

# **BuildMate: PC Assembly & Upgrade Experience**

*Build your dream PC with ease*

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## Requirements Gathering

### Purpose or Objectives for Requirements Gathering User Study

#### *Purpose*

The goal of the BuildMate user study is to understand the requirements, motivations, and challenges users face when building or upgrading a PC. It aims to identify the difficulties consumers encounter such as selecting compatible components or estimating performance so that BuildMate's design can effectively address these issues and deliver a simple, engaging, and user-friendly experience.

#### *Objectives*

- Identify the level of technical knowledge among users interested in PC building.
- Understand common challenges users face when selecting compatible components.
- Learn what kind of visual or interactive features users prefer when assembling a PC virtually.
- Gather feedback to design an intuitive, engaging, and educational UI/UX experience.

### Choice of User Study and User Sample

A survey was carried out using Google Forms to gather data from a wide audience to ensure that BuildMate meets user expectations. Participants with various levels of PC-building experience were able to express their requirements, difficulties, and preferences through this method.

The target users of BuildMate are individuals who are interested in building, upgrading, or customizing PCs but may encounter challenges due to technical complexity, according to the context of our app idea.

This includes:

- Students or young professionals interested in learning about PC components.
- Gaming enthusiasts who want to build or optimize their own systems.
- Individuals planning to upgrade or customize their existing PCs.
- Beginner builders seeking guidance and compatibility support.

To gather relevant insights, a single survey was conducted focusing on:

- User experience and familiarity with PC building.
- Common challenges and frustrations during the building or upgrading process.
- Features users find most useful in a PC-building tool (e.g., compatibility checker, AR preview).
- The level of guidance and visual assistance users expect from such an application.

Moreover, a single survey was used to capture feedback from a broad range of users instead of using dual perspectives, as the app primarily targets individual PC builders with varying expertise levels.

## User Study Survey

The user study for BuildMate was conducted using Google Forms, with a total of 34 participants responding to the survey. The participants represented a diverse range of experience levels, from complete beginners to experienced PC builders. The main objective of this survey was to gain a deeper understanding of users' experiences, motivations, and challenges when building or upgrading personal computers. Through this analysis, the study aimed to identify common pain points such as compatibility issues, budget limitations, and a lack of clear guidance. The findings play a crucial role in shaping BuildMate's design, ensuring that the application effectively simplifies the PC-building process while enhancing usability, engagement, and learning for users at all technical levels.

### ***Survey Questions***

1. Which of the following best describes your experience level with building or upgrading a Personal Computer (PC)? *[Multiple Choice]*
  - Novice (I have little to no technical knowledge and have never built one)
  - Beginner (I have some knowledge but need guidance)
  - Intermediate (I have successfully built/upgraded 1-2 PCs)
  - Expert (I am very comfortable building and troubleshooting multiple PCs)
  
2. What is your primary motivation for building or upgrading a PC? (Select all that apply) *[Checkboxes]*
  - Gaming Performance
  - Professional Work (e.g., video editing, 3D rendering)
  - Cost Savings
  - Learning / As a Hobby
  - Other:

3. What resources or tools do you currently use to learn about or plan PC builds? (Select all that apply) *[Checkboxes]*

- YouTube tutorials
- PCPartPicker or similar websites
- Reddit / Online communities
- Friends or experts
- Manufacturer websites
- Other:

4. How confident are you in choosing compatible components (e.g., CPU and Motherboard) for a PC build? (Please rate your confidence from 1 = Not at all confident to 5 = Very confident) *[Linear Scale]*

Not at all confident

- 1
- 2
- 3
- 4
- 5

Very confident

5. What do you consider a challenge when building or upgrading a PC? (Please select all that apply) *[Checkboxes]*

- Ensuring all components are compatible
- Choosing the best components for my budget
- Understanding performance differences (e.g., "Is this GPU good enough?")
- The physical assembly process
- Finding trustworthy information
- Other:

6. When planning a build, how important is it for you to see what other community members have built or to share your own build with others? (Please rate the importance from 1 = Not important at all to 5 = Very important) *[Linear Scale]*

