Group 3: Computer Builder

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Changelog

Date	Version	Description
12/17/2020	1.0	Reviewed and acknowledged group feedback concerns
12/06/2020	0.7	Added class diagram and glossary
12/02/2020	0.6	Added sequence diagrams and level one data flow diagram
11/20/2020	0.5	Added robustness diagrams
11/06/2020	0.4	Added wireframes
10/30/2020	0.3	Added activity diagrams
10/23/2020	0.2	Added use cases and diagrams
10/16/2020	0.1	Added Requirements

Project Description

Executive Summary

Computer Builder is a web application that can be used to build a custom computer. The user will input various specifications, such as what activities the computer will be used for (gaming, graphic design, programming, etc.), a piece of hardware (for example, a specific graphics card or processor), a price budget, already owned parts, or any combination of specifications. The web application will then display the parts required to build a custom computer for the inputted specifications, ensuring that compatibility issues are accounted for. If it is not possible to build the computer using the given specifications, the application will then recommend a computer that best fits the given specifications.

Key Objectives and Features

The core objectives this project must complete are:

- Be accessible via any modern web browser.
- Filter building options by removing undesirable components.
- Include user owned parts in computer build
- Allow users to set specifications to be used as parameters for generating the computer build by the application
- Display the price and the links where the user can purchase the components.

Periodical meetings with group members will be held to elicit finer details with regard to the design of the project.

Stakeholders

The stakeholders of the project include:

Users

Individuals who are interested and use the web application, and create ad revenue for the owners.

Programmers

Create the website for the computer building service and make improvement updates and do general maintenance.

UI Designers

Create the website layout and user interface for better user experience.

Project Managers

Sets the project deadline and manages both financial and human resources for the project.

Business Team

Creates and expresses the vision for the project and its overall functionality. Communicates with the developer team to deliver the release product.

Marketers

Market the product to the general public

Scope

The software scope of the project in terms of functionality and artifacts to be delivered is a web application that displays a list of the necessary components for building a functional PC. The user can search for specific parts, and the application will create a link for the part at the most inexpensive seller. The user can indicate that they already own certain parts for the PC. The user also has the option to select a budget and their use-case for the PC, such as graphic design, programming, gaming, or any combination of uses. The application then uses the above inputs to determine the best combination of parts as close as possible to the given budget.

When building a computer, a key constraint is compatibility between various parts used to build the computer. The application must be able to ensure that all suggested parts are compatible with each other. It is also necessary for the databases used by the application to update automatically in cases where products become unavailable or prices change.

Future features might include ordering parts directly via the web application, a web forum for computer building enthusiasts, and a blog describing computer updates.

The primary goal of the project will be to streamline and simplify the process for PC part selection for both inexperienced and PC enthusiast users.

Feasibility

The project seems feasible given that multi-source, price checking software has already been implemented on public websites and the required logic is at a complexity level that seems within reach.

Technical

The technical barriers that are necessary to overcome for the system's creation are:

- Designing the logic for how the program selects certain parts based on the specifications entered by the user.
- Creation of databases for various computer parts that can be used to track compatibility issues and the various specification requirements of users.
- Development of a method for updating links to the various computer parts automatically to ensure that the application is running properly without manual intervention.

Organizational

- The application is relatively simple, requiring at least 2 developer roles after release for maintaining product library and application compatibility. Additional personnel may be required to provide technical support for users.

Operational

- Users should be able to find a build list within 30 minutes of using the application.
- An internet connection and compatible browser is necessary to use the application.

Economic

- The web application has two possible revenue streams. The first revenue stream is through the affiliate links provided with each part that is generated by the application for the user. The affiliate links provide a portion of the sales revenue of the purchased item back to the organization. The second revenue stream is through web advertisements. However, many users will often use an adblock application when faced with banner ads, and many of these applications remove affiliate tags from URLs. For this reason, further examination of the inclusion of web advertisements is necessary.
- The application will be free to use
- Costs
    - Development team
    - Servers and associated costs

    - Marketing costs (advertisements)
    - Future update costs

Support / Maintainability

- The project will need regular updates to the system to update the components and its pricing/the links to buy the components.
- Server maintenance.

Marketability

- Target audiences
    - Must have an internet connection and access to the web browser.
    - Have a mailing address where it is appropriate to send large packages (largest items tend to be PC cases).
    - Are novice or intermediate computer builders.

Developability

- Minimal amount of complexity in developing logic for compatibility and handling price considerations.
- Modest amount of effort for designing a system to manage the catalog of available components.

Schedule

- Given a small team, it should take 4~5 weeks (40 hours a week) working full time to develop a functional product.

Software Requirements Specification

Functional Requirements

The following functional requirements have been categorized in three categories. Account management, Application, and Database. Account management concerns functions related to managing user accounts. Application requirements concern the specific functions of the application. While database requirements concern aspects of the databases used to store computer parts for use within the application.

1.1 Account Management Requirements

Req-ID	Requirement
FR-AMR-1.1.0	User will be able to create a user account with their username as a unique account ID.
FR-AMR-1.1.1	User will be able to recover their account when their password has been forgotten.
FR-AMR-1.1.2	User will be able to change their account email address.
FR-AMR-1.1.3	User shall be able to save various computer builds to their account.
FR-AMR-1.1.4	User must verify account information by clicking on a link sent to the email address used for the account.
FR-AMR-1.1.5	User must be associated with an account ID on creation of account.

1.2 Application Requirements

Req-ID	Requirement
FR-AR-1.2.0	User can search for part names in a search bar, for which the application will display a list of part names and links to those parts.
FR-AR-1.2.1	User will be able to input the computer parts that they already own.
FR-AR-1.2.2	User will be able to blacklist specific manufacturers.
FR-AR-1.2.3	User will be able to enter various specifications and the application will generate a computer build based upon the specifications.
FR-AR-1.2.4	User will be able to require specific parts that are already owned for a build recommendation.
FR-AR-1.2.5	User accounts will be able to load computer builds generated in the past.
FR-AR-1.2.6	Application must be able to interface with the database(s).
FR-AR-1.2.7	A user account is not required to use the application.

1.3 Database Requirements

Req-ID	Requirement
FR-DB-1.3.0	Database will update every time a lower price for a specific part is found online.
FR-DB-1.3.1	User PC builds will be stored against the user account if they have one.
FR-DB-1.3.2	Database must maintain entries for each type of computer part
FR-DB-1.3.3	Database must maintain prices for the computer parts
FR-DB-1.3.4	Database must maintain compatibility issues related to computer parts
FR-DB-1.3.5	Database will update the price every time the lowest price for a specific part is unavailable.

Non-Functional Requirements

The Non-Functional Requirements have been split into the following four sections: Usability Requirements, Reliability Requirements, Performance Requirements, and Maintainability Requirements. Usability requirements are associated with the interaction between the application and the user. The reliability is concerned with the uptime of the application. The performance requirements are pertaining to the overall performance of the application and how quickly it can perform specific tasks. The final requirement, Maintainability, is associated with the various aspects that will need to be checked on and ensuring it is running.

2.1 Usability Requirements

Req-ID	Requirement
NFR-UR-2.1.0	The design and the user interface must be compatible with modern browsers: Firefox, Google Chrome, Microsoft Edge, Safari, Opera, and Brave.
NFR-UR-2.1.1	The website auto resizes for the changes in the user's window size.
NFR-UR-2.1.2	Application will conform to 1920×1080 screen resolutions.
NFR-UR-2.1.3	Application will use 12dp font sizes and Arial as its display font face.
NFR-UR-2.1.4	Application shall be available in several languages.
NFR-UR-2.1.5	Application will be functional on devices with below average

	performance.

2.2 Reliability Requirements

Req-ID	Requirement
NFR-RR-2.2.0	If the link of a PC part changes, the application will find another link to the same part without the application breaking.
NFR-RR-2.2.1	Application must have a real time backup system for user information and system data.
NFR-RR-2.2.2	The cloud service shall have 0.997 up-time.

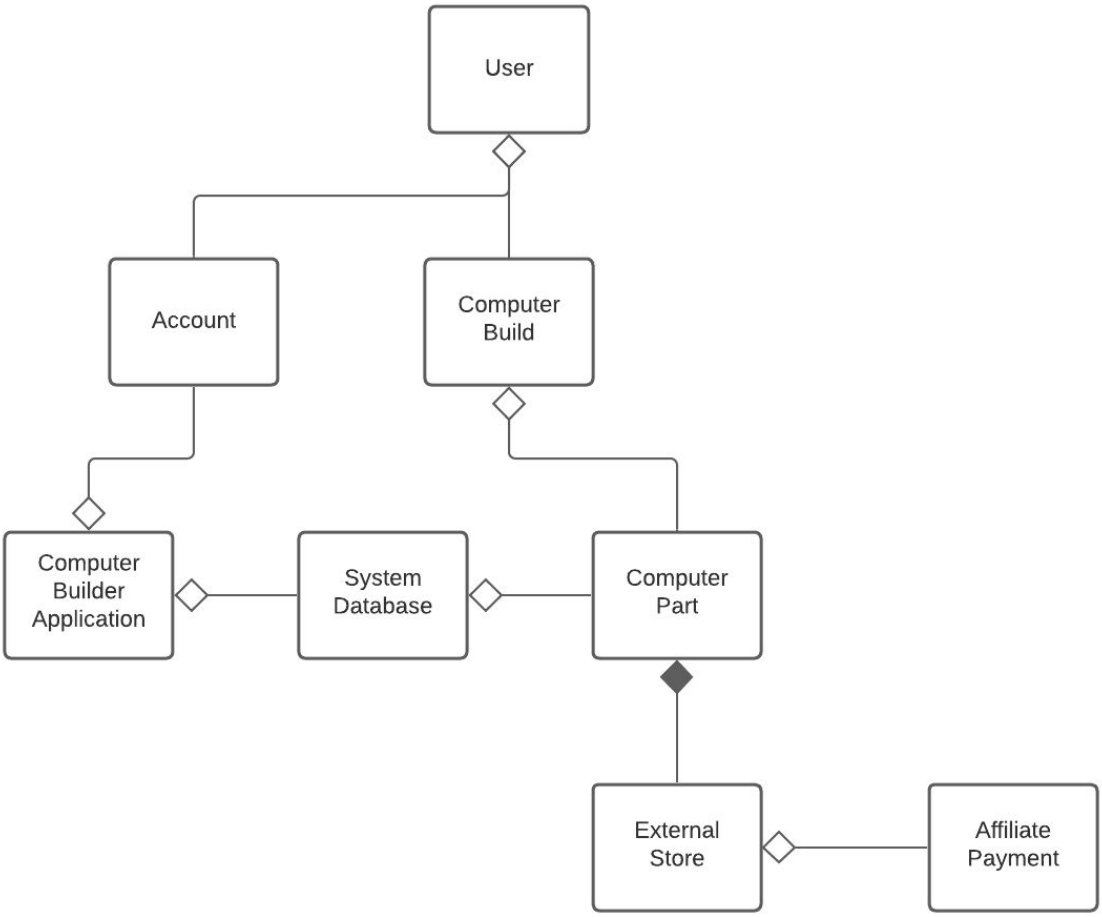
2.3 Performance Requirements

Req-ID	Requirement
NFR-PR-2.3.0	After searching for a part in the search bar, the application shall return a list of search results within 3 seconds.
NFR-PR-2.3.1	The application will make updates on all user PC builds within 2 seconds.

