Criterion B: Design

System diagrams

The system diagram in figure 1 illuminates the relationship between elements in the system (e.g. users, clients, servers, database), showing how they interact and the data flow between them.
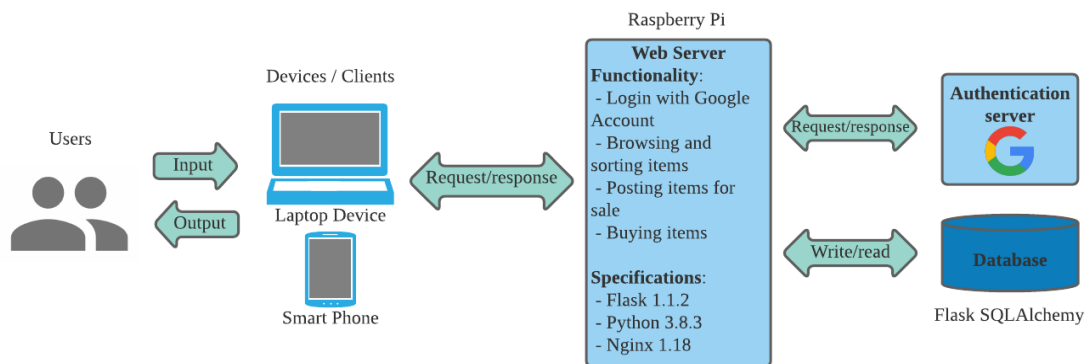

Figure 1: System diagram, showing interaction/hierarchy between users, clients, servers and database.