Not important at all

- 1
- 2
- 3
- 4
- 5

Very important

7. If you have faced challenges during a build in the past, could you briefly describe what happened? *[Open-ended]*

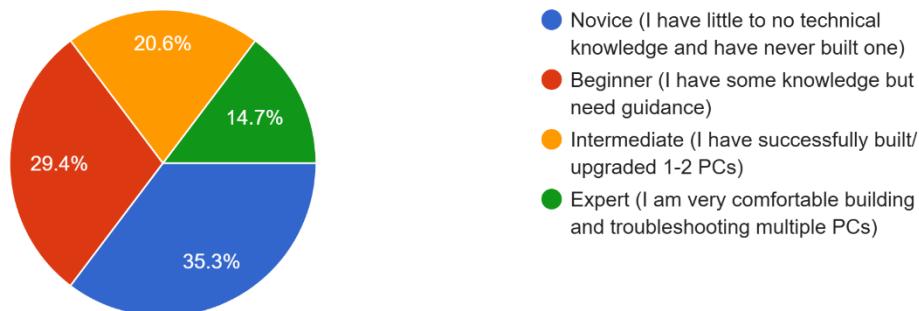
8. What is one feature you wish existed to make the PC building or upgrading process easier? *[Open-ended]*

## Data Visualization and Analysis

The following charts and summaries present key findings from the 34 participants, highlighting their experience levels, common difficulties, and desired features.

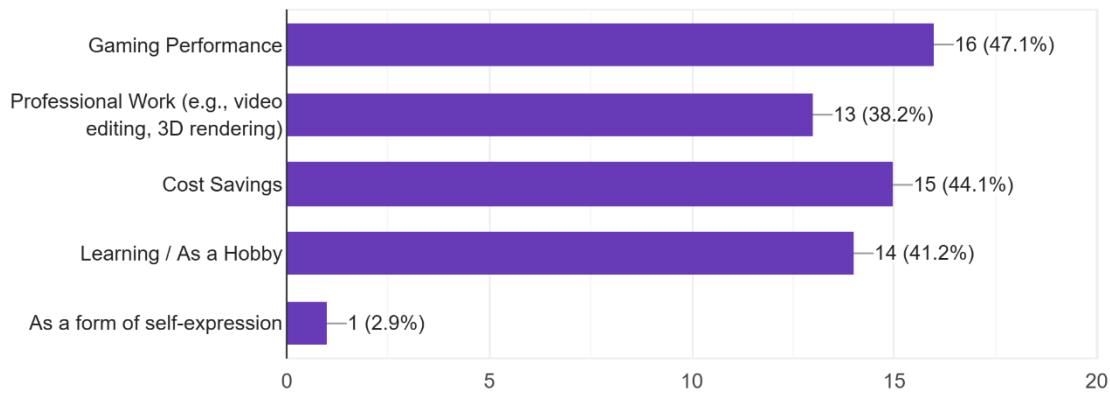
Which of the following best describes your experience level with building or upgrading a Personal Computer (PC)?

34 responses



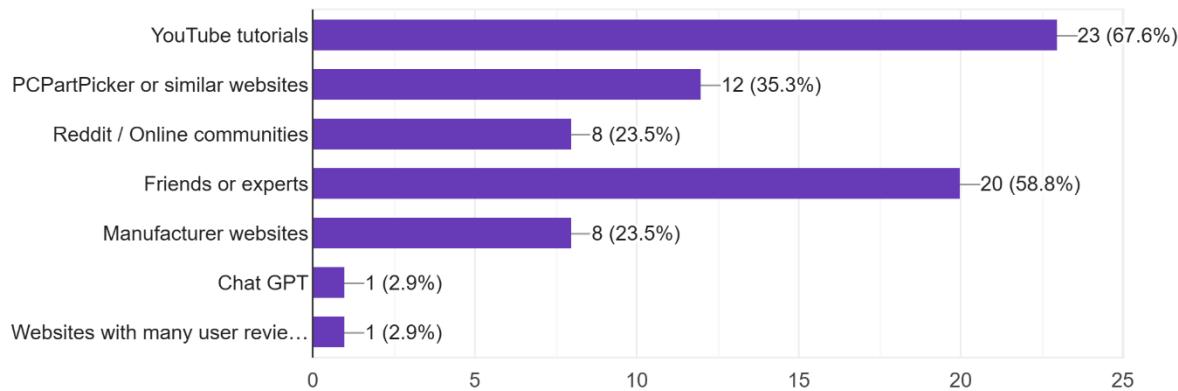
What is your primary motivation for building or upgrading a PC? (Select all that apply)