2.4 Maintainability Requirements

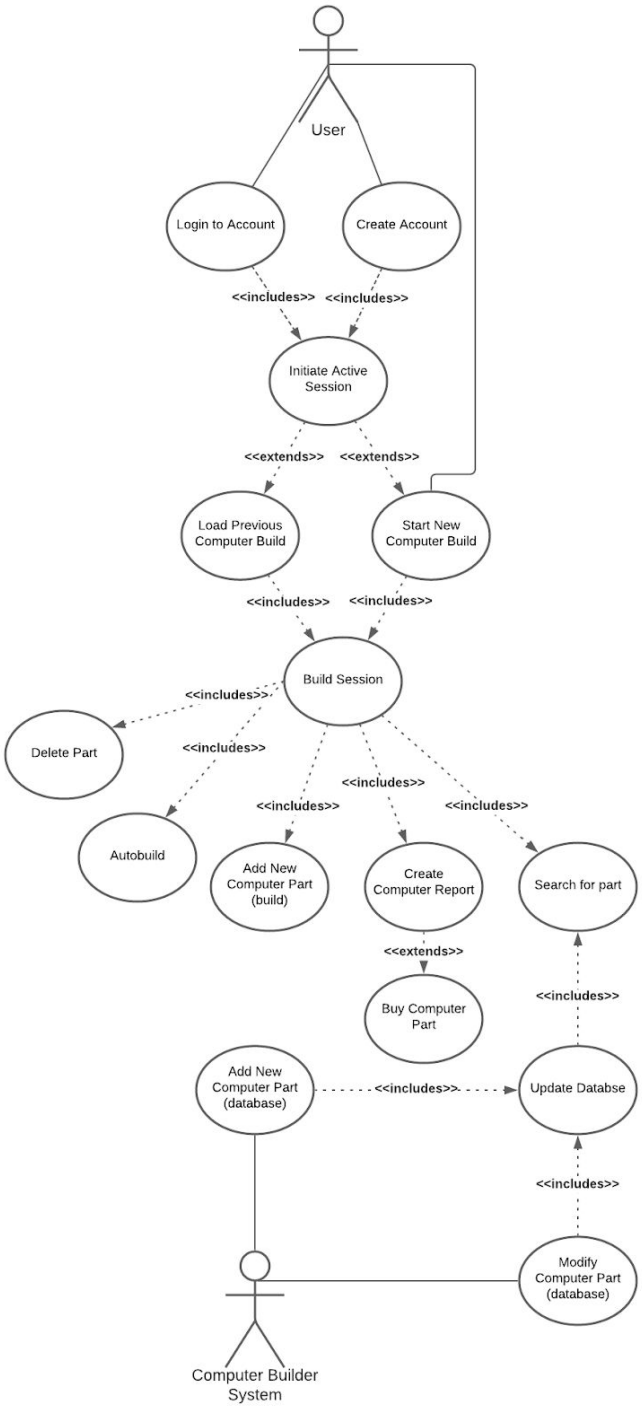
Req-ID	Requirement
NFR-MR-2.4.0	Modification to HTML and CSS will regularly be carried out to meet the updates on modern browsers.
NFR-MR-2.4.1	The application’s database will be updated when new components are released.

Domain Diagram



Use Cases

Use Case Diagram



Administrative Functionalities

Use Case: Start New Computer Build (Kiernan)
Goal: Start a new computer build
Actor(s): User
Preconditions: None
Trigger: User clicks “Start New Computer Build” link
Main Scenario:

1. User views web page
2. User clicks “Start New Computer Build”
3. User is shown a blank computer build form

End Condition: User is at a computer build form

Use Case: Load Previous Computer Build (Andrew Montgomery)
Goal: Load a previous computer build made with the application
Actor(s): User , Computer Build System, System Database
Preconditions: User has a user account, User has internet access
Trigger: User selects “Load previous computer build” from user account home page
Main Scenario:

1. User selects “Load previous computer build” option
2. System retrieves previous computer builds associated to the User account
3. System displays the previous computer build list UI
4. User selects the previous computer build to load
5. The system displays the computer build UI for the selected previous computer build

Alternatives:
In step 2: If the user does not have a previous computer build to load, the system will instead prompt the user to start a new computer build
In step 4: If the user does not want to load a previous computer build from the list, the user can press the cancel button and the system will return the User to the user account home page.
End Condition: The system has displayed the computer build UI for the selected previous computer build.

Use Case: Autobuild (Suhyun)
Goal: Automatically completing the current computer build session based on specifications provided by the user
Actor(s): User, Computer Builder System, System database
Preconditions: User has an active computer build session
Trigger: User clicks “Autobuild” button from the current build session webpage
Main Scenario:
1. User presses “Autobuild” button
2. The Autobuild popup window is displayed by the Computer Builder System
3. The user modifies specifications for the computer that is to be built
4. The user clicks the “save preferences” button to save the desired specifications
5. The user clicks the “fill in parts” button
6. The computer builder system searches the system database for parts the fit the user specifications
7. The computer system displays the selected parts in the current parts display

Alternatives:
In step 3: The user can choose to not modify preferences and clicks the “fill in parts” button. The Computer Builder System will then search the system database using the default specifications.
In step 5: The user can click the “cancel” button to exit the Autobuild popup window and return to the current build session default page.
In step 6: If the computer builder system cannot find computer parts in the System database, the computer builder system will select the parts that are best fitting for the desired specifications.
End Condition: The system has displayed a complete computer build in the current parts display.

Use Case: Search for part (Ulysess Steenmeyer)
Goal: Discover a desirable part for a computer build
Actor(s): User
Preconditions: User is apart of an active build session
Trigger: Use selects combo box for selecting a part type.
Main Scenario:
1. User selects type of part to be added (CPU, Storage, etc.)
2. User may change search parameters
3. System displays the best available options based on current criteria
4. User selects the desired part

End Condition: User has selected a desired part

Use Case: Add a new Computer Part to a Computer Build (Adrian)
Goal: Add a new computer part to an existing computer build on the user account
Actor(s): User, Computer Builder System, System database
Preconditions: User is connected to the internet, User has an active computer build session, User has searched and selected a part to add to the computer build
Trigger: User selects “Add a New Part”
Main Scenario:

1. The user clicks “Add New Part” button on the “search for part” page
2. The System checks the database for compatibility issues
3. The system displays a dialogue that prompts the user to confirm adding the part to the current computer build session
4. The user clicks the Confirm button
5. The computer part is added to the current computer build session

Alternatives:
In step 2: If the system detects compatibility issues with a selected part, the system will notify the user of the detected compatibility issue by displaying a compatibility error dialogue, and the user can choose to cancel adding the part or add the part anyway. The user will be returned to the search for part page.
In step 3: If the user does not want to add the part to the current computer build session, the user can select cancel and the system will return the user to the search for parts page.
End Condition: User is viewing their computer build with the updated part

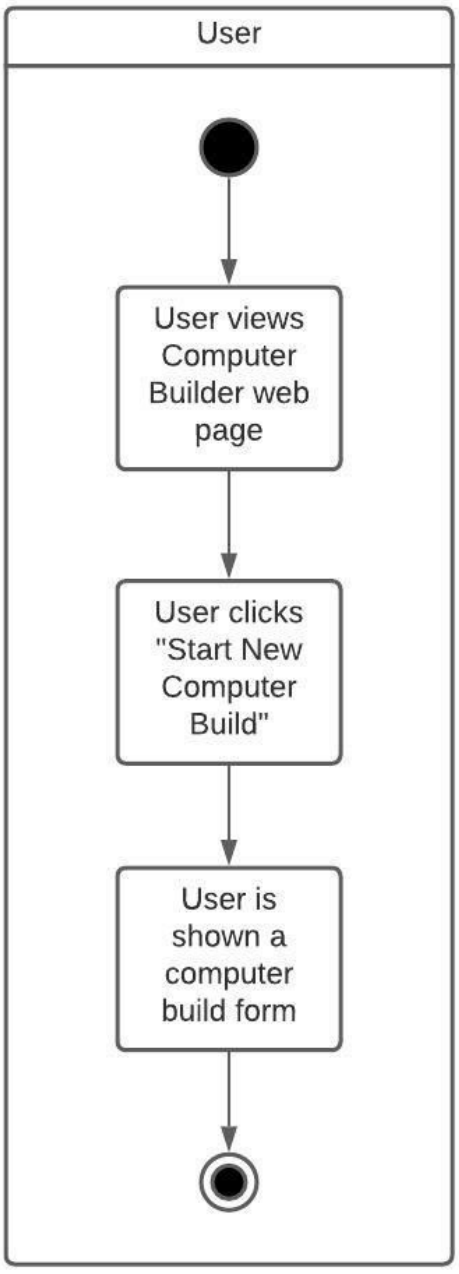
Use Case: Purchasing a computer part (Mohammed Ali)
Goal: User is able to purchase computer part
Actor(s): User
Preconditions: None
Trigger: User has found a computer part they are interested in purchasing
Main Scenario:

1. User adds the desired part into the computer build.
2. User navigates to build session.
3. User selects purchase link.
4. User is reloaded to a new page that informs user they are being taken off the website.
5. User purchases item from new website opened in a new tab.

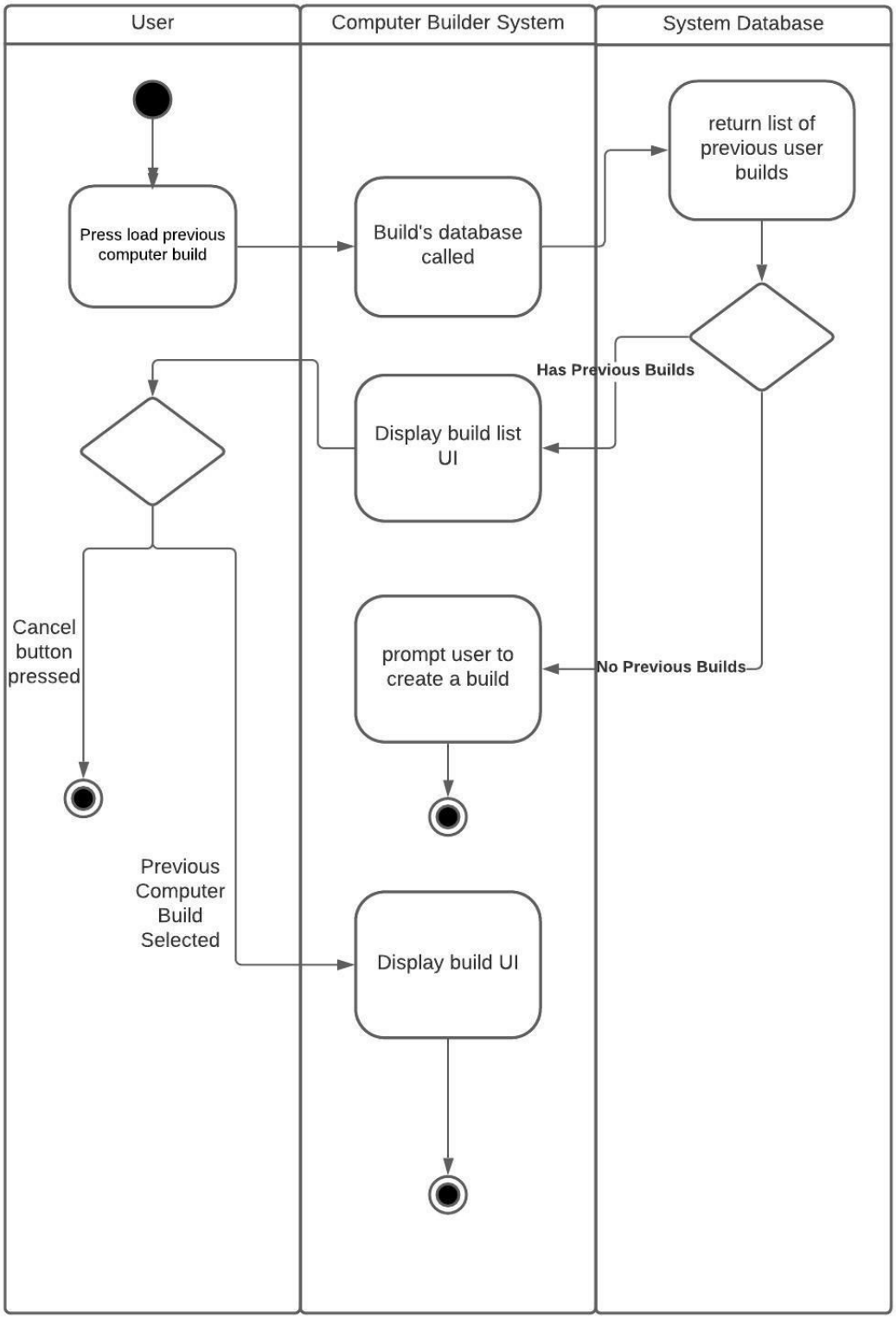
End Condition: User purchases the part successfully from the external website