The site map in figure 2 describes the website structure and user interaction functionality (e.g. buttons, what is displayed etc.). It also shows what pages are interlinked and can give an idea of the user experience in terms of site organization.
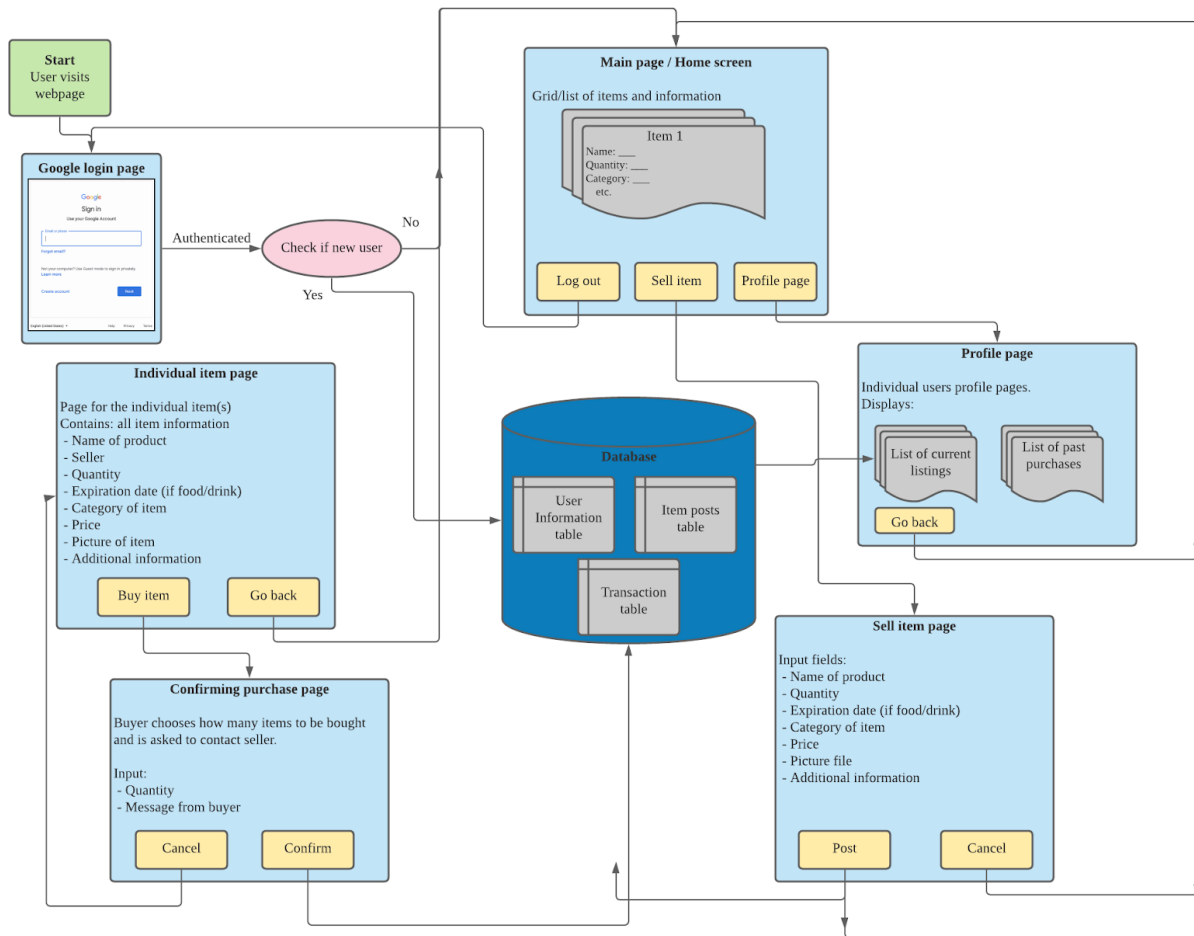
Figure 2: Site map, showing how individual pages link together. Yellow boxes symbolize buttons, blue boxes symbolize pages, the pink circle symbolizes a process and the grey figures symbolize displayed information.

