simple prototype in the actual implementation to create some pages I did not get to prototype. Some example sketches:

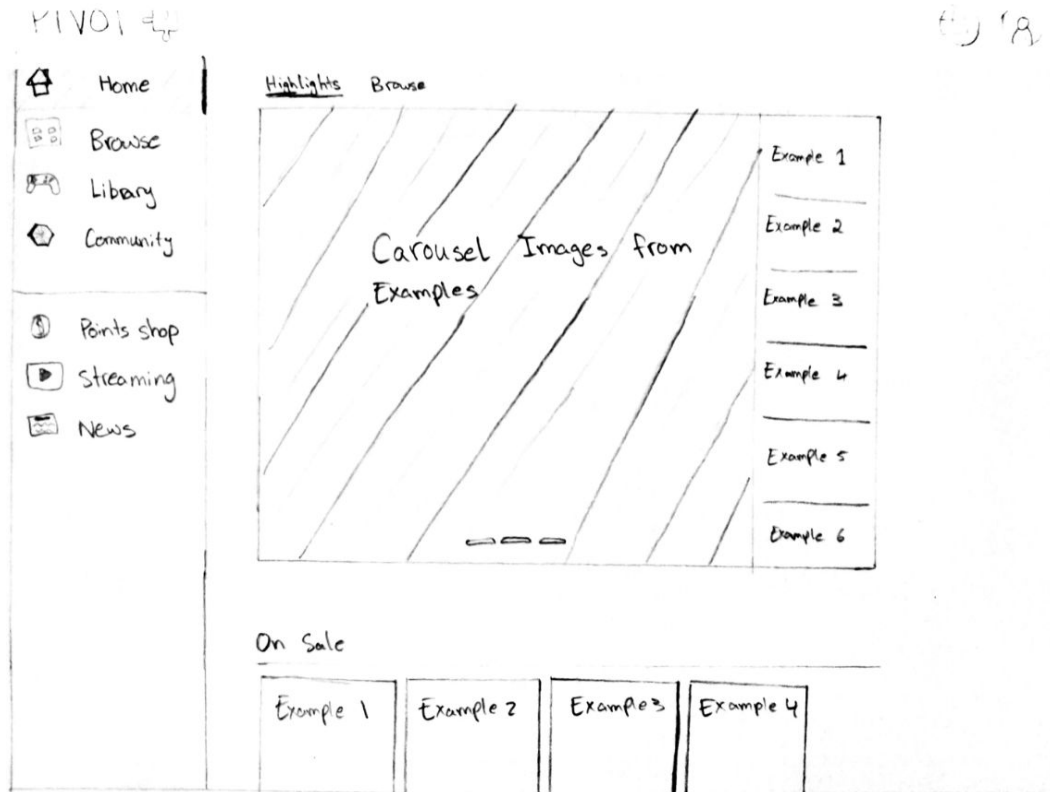


Image. Sketch of Homepage

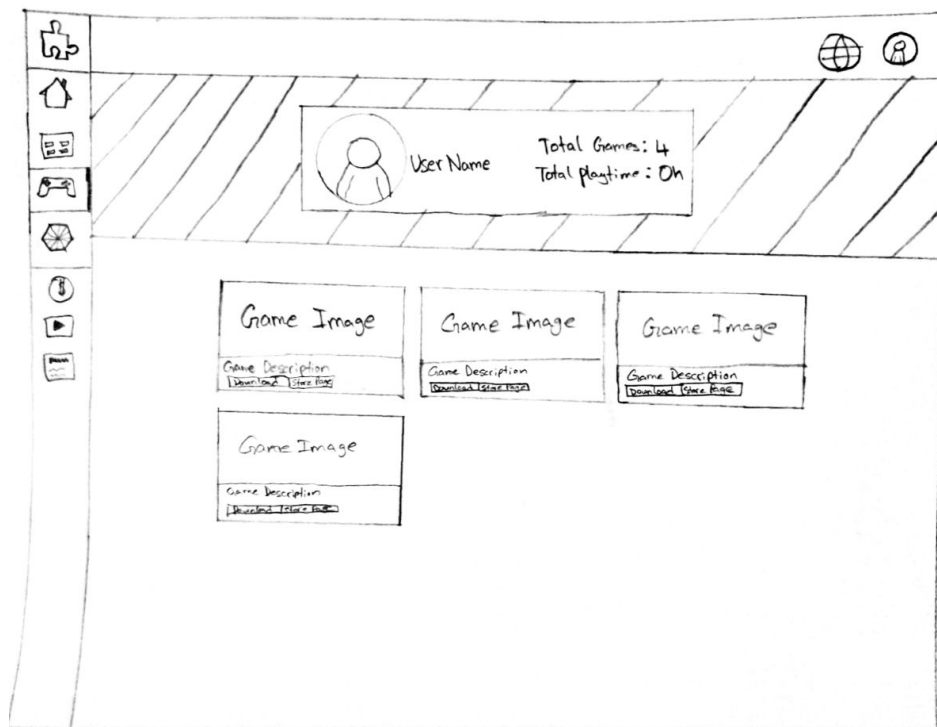


Image. Sketch of user library

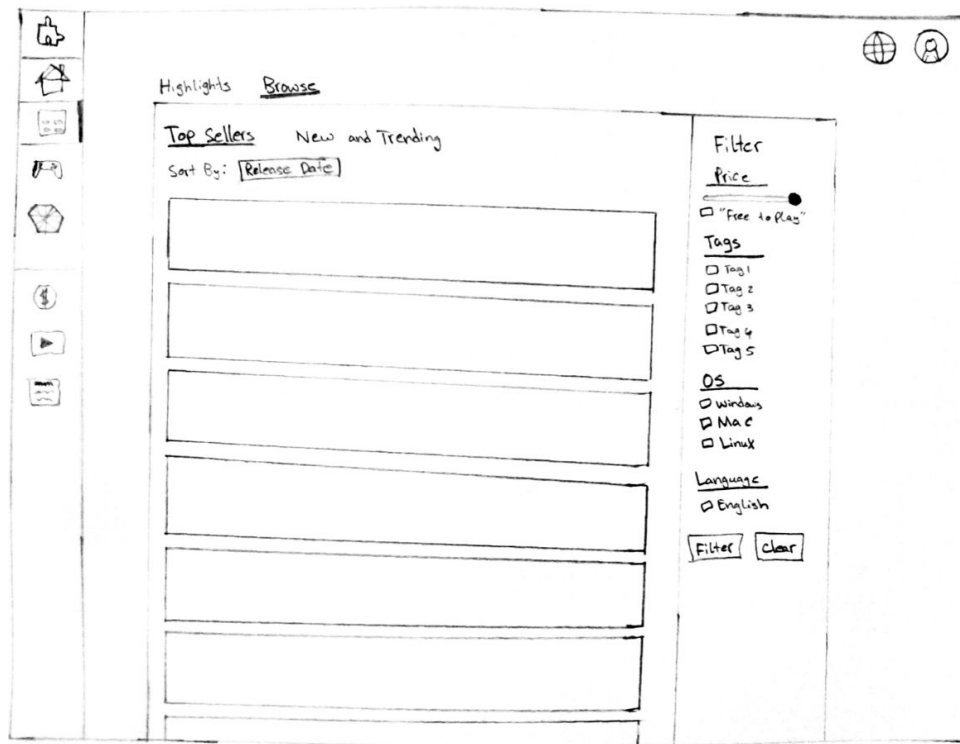


Image. Sketch of user library

## How did you make decisions on layout considerations?

The layout considerations were made with efficiency, learnability, and safety in mind. As mentioned in above, I made extensive use of the Gestalt principles as well to connect the elements and make the implementation feel complete. Unfortunately, I am a novice at web development, this was my first time trying to implement a full website so I was not able to completely satisfy a safe layout. My implementation does indeed resize most if not all elements, but due to my lack of knowledge and time constraints, some elements fail to be *usable* under smaller screen sizes. Smaller resolutions create issues in my interface such as stretching images, but most other elements such as input boxes and buttons reize well. I had aimed to follow a Struts and Springs model with auto-scaling of some elements.

## How do you handle events, input and errors?

There is a limited amount of input that I take from the user. Most user input that is taken is in the form of pre-arranged options to choose from, such as the game filters. An example of where user input straight from the keyboard would be billing for the games, but in that scenario a back-end would be needed to verify billing information most likely through a portal to some bank or monetary service such as paypal. Events are handled either though HTML itself, such as most links, or through JavaScript using JQuery. JQuery handles all event code behind the scenes and all I have to do is to write code to recognize that the event occurred and what actions need to be taken. Most user input is taken in the

form of mouse hovers and clicks, a minimal amount of actions are captured through keyboard input for things such as searches and billing.

### How would you evaluate your design?

I would evaluate the system mainly using a usability testing, experiments approach and possibly a quick and dirty evaluation approach. The point of the evaluation with these approaches would be to receive user feedback in a controlled setting so that I am able to better measure how the users react to the system and if the system fulfils its requirements. Techniques will involve simply observing users, asking users and experts their opinions on the system and testing their performance. I will use the DECIDE framework to guide the evaluation, this means that I will determine the goals, explore the questions I wish to ask, choose the method and technique to get answers, identify issues, decide how to deal with ethical issues, and then evaluate and present the data.