Activity Diagrams

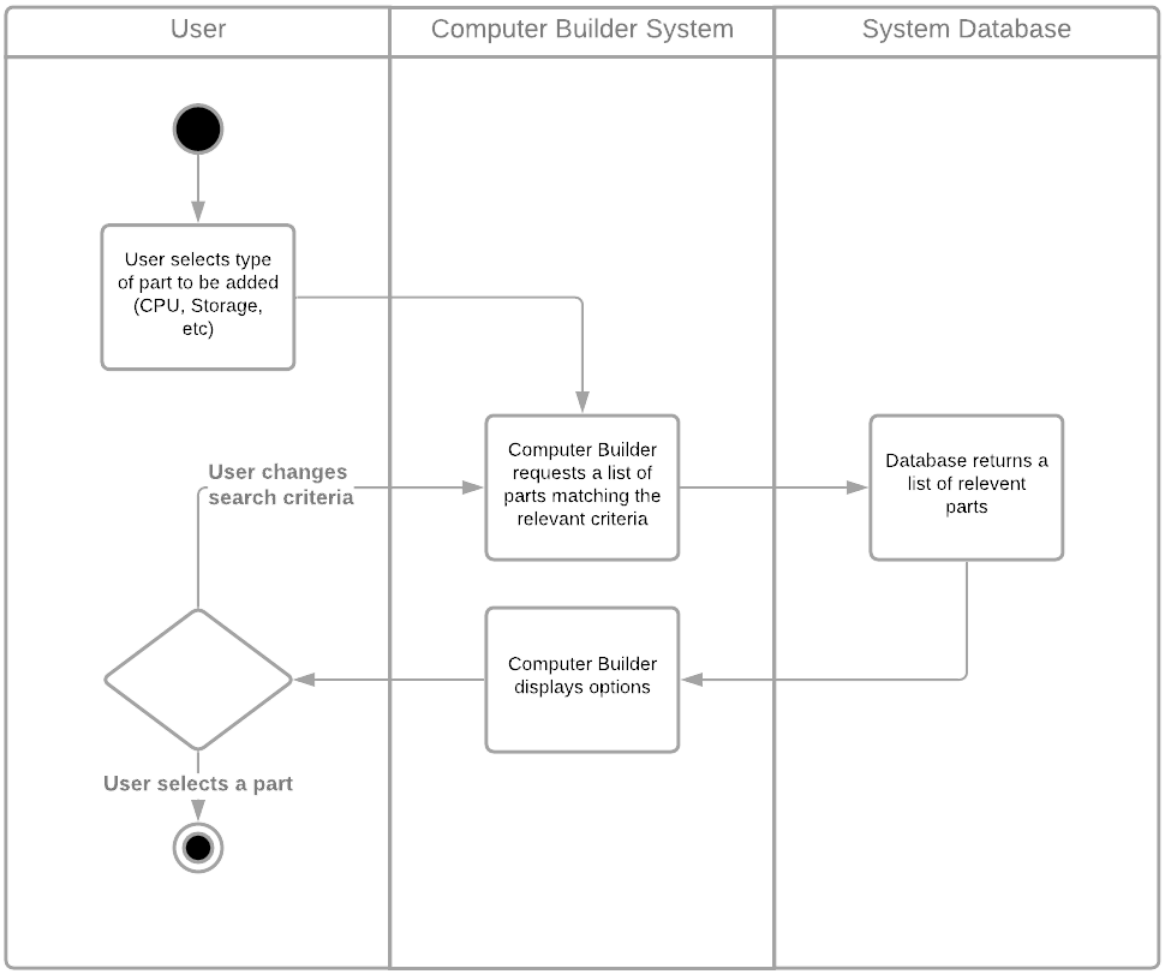
Start New Computer Build



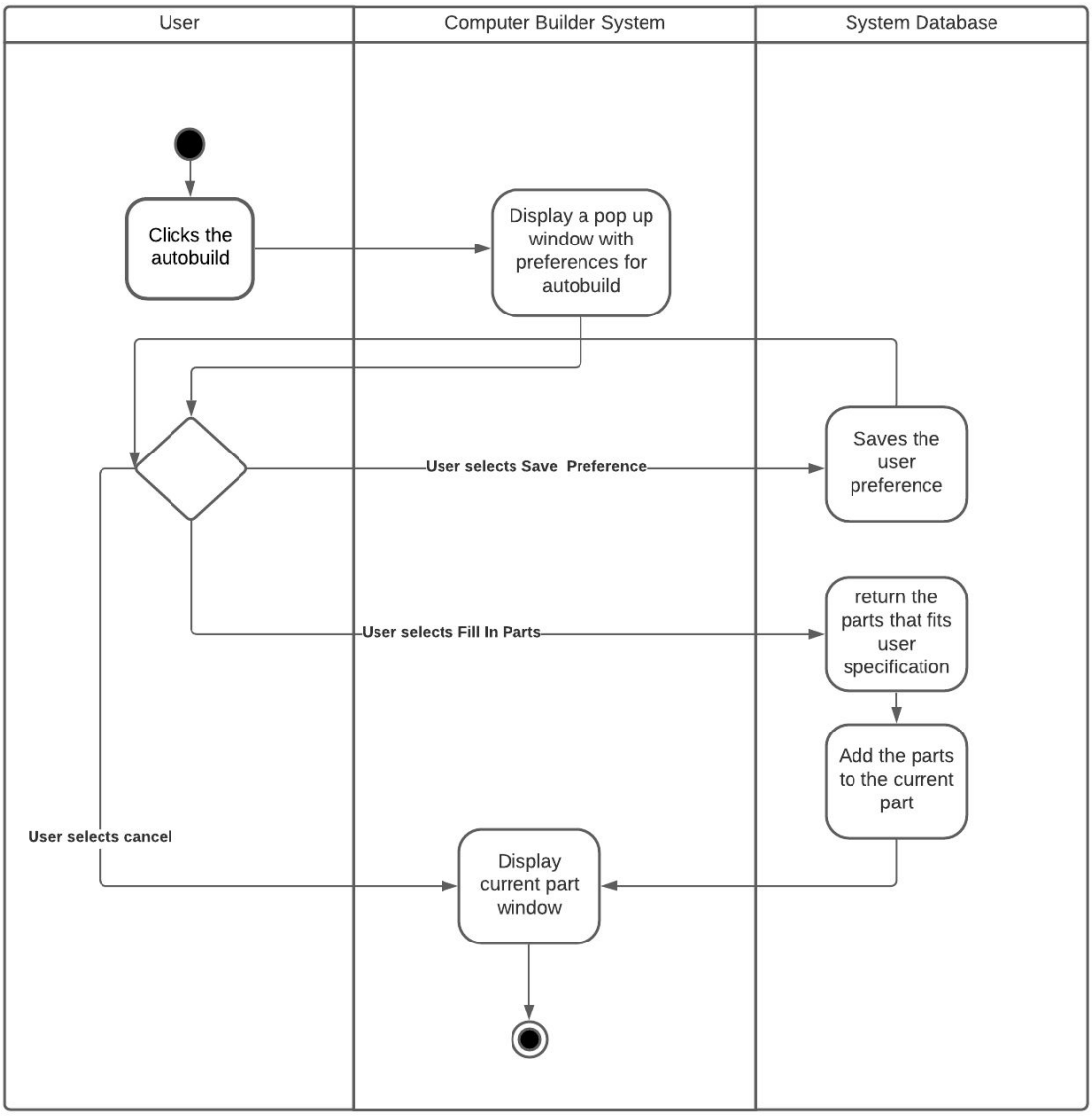
Loading Previous Computer Build Activity Diagram