34 responses



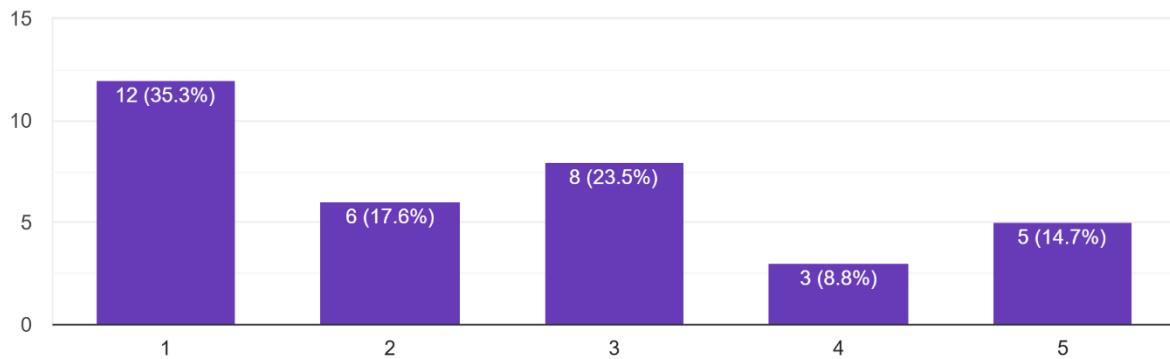
What resources or tools do you currently use to learn about or plan PC builds? (Select all that apply)

34 responses



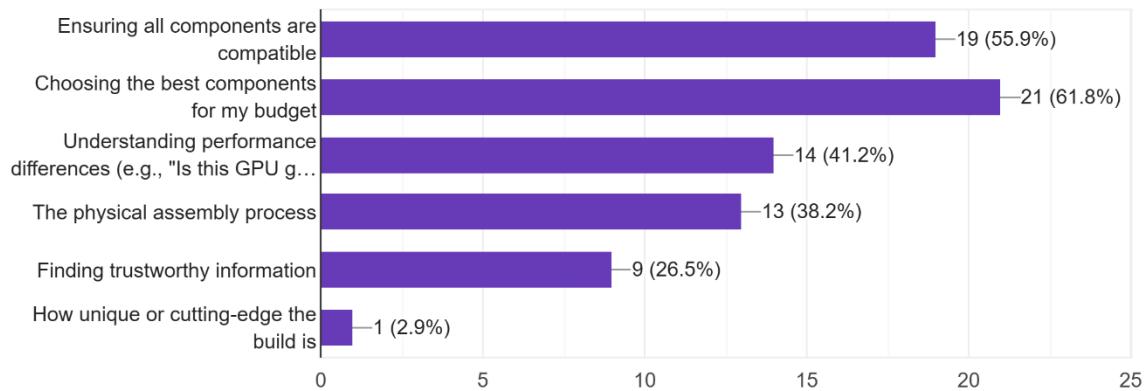
How confident are you in choosing compatible components (e.g., CPU and Motherboard) for a PC build? (Please rate your confidence from 1 = Not at all confident to 5 = Very confident)

34 responses

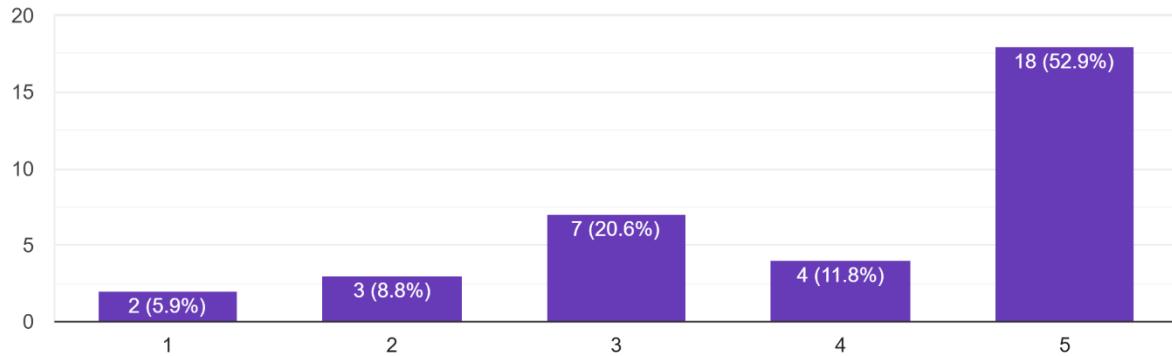


What do you consider a challenge when building or upgrading a PC? (Please select all that apply)

34 responses



When planning a build, how important is it for you to see what other community members have built or to share your own build with others? (Please rate...rom 1 = Not important at all to 5 = Very important)  
34 responses



If you have faced challenges during a build in the past, could you briefly describe what happened?