GUI Design

Early prototypes of graphical user interface (GUI) designs are important to visualize the user experience. Understanding and iteratively improving these prototypes leads to higher usability of the system.
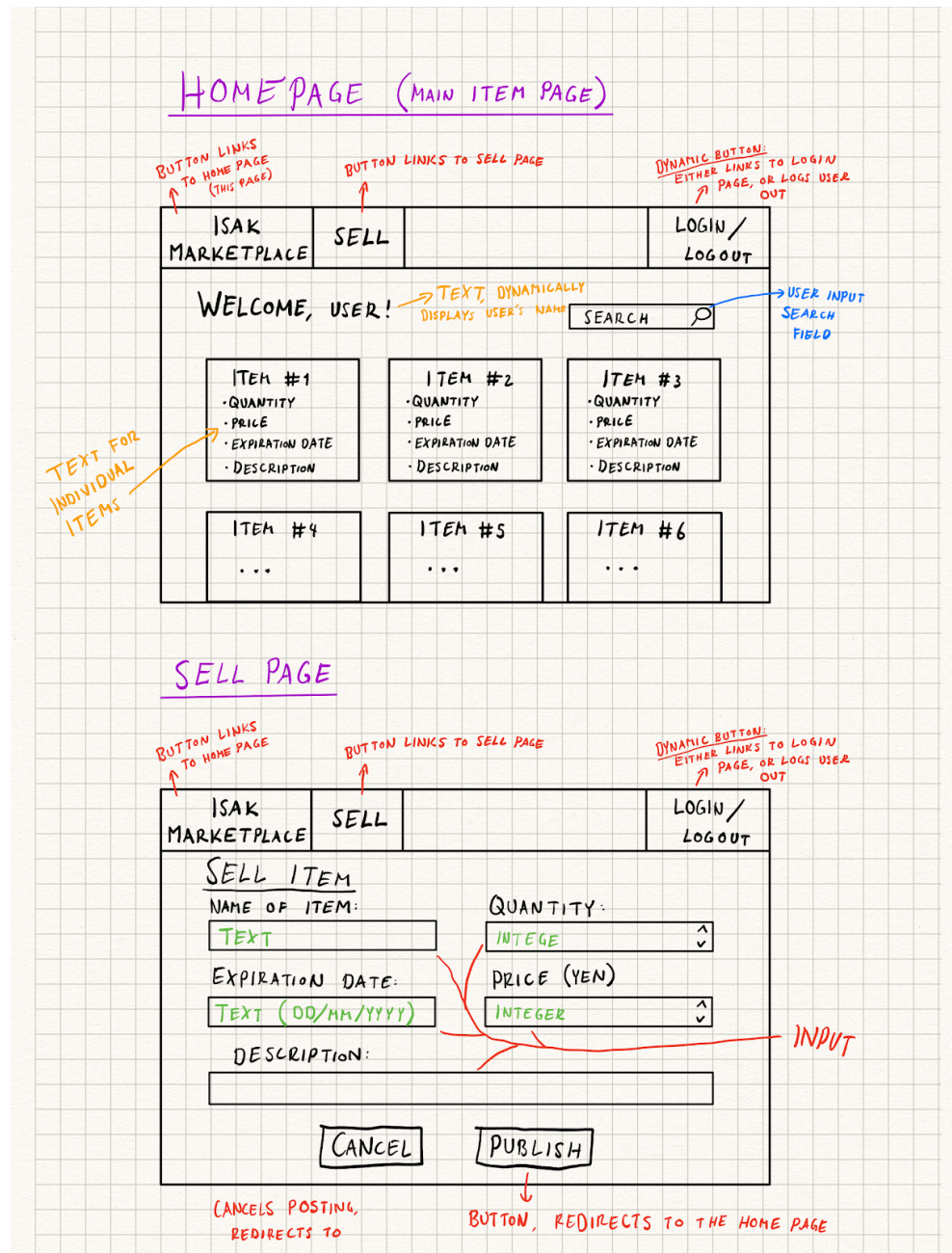