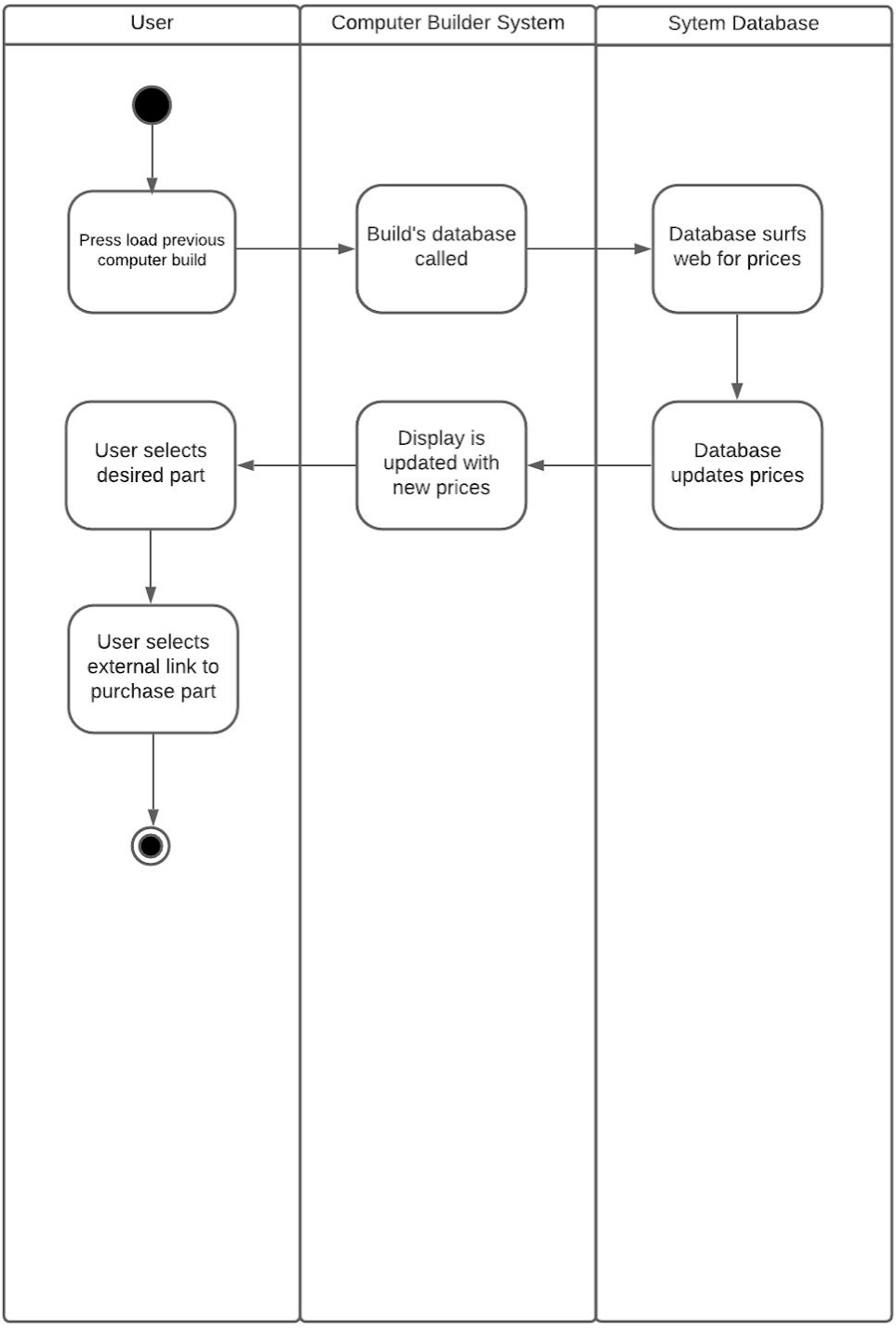
Search for Part



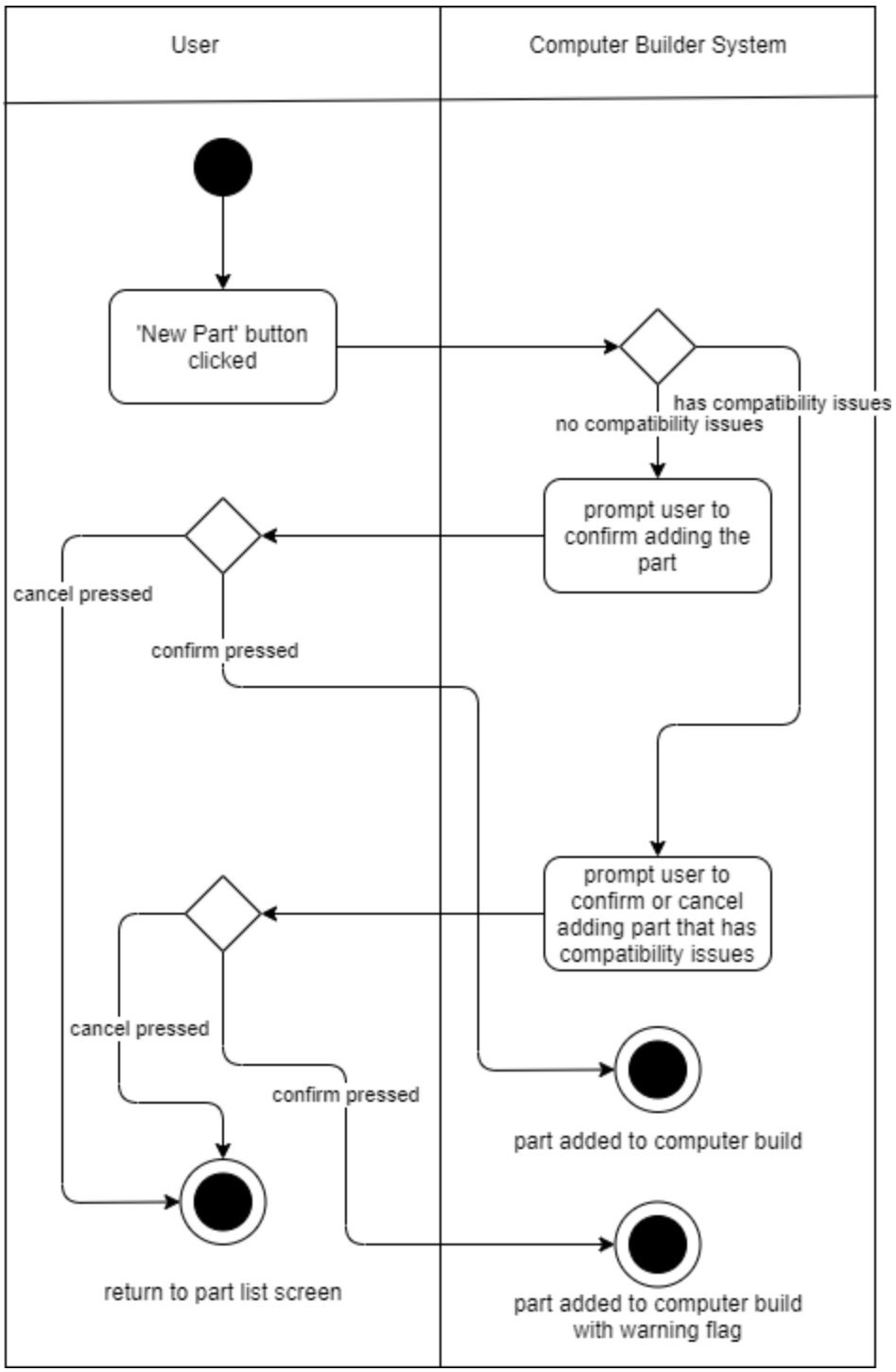
Autobuild


User
Computer Builder System
System Database
Clicks the autobuild
Display a pop up window with preferences for autobuild
User selects Save Preference
Saves the user preference
User selects Fill In Parts
return the parts that fits user specification
Add the parts to the current part
User selects cancel
Display current part window

Purchasing Computer Part

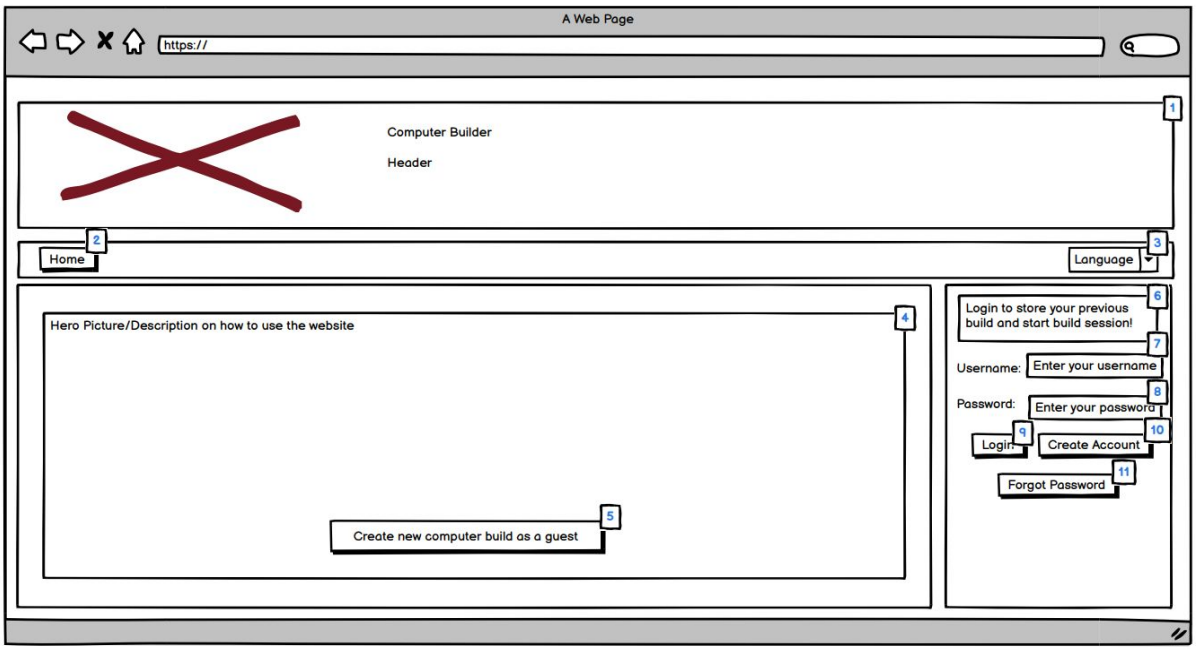


Add New Part to Existing Computer Build



Wireframes

Home Page

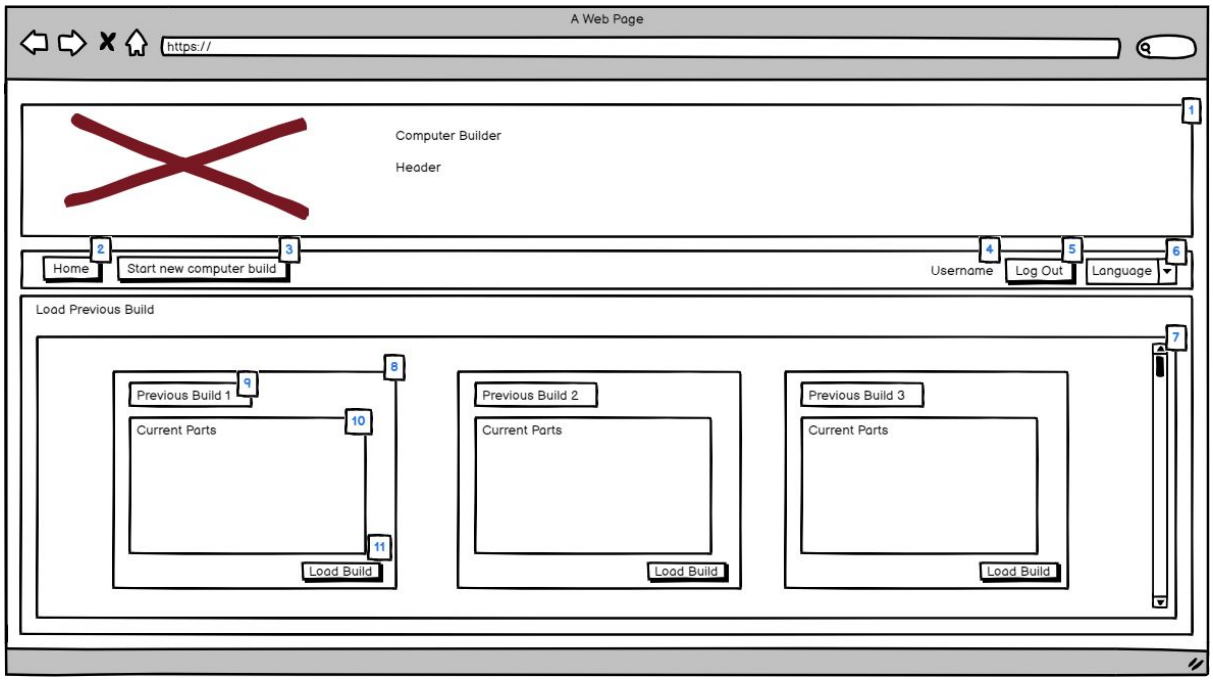


WF1: Display home page, create account and continue as guest

Wireframe ID	Wireframe Description
WF1.1	Computer Builder logo and header
WF1.2	Home page link
WF1.3	Language drop down menu for modifying language preference
WF1.4	Computer Builder application description
WF1.5	Button link to navigate to starting a new computer build session
WF1.6	Login description
WF1.7	Username input text field
WF1.8	Password input text field
WF1.9	Login button to log user into system
WF1.10	Create account button to navigate user to account creation page

WF1.11	Forgot password button to navigate user to account recovery page

Home Page when Logged In

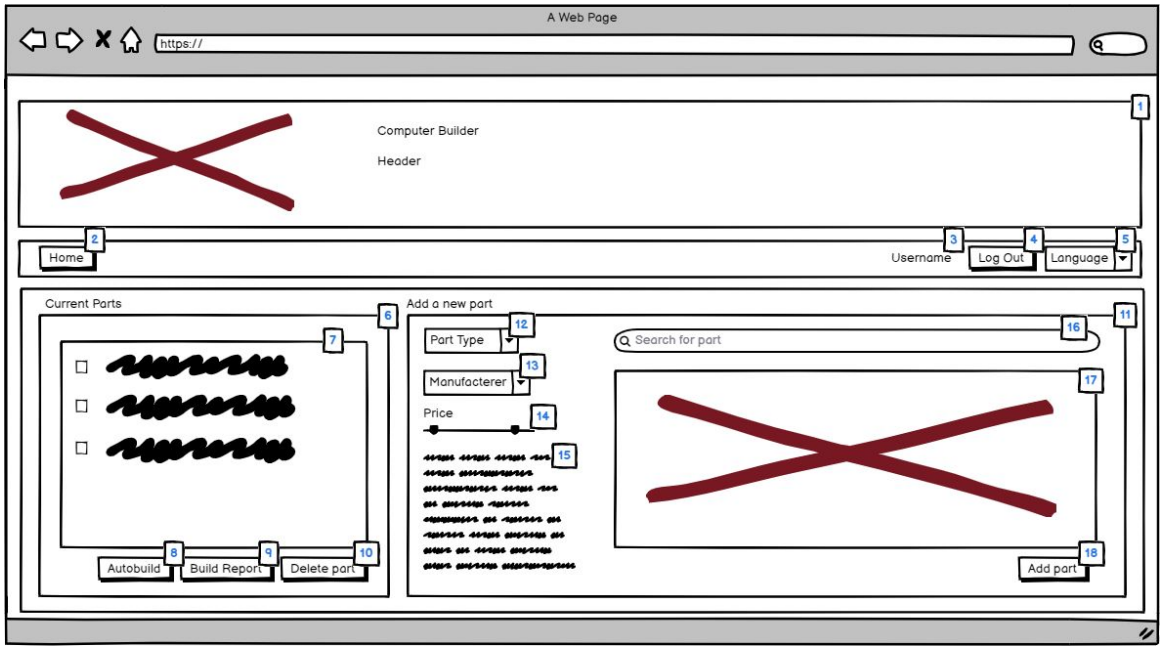


WF2: Display the home page when logged, show the previous builds

Wireframe ID	Wireframe Description
WF2.1	Computer Builder logo and header
WF2.2	Home page link
WF2.3	Start new computer build link to navigate to starting a new computer build session
WF2.4	Username of currently logged in user
WF2.5	Log out button to log current user out of system
WF2.6	Language drop down menu for modifying language preference
WF2.7	Previous computer build display window
WF2.8	Previous computer build display
WF2.9	Title of previous computer build

WF2.10	Current part list for previous computer build
WF2.11	Load build button to navigate to previous computer build session

Current part/Add new part view

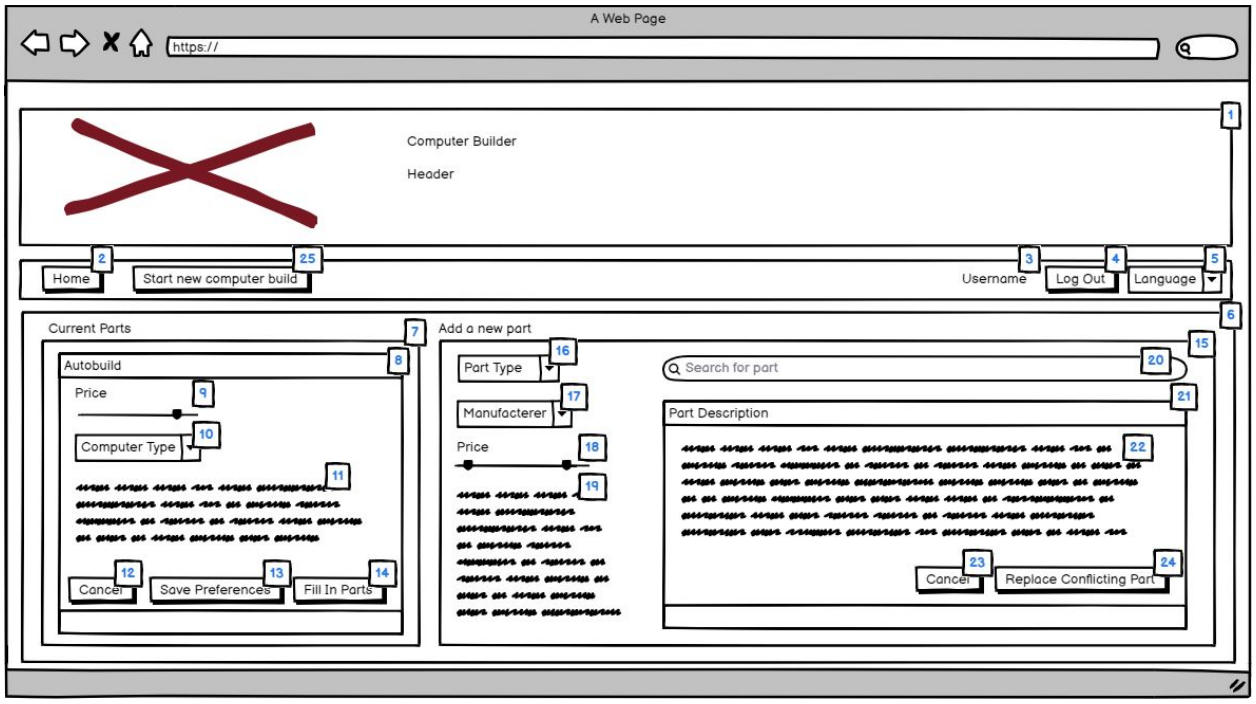


WF3: Add a new part view and display current parts

Wireframe ID	Wireframe Description
WF3.1	Computer Builder logo and header
WF3.2	Home page link
WF3.3	Username of currently logged in user
WF3.4	Log out button to log current user out of system
WF3.5	Language drop down menu for modifying language preference
WF3.6	Current parts display window
WF3.7	Current parts display
WF3.8	Autobuild button to navigate to Autobuild page
WF3.9	Build Report button to navigate to Build Report page
WF3.10	Delete Part button to delete a part from the current part list