### What are some of the questions you might consult an expert in order to answer?

I would consult experts on the design decisions I made for the systems efficiency and learnability as well as my interface's accessibility. I would consult for possible improvements that can be made to my design to possibly increase the system efficiency for tasks to reduce time wasted for the user. Another point would be that my system itself does not provide much help to beginner users which can be improved upon with expert help. Finally, when I was designing my system, I had accessibility in mind but I would still consult experts on where improvements can be made for the platform to be able to reach a wider audience.

### What sort of user testing would you perform?

I would invite a number of participants to use the system in a controlled environment. The users will represent possible real-world users of the system and the tasks will be representative of how the system will be used. The users will be given time limited tasks with the testing conditions being the same for all users. The purpose of the tasks would be to measure any usability issues in the interface and also testing whether navigation within the site is effective. I will again be using the DECIDE framework to develop aspects of the user testing session such as the goals, questions, what type of data to collect and how to present that data.

If you were to design a questionnaire to improve feedback and usability, what would this look like?

I would ask questions like:

*Please circle the most appropriate selection.*

Age Range:	13 - 19	20 - 29	30 - 39	40 - 49	50+
Gender:	Male	Female	Other	Unspecified	

Web Experience:      Beginner      Intermediate      Expert

Strong Agree, Agree, Neutral, Disagree, Strongly Disagree

1. *The navigation on the links is clear:*
2. *The website contains information that is useful to me:*
3. *Our pricing is very clear:*
4. *The website was easy to learn:*
5. *Everything is clearly labeled:*
6. *The website is easy to understand:*
7. *I liked the colour scheme:*

*Please explain in your own words:*

1. *Did you find the information you were looking for?*
2. *What's the ONE thing missing from this page?*
3. *If you could no longer use this website, what is the ONE thing you would miss the most?*
4. *How easy was it to complete a purchase?*
5. *What could we have done better?*
6. *What comes to your mind when thinking about our product/website?*
7. *How does our service compare to Steam?*
8. *What is the most important feature you think we should add?*

Anything else you consider relevant to document and explain related to your design, implementation and execution of the project.

For this project, I designed and implemented a web application interface corresponding to a hypothetical online games platform called *Pivot*. In its final form the application has been designed to be a hub for playing and collecting video games. Unfortunately, I was not able to fully implement what I had envisioned in my proposal. In the end, I had to dumb down a couple of features due to the scope far surpassing what I would have been able to accomplish with my skills and the time I had.

The interface has been created from scratch using HTML, CSS and JavaScript, with the only framework used being "Bootstrap", a CSS framework directed at front-end web development. I am a complete novice at web development. This is the first time I implemented a full web interface of this complexity and have learned a lot and improved as I moved along with the development. For example, my index.html file had little actual JavaScript in the background and everything was made by hand, which I learned later was very inefficient and restrictive. My later pages (such as the game pages) are dynamically created using JavaScript. My website is also not fully responsive due to me not having enough experience creating responsive websites. All Bootstrap markup was also customized because I wanted to make the UI match with the design I had created, which I would say was a success. Another thing to note would be that I do not force the user to input anything for the billing information for the sake of quick testing as there are a lot of fields there, so when testing my site, there is no need to actually input billing information

I spent some time collecting data for 24 games from across the Steam, GOG and Epic games stores. I then converted all that data into JSON objects that are stored as variables in two .js files and are read to dynamically create certain pages on my site. I also rely on localStorage to store user data for games they own. I later found out that FireFox is well known to have bugs and issues with localStorage and it seems like the current version of FireFox has a bug where variables cannot be added to the storage, thus my website only works *fully* with Google Chrome and Edge. I would recommend using Google Chrome to run my website as it was the main browser I was using during development and am confident all scripts work.

## References (Unrelated to the code):

1. <https://chir.ag/projects/name-that-color/>
2. <https://www.color-blindness.com/color-name-hue/>
3. <https://colornamer.robertcooper.me/>
4. [Dribbble - Discover the World's Top Designers & Creative Professionals](#)
5. [A Simple Web Developer's Color Guide — Smashing Magazine](#)
6. [Elegant or Boring? Gray Color in Website Design - noupe](#)
7. [Meaning of The Color Grey | Bourn Creative](#)
8. [Exploring the Gestalt Principles of Design | Toptal](#)
9. [Gestalt Principles of Perception | Introduction to Psychology \(lumenlearning.com\)](#)