Figure 3: Early sketch of the Graphical User interface, including homepage and selling page. Red text describes buttons, orange text describes text and blue and green text describes input fields.

Entity-relationship diagram (ERD)

The Entity relationship diagram (ERD) visualizes the relationship between database tables and attributes of the database entry objects. Additionally, the ERD describes how entities interact and are interrelated with each other.
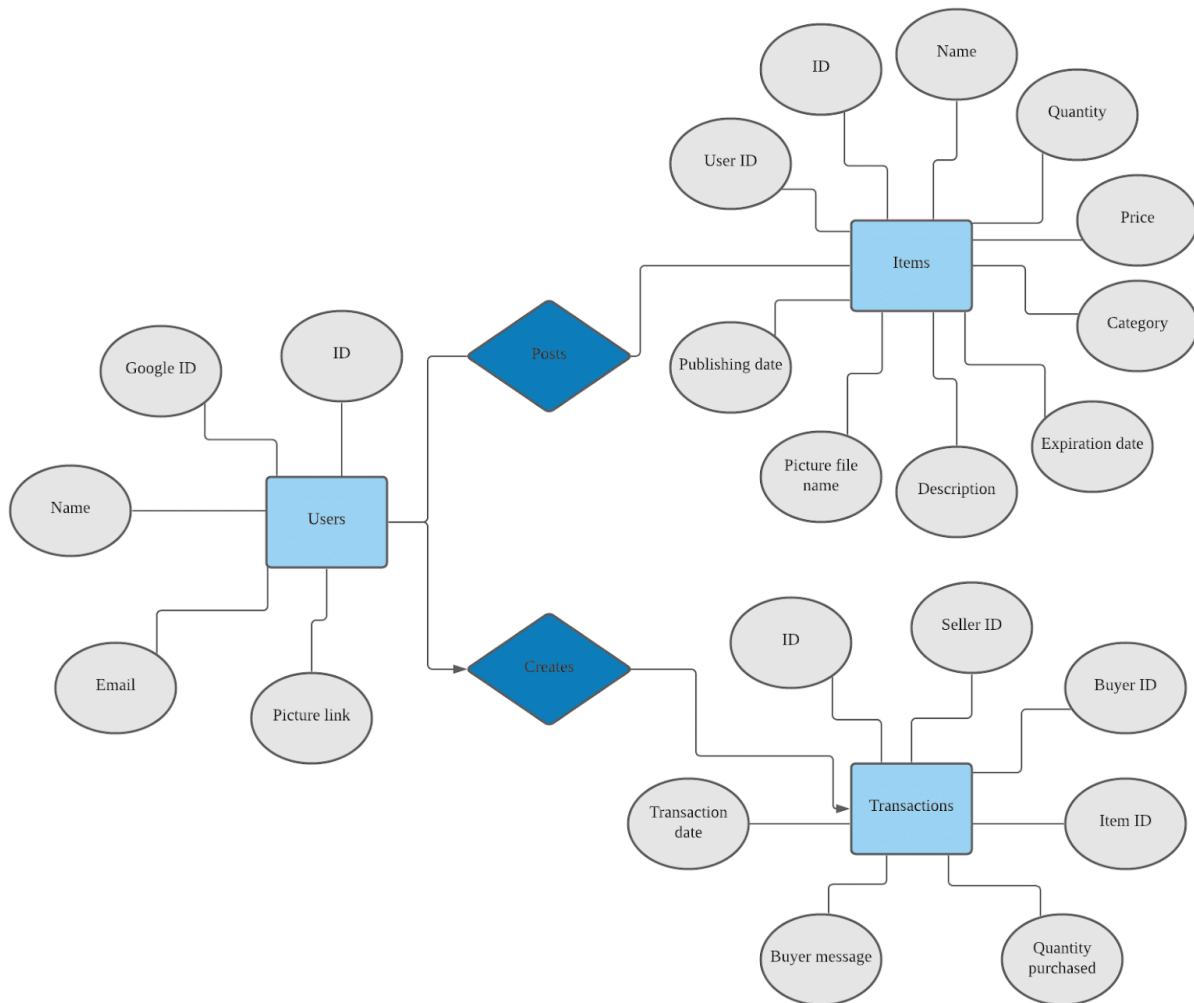

Figure 3: Visualizing an Entity-Relationship Diagram (ERD). Boxes symbolize entities, circles symbolize attributes and the parallelogram symbolizes the relationship between them.

Flowcharts

Flowcharts visualize algorithms, making it easier to understand their purpose, logic and output. For this section 3 flow charts have been included to help explain more complex processes on the backend server.