WF3.11	Add a new part display window
WF3.12	Part Type drop down selection window to select the type of part to search for
WF3.13	Manufacturer drop down selection window to select manufacturer to search for
WF3.14	Price slider to select price range search specification
WF3.15	Search specifications unique to part type
WF3.16	Search bar for user to input specific part to search for
WF3.17	Part display window to display information about part being searched for
WF3.18	Add part button to add selected part to current part list

Autobuild/Part Description

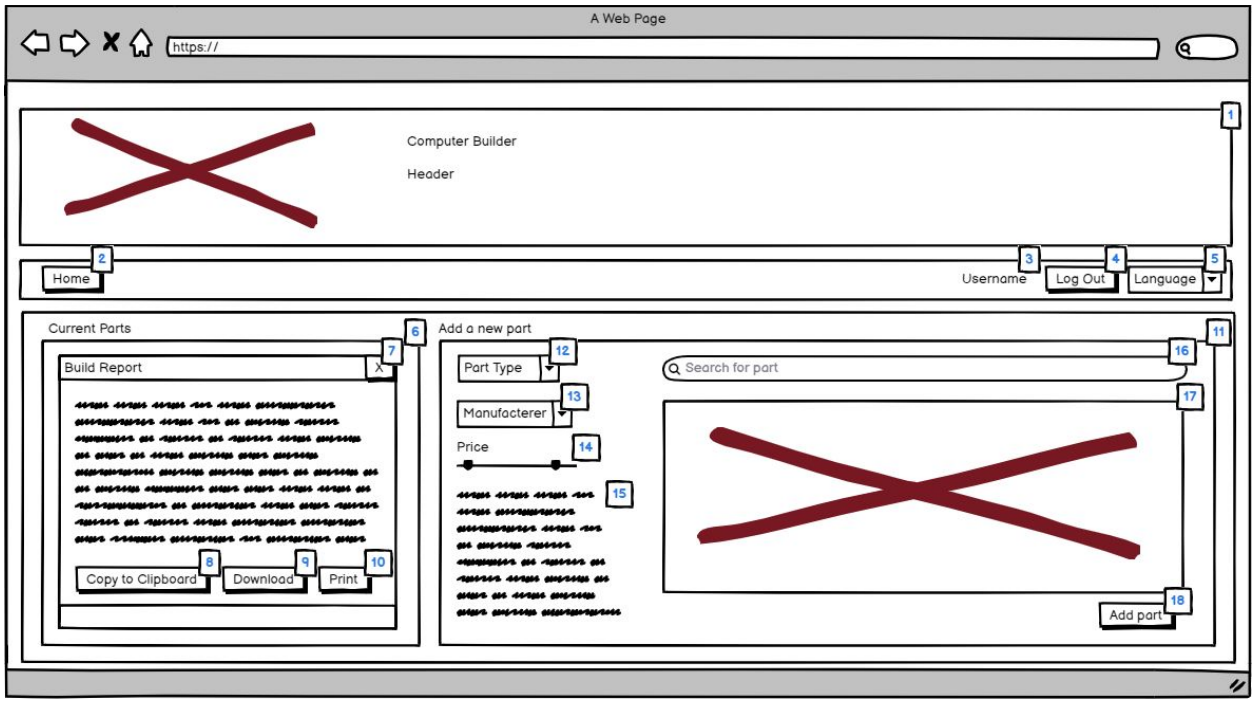


WF4: Create autobuild

Wireframe ID	Wireframe Description
WF4.1	Computer Builder logo and header
WF4.2	Home page link
WF4.3	Display for user's username
WF4.4	Button logs out the user from their account
WF4.5	Language dropdown menu allows user to change language preferences
WF4.6	Display for the current parts and add new parts displays
WF4.7	Current parts display containing current parts and autobuild functionality
WF4.8	Autobuild display allows the user to fill in the remaining undetermined parts in the build
WF4.9	Slider allows the user to set a maximum price or price range

WF4.10	Dropdown menu allows the user to identify the primary use case of the computer
WF4.11	List of current parts
WF4.12	Button allows the user to cancel the current autobuild session
WF4.13	Button allows the user to save the current computer part filters
WF4.14	Button initiates the autobuild and fills in the remaining undetermined parts in the build
WF4.15	Display contains add new part functionality
WF4.16	Dropdown menu determines the type of part to be searched for
WF4.17	Dropdown menu determines the manufacturer to be searched for
WF4.18	Slider allows the user to determine a range of prices
WF4.19	List of parts meeting the search criteria
WF4.20	Search bar to search for part keywords
WF4.21	Part description display
WF4.22	The description of the current selected part
WF4.23	Button to cancel the current part selection
WF4.24	Button to replace a current conflicting part type
WF4.25	Button to start a new computer build

Build Report

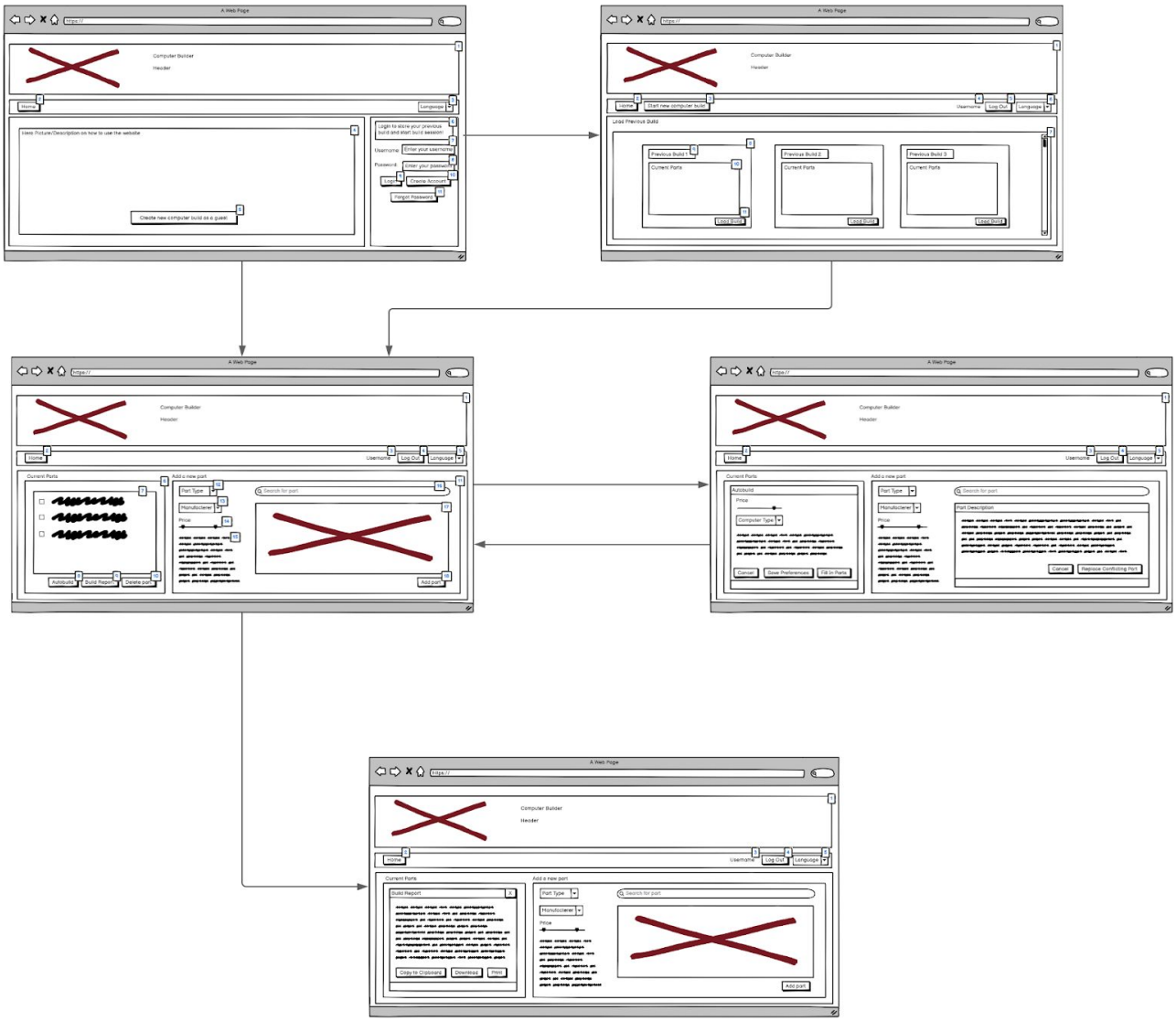


WF5: Creating build report

Wireframe ID	Wireframe Description
WF5.1	Computer Builder logo and header
WF5.2	Home page link
WF5.3	Username of currently logged in user
WF5.4	Log out button to log current user out of system
WF5.5	Language drop down menu for modifying language preference
WF5.6	Current parts display window
WF5.7	Exits the build report and returns to the current part
WF5.8	Copies the build report to clipboard
WF5.9	Downloads the build report as .docx
WF5.10	Downloads the build report as a printable format in .pdf
WF5.11	Add a new part display window

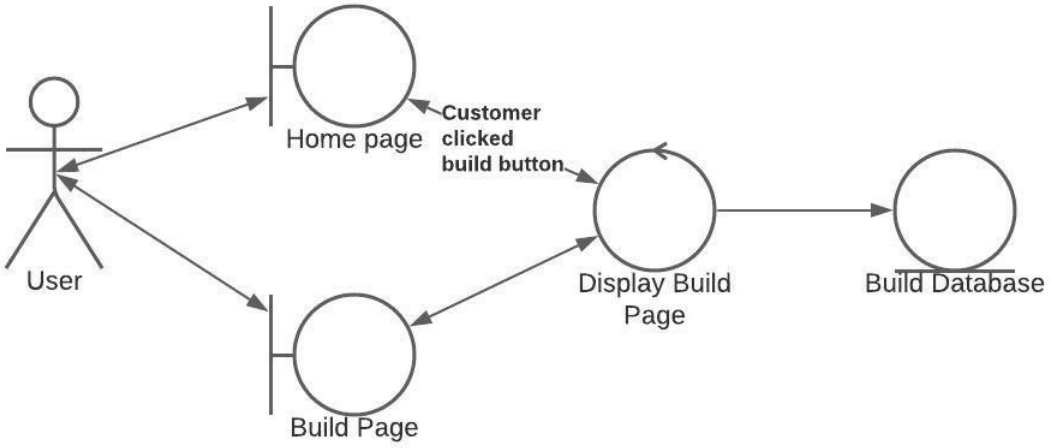
WF5.12	Part Type drop down selection window to select the type of part to search for
WF5.13	Manufacturer drop down selection window to select manufacturer to search for
WF5.14	Price slider to select price range search specification
WF5.15	Search specifications unique to part type
WF5.16	Search bar for user to input specific part to search for
WF5.17	Part display window to display information about part being searched for
WF5.18	Add part button to add selected part to current part list

Navigation map of computer builder

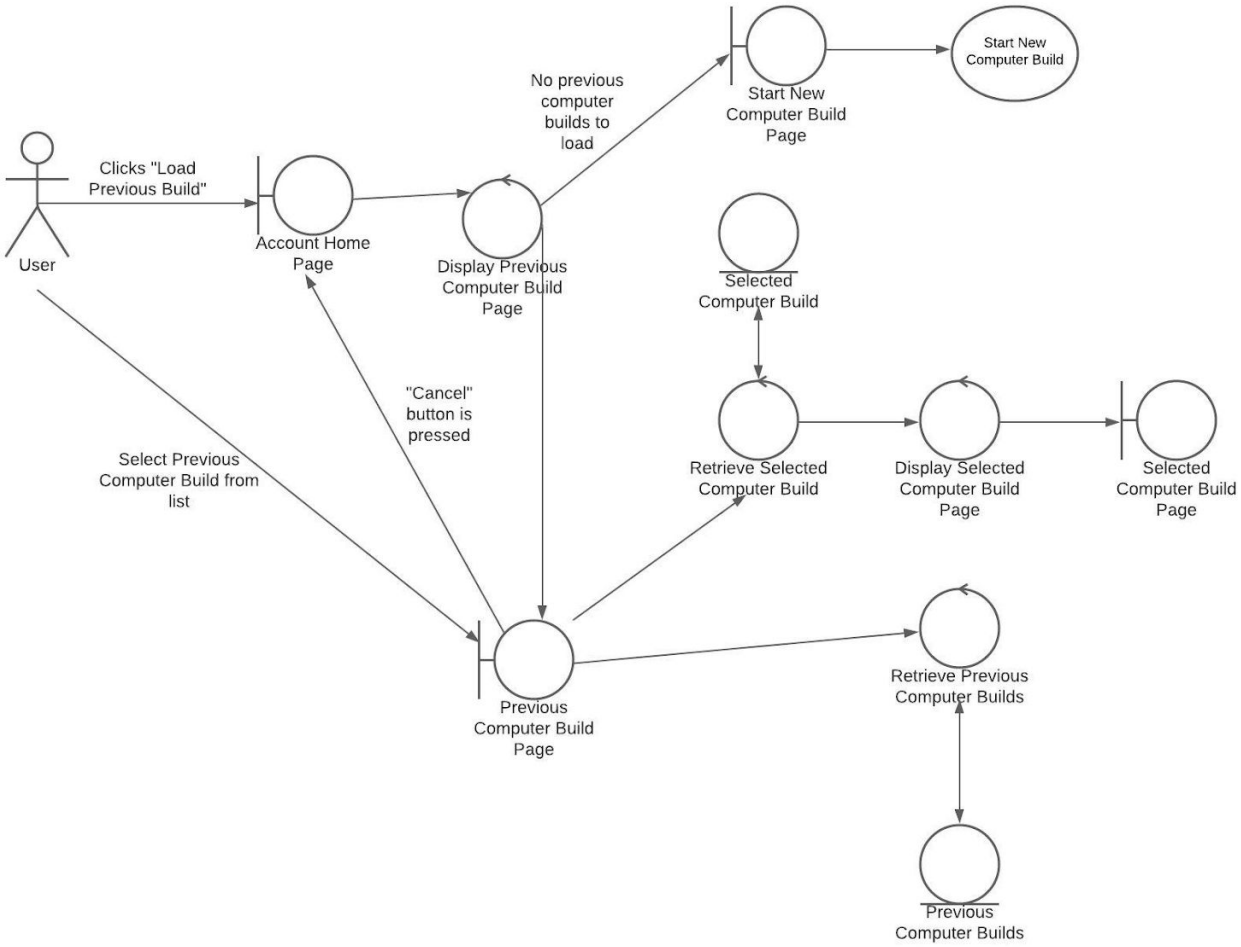


Robustness Diagrams

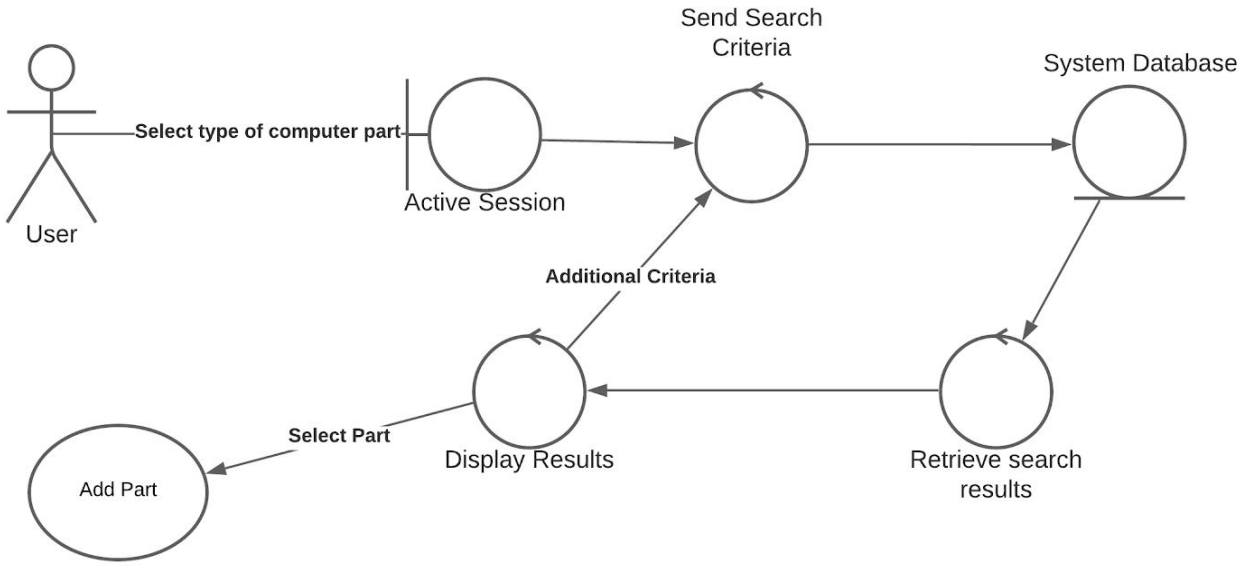
Start New Computer Build



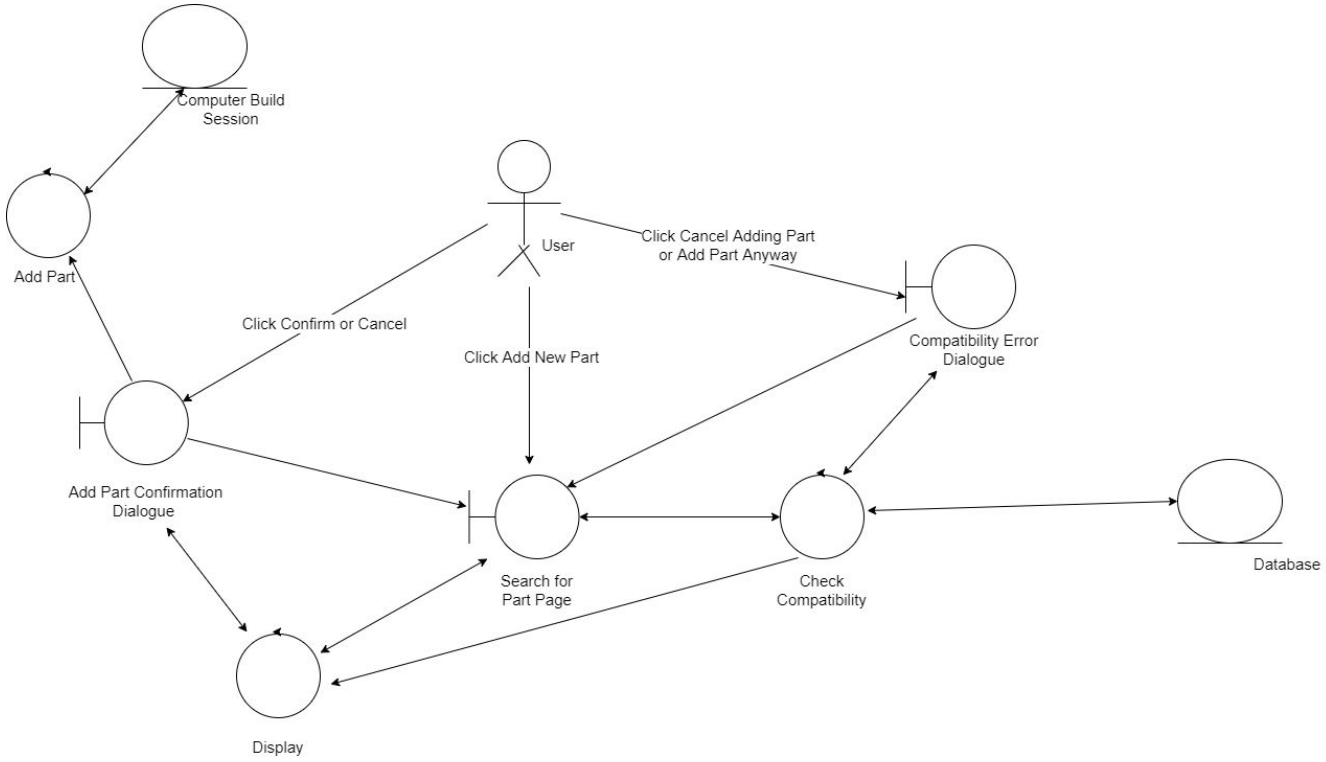
Load Previous Build



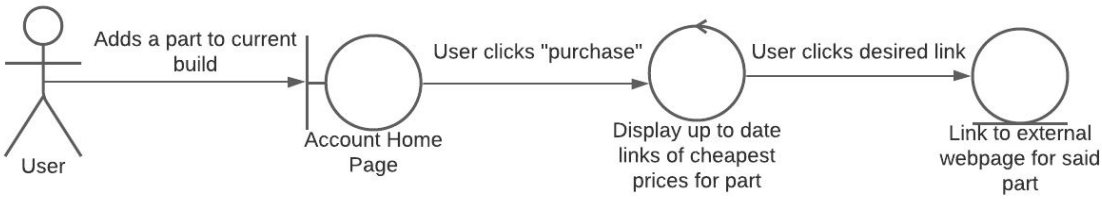
Search for Part



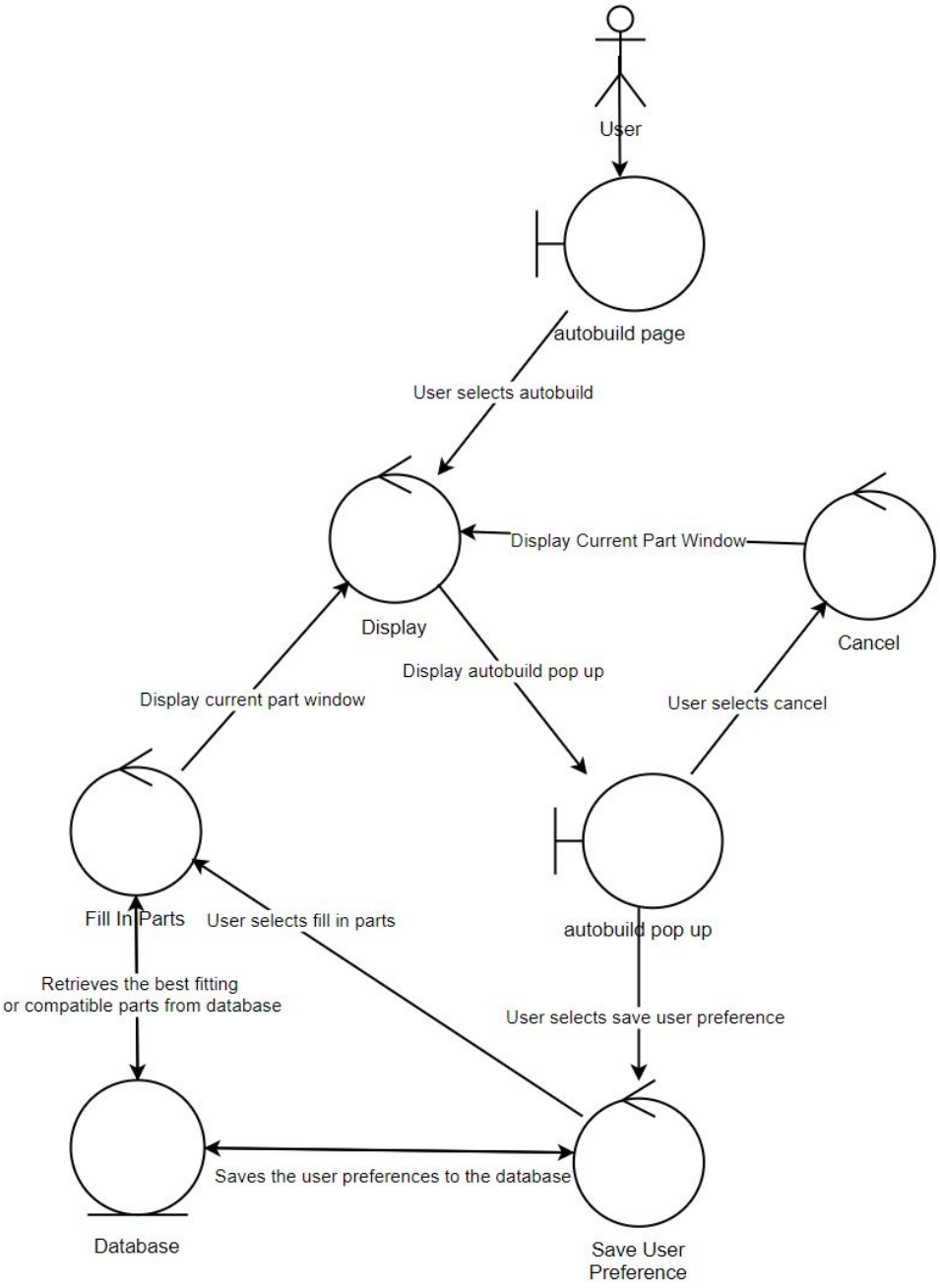
Add a New Computer Part to a Computer Build