Recursive Insertion Sort

Sorting algorithms are crucial for organizing data based on some criteria. For this project the criteria is ascending/descending order of both prices and publishing dates. The algorithm visualized in figure 4 shows one approach to this problem, by recursively building the sorted array one element at a time by inserting these elements into their correct position related to other elements, a method which is more efficient than linear sorting.
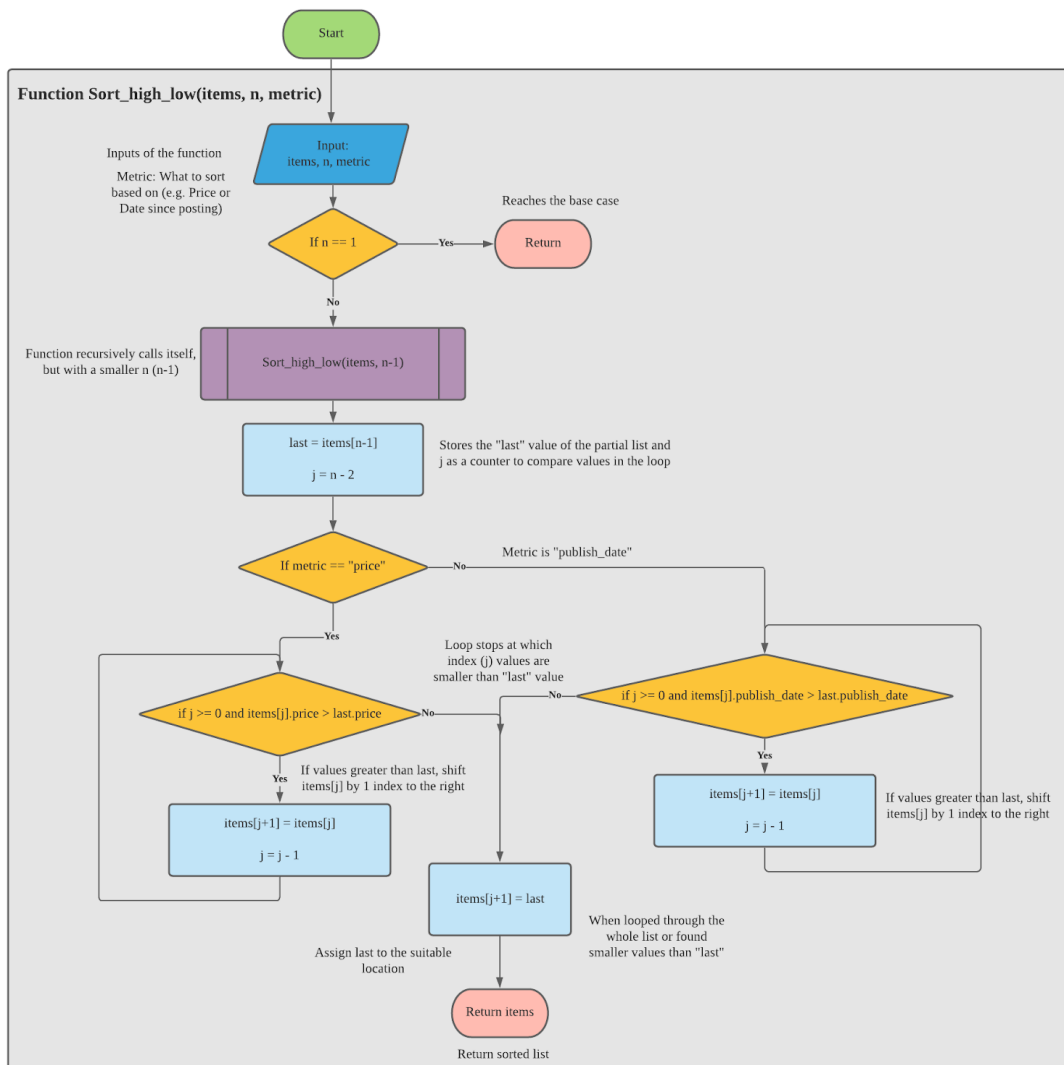
Flowchart Recursive Insertion Sort

Figure 4: Flowchart for the recursion insertion sort. Descriptions of the steps are included in the figure. Yellow parallelograms symbolize control flow operations (if statements, for/while loops), light blue boxes symbolize processes, the dark blue parallelogram symbolizes getting the input of the function and the purple box represents the entire function itself (for recursive calling).