Purchasing Computer Part

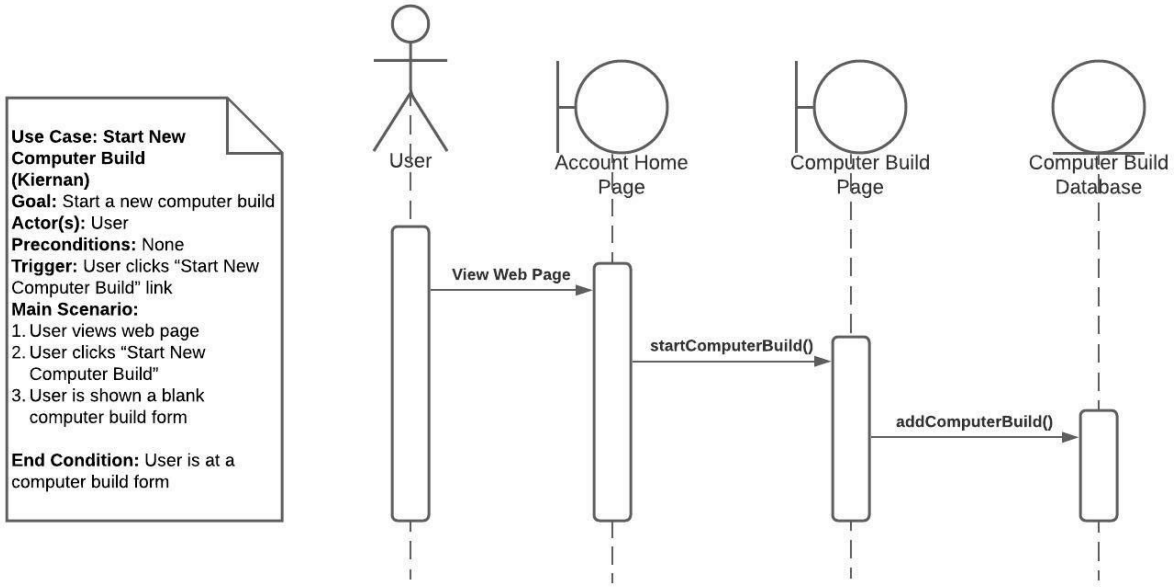


Autobuild


User
autobuild page
User selects autobuild
Display
Display Current Part Window
Cancel
Display autobuild pop up
Display current part window
User selects cancel
Fill In Parts
User selects fill in parts
autobuild pop up
Retrieves the best fitting
or compatible parts from database
User selects save user preference
Saves the user preferences to the database
Database
Save User
Preference

Sequence Diagrams

Start New Computer Build



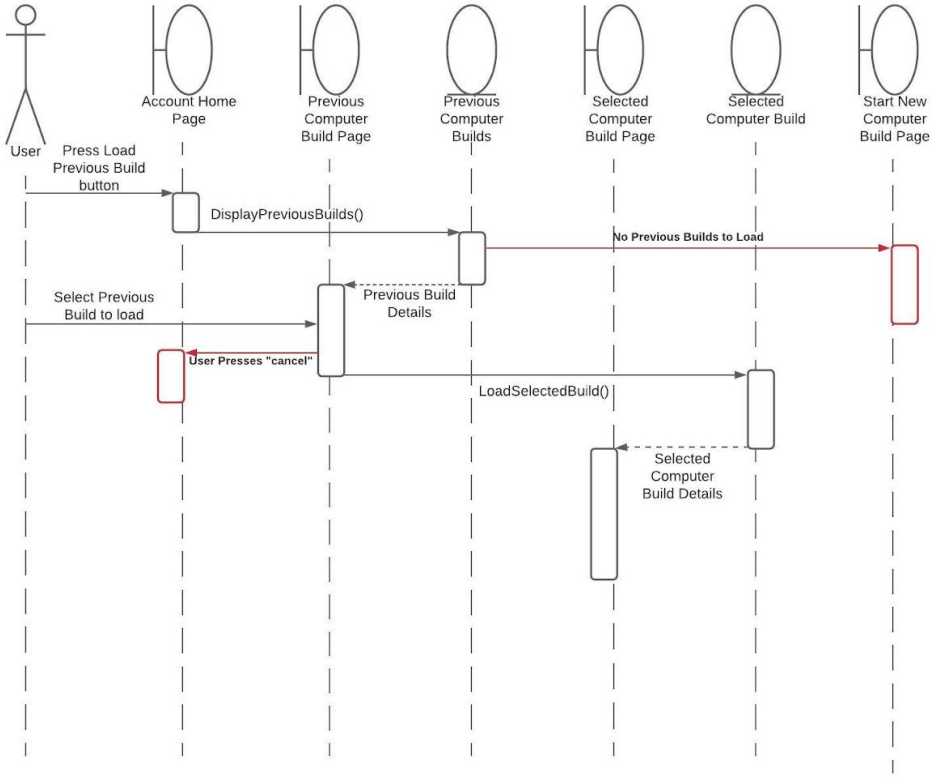
Load Previous Computer Build:

Use Case: Load Previous Computer Build
Goal: Load a previous computer build made with the application
Actor(s): User , Computer Build System, System Database
Preconditions: User has a user account, User has internet access
Trigger: User selects "Load previous computer build" from user account home page

Main Scenario:
1.) User selects "Load previous computer build" option
2.) System retrieves previous computer builds associated to the User account
3.) System displays the previous computer build list UI
4.) User selects the previous computer build to load
5.) The system displays the computer build UI for the selected previous computer build

Alternatives:
In step 2: If the user does not have a previous computer build to load, the system will
instead prompt the user to start a new computer build
In step 4: If the user does not want to load a previous computer build from the list, the
user can press the cancel button and the system will return the User to the user account home page.

End Condition: The system has displayed the computer build UI for the selected previous computer build.

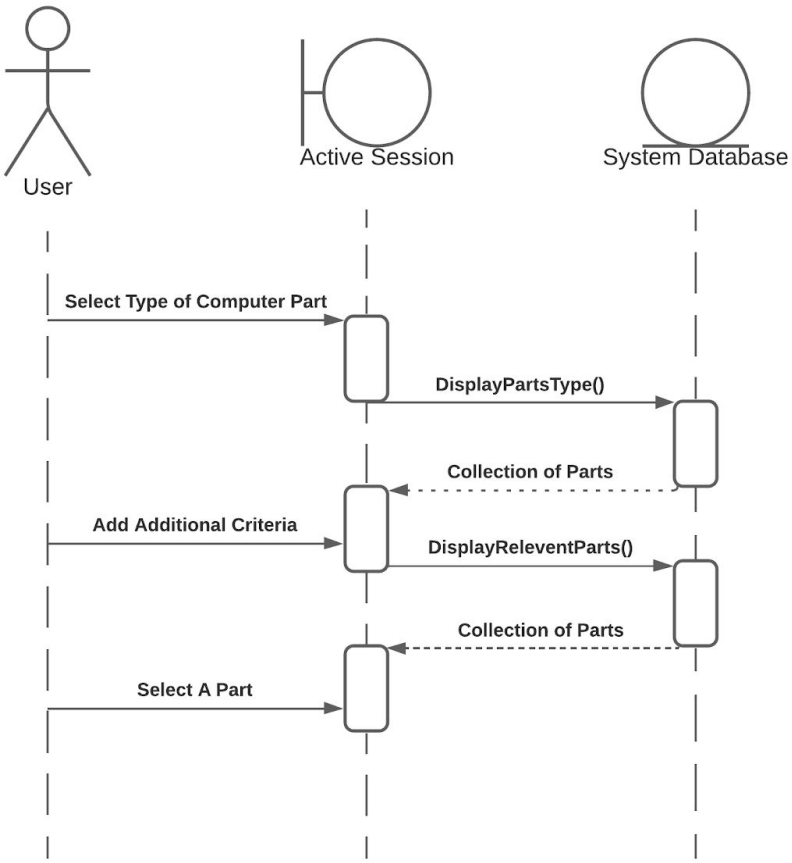


Search for Part

Use Case: Search for part
Goal: Discover a desirable part for a computer build
Actor(s): User
Preconditions: User is apart of an active build session
Trigger: Use selects combo box for selecting a part type.

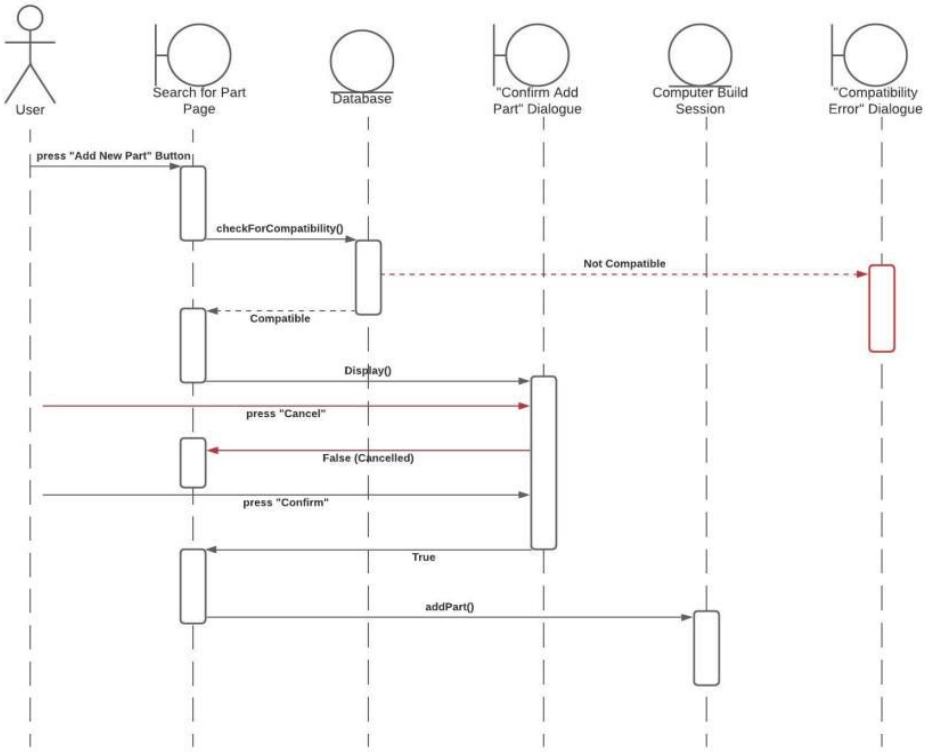
Main Scenario:
1.)User selects type of part to be added (CPU, Storage, etc.)
2.)User may change search parameters
3.)System displays the best available options based on current criteria
4.)User selects the desired part

End Condition: User has selected a desired part



Add a New Part to a Computer Build:

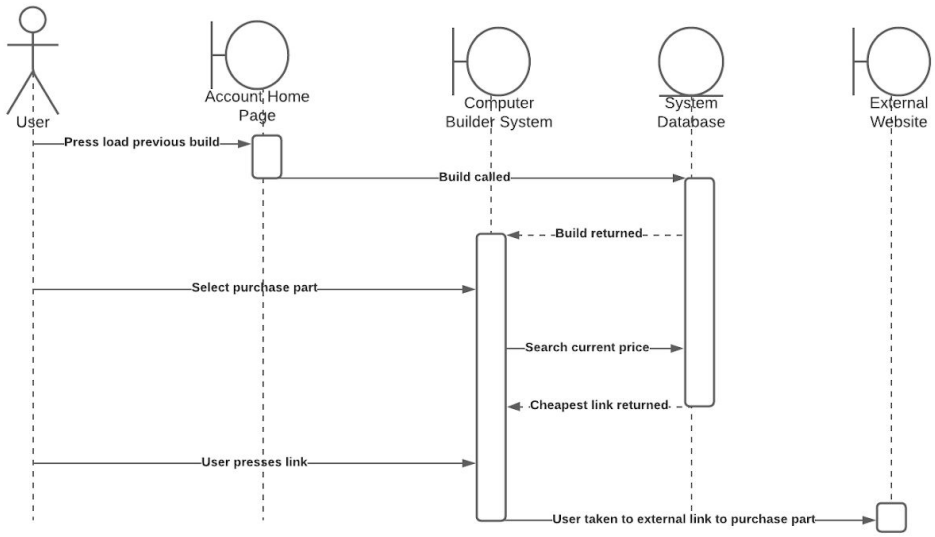
Use Case: Add a new Computer Part to a Computer Build (Adrian)
Goal: Add a new computer part to an existing computer build on the user account
Actor(s): User, Computer Builder System, System database
Preconditions: User is connected to the internet, User has an active computer build session, User has searched and selected a part to add to the computer build
Trigger: User selects "Add a New Part"
Main Scenario:
The user clicks "Add New Part" button on the "search for part" page
The System checks the database for compatibility issues
The system displays a dialogue that prompts the user to confirm adding the part to the current computer build session
The user clicks the Confirm button
The computer part is added to the current computer build session
Alternatives:
In step 2: If the system detects compatibility issues with a selected part, the system will notify
the user of the detected compatibility issue by displaying a compatibility error dialogue, and the user can choose to cancel adding the part or add the part anyway. The user will be returned to the search for part page.
In step 3: If the user does not want to add the part to the current computer build session, the
user can select cancel and the system will return the user to the search for parts page.**End Condition:** User is viewing their computer build with the updated part



Purchasing a Computer Part

Use Case:
Purchasing a computer part (Mohammed Ali)
Goal: User is able to purchase computer part
Actor(s): User
Preconditions: None
Trigger: User has found a computer part they are interested in purchasing
Main Scenario:
1. User adds the desired part into the computer build.
2. User navigates to build session.
3. User selects purchase link.
4. User is reloaded to a new page that informs user they are being taken off the website.
5. User purchases item from new website opened in a new tab.

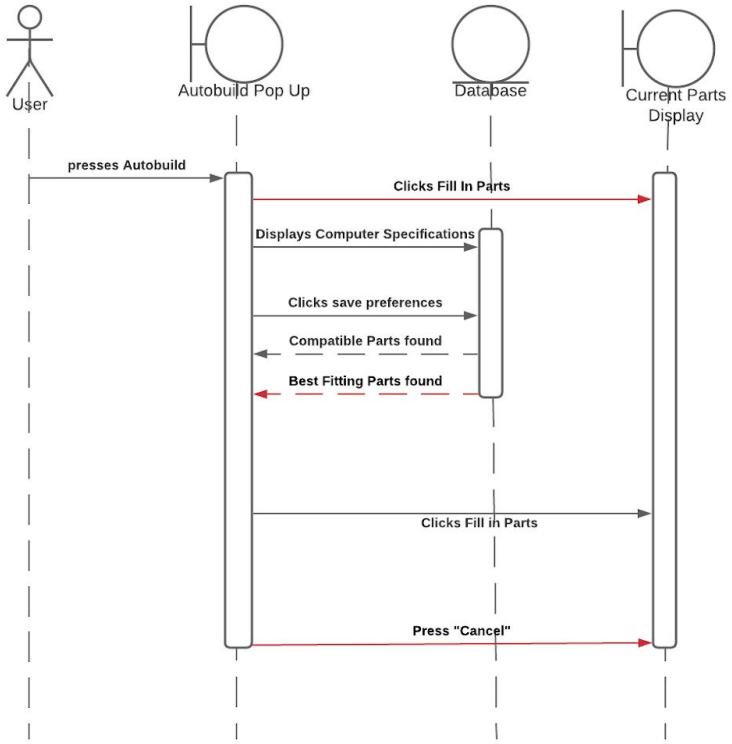
End Condition: User purchases the part successfully from the external website



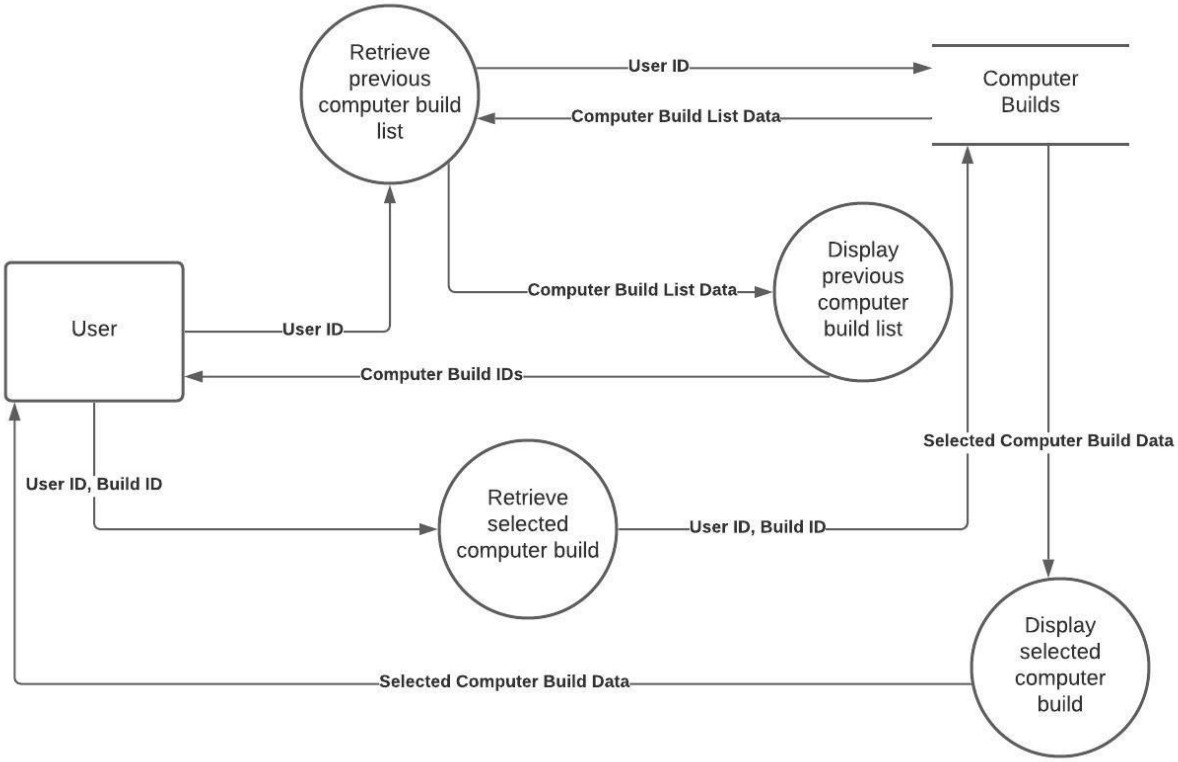
Autobuild

Use Case: Autobuild
Goal: Automatically completing the current computer build session based on specifications provided by the user
Actor(s): User, Computer Builder System, System database
Preconditions: User has an active computer build session
Trigger: User clicks "Autobuild" button from the current build session webpage
Main Scenario:
1. User presses "Autobuild" but
2. The Autobuild popup window is displayed by the Computer Builder System
3. The user modifies specifications for the computer that is to be built
4. The user clicks the "save preferences" button to save the desired specifications
5. The user clicks the "fill in parts" button
6. The computer builder system searches the system database for parts the fit the user specifications
7. The computer system displays the selected parts in the current parts display

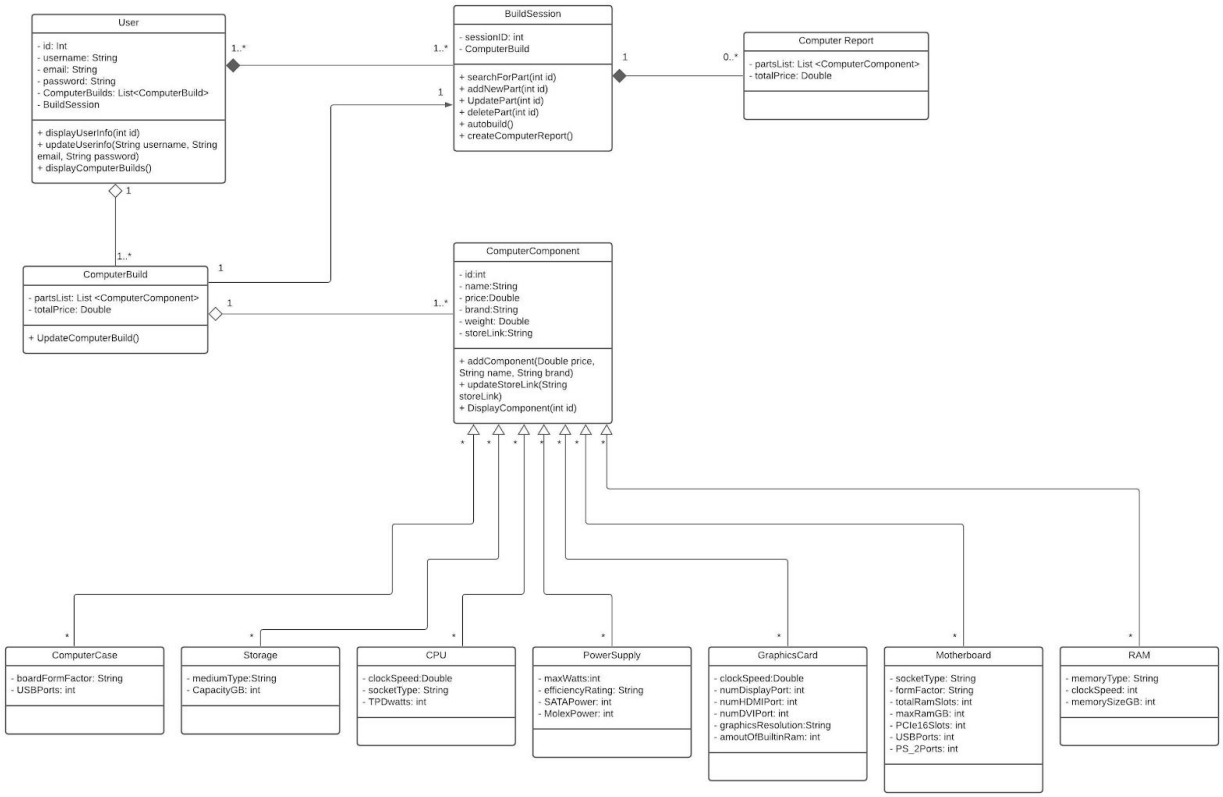
Alternatives:
In step 3: The user can choose to not modify preferences and clicks the "fill in parts" button. The Computer Builder System will then search the system database using the default specifications.
In step 5: The user can click the "cancel" button to exit the Autobuild popup window and return to the current build session default page.
In step 6: If the computer builder system cannot find computer parts in the System database, the computer builder system will select the parts that are best fitting for the desired specifications.
End Condition: The system has displayed a complete computer build in the current parts display.



Data Flow Diagram - Level One



Class Diagram



Glossary

GL1: Glossary terms and definitions

Term	Definition
Account	A class that stores id, username, user's email, user's password, customized computer builds, and build sessions.
Autobuild	A system functionality that automatically generates a build report based on the user's specific preferences.
Build Database	See System Database.
Build ID	A unique identifier that is created and given by the system.
Build Session	The active session of a person building a computer using the application.
Computer Build ID	Unique identification number for a specific computer build in the computer build database.
Computer Build System	The application as a whole that is used to build a computer.
Computer Part	A component that can be used to build a computer.
Computer Report	A docx file generated by the application that details the computer parts that have been selected for a person's computer build.
PC Build	A collection of PC parts or components that would be used to assemble a physical PC.
Preferences	Specifications set by the user to determine the necessary functionality for the computer being built by the application.
System Database	The database that stores the information about various computer parts, user account information, and user builds.
User	Person who wants to build a computer using the application.
User ID	Unique identification number for a specific user in the System Database.