Search and sort flowchart

This process filters the items shown based on a search term input by the user, in addition to applying the sorting algorithm outlined in figure 4 to efficiently organize the items.
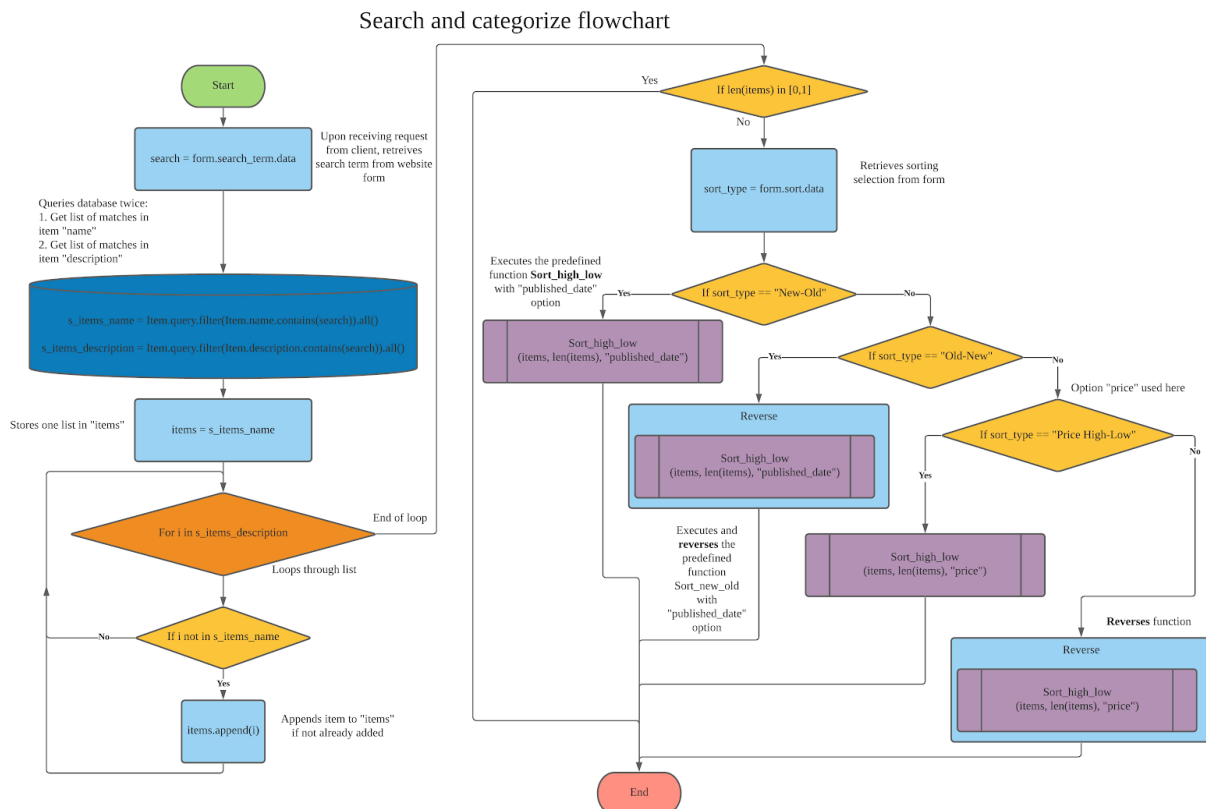

Figure 5: Search and sort flowchart. Steps are explained through the text on the figure. The yellow parallelograms symbolize control flow operations (if statements, for/while loops), light blue boxes symbolize processes, the dark blue cylinder symbolizes database operations and the purple box represents a function (in this case "Sort_high_low", from figure 4).

Validate filename flowchart

This algorithm secures the filename of uploaded images by removing non-standard characters that could potentially be used to exploit the file upload system.
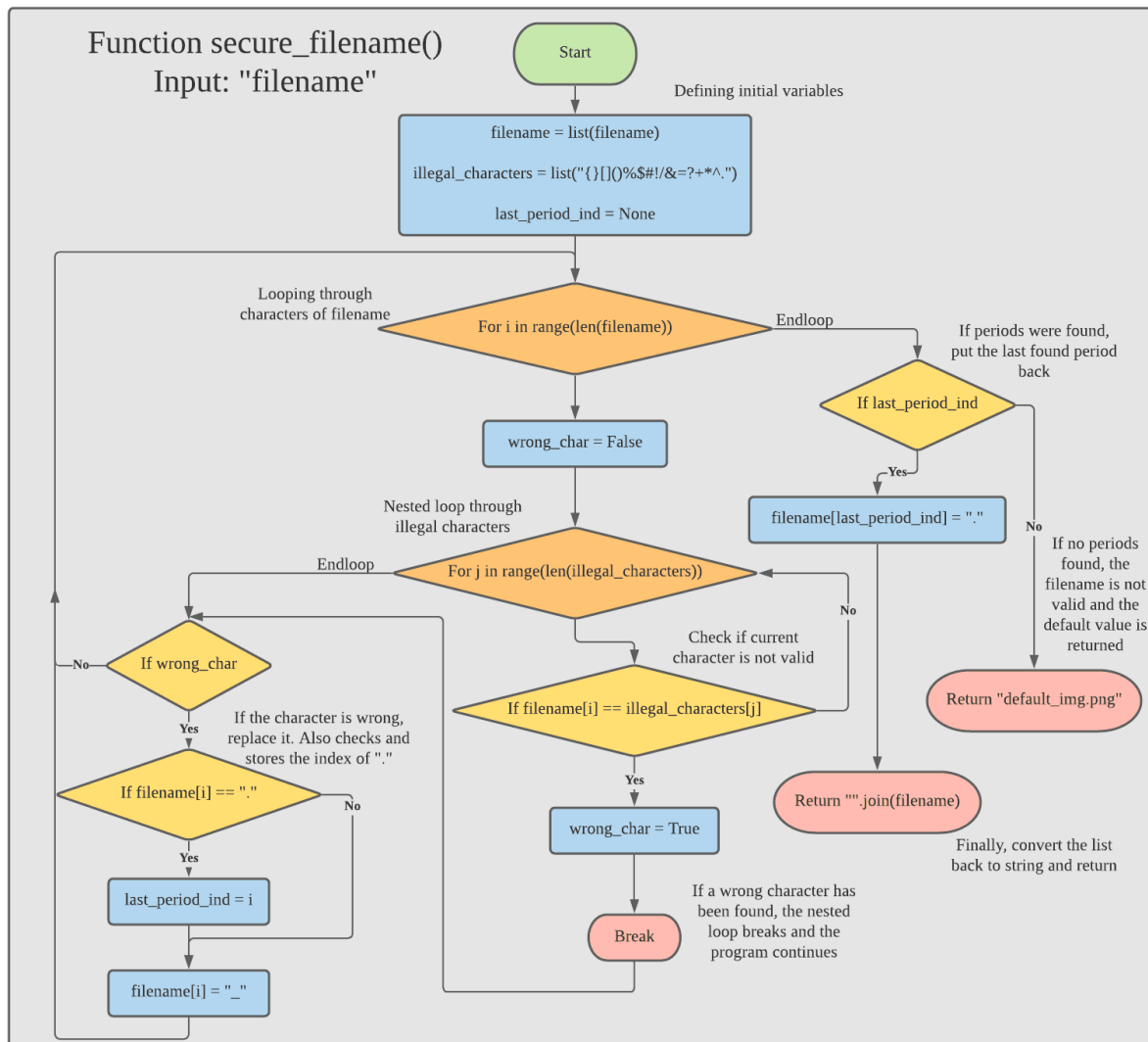

Figure 6: Flowchart for filtering the characters in the filename of user uploads. Descriptions of the steps are included in the figure. Yellow parallelograms symbolize control flow operations (if statements, for/while loops) and light blue boxes symbolize processes.

Test plan

The test plan outlines steps required to understand if the product meets the success criteria of the client. These steps include which functionality is tested, the input of the test and a successful outcome of the test - indicating if the program meets the criteria or not.

Test step	Action to test	Input	Expected output	Success criteria
1	Log in with Google account (user 1)	Email and password credentials of a Google account	Logged in to the webpage, shows "Welcome, [name]!"	1
2	Post item 1 for sale	Press "sell". Name: "Chips". Quantity: 5. Price: 100. Category: "Food". Expiration date: 23.04.2021. Description: "Cheap chips for sale". Picture: upload from computer	Item is displayed with correct information	2 (a,b,c,d,e,f,g)
3	Post item 2 for sale	Press "sell". Name: "1984". Quantity: 1. Price: 750. Category: "Book". Description: "1984 is one of my favorite books. Very much recommended!". Picture: upload from computer	Item is displayed with correct information	2 (a,b,c,d,e,f,g)
4	Log in with different Google account (user 2)	Email and password credentials of a Google account	Logged in to the webpage, shows "Welcome, [name]!"	1
5	Post item 3 for sale	Press "sell". Name: "Jeans". Quantity: 3. Price: 500. Category: "Clothes". Description: "Old jeans, waist size 34". Picture: upload from computer	Item is displayed with correct information	2 (a,b,c,d,e,f,g)
6	Post item 4 for sale	Press "sell". Name: "Flashlights". Quantity: 2. Price: 1000. Category: "Tech". Description: "Flashlights for sale. Batteries included". Picture: upload from computer	Item is displayed with correct information	2 (a,b,c,d,e,f,g)
7	Post item 5 for sale	Press "sell". Name: "Eggs". Quantity: 12. Price: 50. Category: "Food". Expiration date: 23.12.2020. Description: "I bought too many eggs, and need help eating them. Selling each egg individually!". Picture: upload from computer	Item is displayed with correct information	2 (a,b,c,d,e,f,g)
8	Show all listings	Click "Marketplace" in top left corner	Homepage is shown with all available listings	6
9	Sort all listings New-Old	Select "New-Old" and click "search"	Newest items are shown first	6a
10	Sort all listings	Select "Old-New" and click "search"	Older items are shown first	6b

	Old-New			
11	Sort all listings with price High-Low	Select "Price High-Low" and click "search"	Most expensive items are shown first	6c
12	Sort all listings with price Low-High	Select "Price Low-High" and click "search"	Cheapest items are shown first	6d
13	Filter listings by category	Select "Food" and click "search"	Shows only items in food category	5a
14	Filter listings by search term 1	Input "light" into search bar and click "search"	Shows "Flashlight" item	5b
15	Filter listings by search term 2	Input "sale" into search bar and click "search"	Shows both "Chips" and "Flashlight" items	5b
16	Buy item 1	Click on "Chips" item. Click "buy", select quantity of 2, input buyer description as "Please meet me in the cafeteria at 6pm tomorrow" and click "confirm"	Confirmation screen is shown. Quantity is decreased	3 (a,b)
17	Buy item 2	Click on "1984" item. Click "buy", select quantity of 1, input buyer description as "I'll text you on google hangouts when i'm free" and click "confirm"	Confirmation screen is shown. Item is removed from selection	3 (a,b)
18	Display personal profile page information (user 2)	Click "Profile", then "Posts" or "Transactions"	Shows item 3, 4 and 5 posted for sale. Shows transactions of step 16 and 17	4 (a,b)
19	Log in with Google account (user 1)	Email and password credentials of a Google account	Logged in to the webpage, shows "Welcome, [name]!"	1
20	Buy item 3	Click on "Jeans" item. Click "buy", select quantity of 2, input buyer description as "I'll come to your house to pick them up" and click "confirm"	Confirmation screen is shown, item quantity is reduced on homepage	3 (a,b)
21	Buy item 4	Click on "Flashlight" item. Click "buy", select quantity of 2, input buyer description as "Love these. Can't wait to use them!" and click "confirm"	Confirmation screen is shown. Item is removed from homepage selection	3 (a,b)
22	Display personal profile page information (user 1)	Click "Profile", then "Posts" or "Transactions"	Shows item 1 and 2 posted for sale. Shows transactions of step 16, 17, 20 and 21	4 (a,b)

Word count: N/A