16 responses

I haven't built a computer

Parts are missing

Cable management took too long, and I wasn't sure how to improve airflow.

First time turning on :D

Compatibility issues

A very frequent issue is the PC failing to POST (Power-On Self-Test) because the RAM sticks are not properly seated in the motherboard slots, or they are installed in the wrong slots (not following the dual-channel configuration specified in the motherboard manual). Another common one is using RAM that is technically incompatible with the CPU or motherboard, often resulting in frustrating instability or a failure to boot entirely.

I didn't understand which components were compatible, like which CPU fits which motherboard.

What is one feature you wish existed to make the PC building or upgrading process easier?

19 responses

A real-time simulation that compares performance between different configurations.

A performance estimator that predicts gaming FPS or rendering speed.

check all parts are assembled correctly

All pieces connect themselves autonomously like a magnet

Step by step tutorial would be helpful

A centralized tool that tracks firmware and driver updates for all components.

having conventional connectors and compatibility details with the product

A step by step visual guide that shows exactly where and how to connect each part.

Amazon used to allow unconditional returns even for compatibility issues – it was awesome, but it disappeared as abuse increased. I'd love a similar insurance or support system.

## Data Analysis

The collected survey data was analyzed to understand user experience, preferences, and challenges in PC building. Basic statistics such as averages and percentages were used for numerical data. Open-ended answers were grouped into common themes to highlight user needs and suggestions.

### *Participants experience level*

Experience level	Count	Percentage
Novice	8	24%
Beginner	13	38%
Intermediate	7	21%
Expert	5	15%

Around 62% of participants identified as novice or beginner, demonstrating that a majority of BuildMate's target audience has limited PC-building experience.

This supports the need for a guided onboarding process, interactive tutorials, and in-app educational resources to assist users in selecting and assembling components confidently.

***Confidence in choosing compatible components (1-5 scale)***

Metric	Value
Mean	2.9
Median	3
Mode	3
Standard Deviation	1.1

The average confidence level of 2.9 indicates moderate uncertainty among users when selecting compatible components such as CPU–motherboard or RAM–GPU combinations. The relatively high standard deviation (1.1) suggests a wide variation in technical confidence.

***Importance of viewing/sharing community builds (1-5 scale)***

Metric	Value
Mean	3.6
Median	4
Mode	4

A large portion of respondents rated this feature as important, demonstrating enthusiasm for community engagement.

***Major challenges identified (multiple choice)***

Challenge	Percentage
Ensuring component compatibility	64%
Choosing components within budget	52%
Understanding technical specifications	46%
Assembling physical components	27%
Other	9%

According to over two-thirds of participants, the biggest problem was making sure the parts were compatible, which was followed by financial limitations and technical complexity.

### ***Learning resources used (multiple choice)***

Resource	Percentage
YouTube tutorials	68%
Friends or experts	59%
PCPartPicker or similar websites	35%
Manufacturer websites	24%
Reddit / Online communities	24%
Other	6%

The most popular learning resources are YouTube tutorials and recommendations from friends or professionals, indicating that users mainly rely on visual and social learning. Popular websites for checking compatibility and specifications are PCPartPicker and manufacturer sites. There is growing interest in new learning resources, as shown by the few users who picked up AI tools or review-based websites.

### ***Qualitative insights (from open ended responses)***

Theme	Frequency	Example response
Compatibility issues	12	My CPU didn't fit the motherboard socket.
Budget	9	Couldn't find good parts that match my budget.
Lack of guidance	7	I wish there was a guided checklist or compatibility checker.
Visualization needs	5	It would be helpful to see a 3D model of my build.

Participants consistently emphasized the importance of guided visualization, budget optimization, and compatibility assurance. These findings suggest that users expect a more guided, visual, and informative PC-building experience rather than a purely technical interface, aligning closely with the quantitative results.

## **Insights from the Results**

### ***Key user insights***

- Most users are beginners: 62% of participants identified as novice or beginner, indicating the need for an easy, guided onboarding experience.
- Moderate confidence in compatibility: An average confidence score of 2.9 shows that users often feel unsure about selecting compatible parts, highlighting the importance of real-time compatibility checking and smart recommendations.
- High interest in community interaction: With a mean score of 3.6 for community features, users value sharing and exploring other builds suggesting social or collaborative functions would enhance engagement.
- Compatibility and budget are top challenges: 64% struggled with compatibility and 52% with budget control.
- YouTube and peers dominate learning: 68% of users rely on YouTube and 59% on friends or experts, showing a preference for visual and social learning resources.

### ***Requirement implications for BuildMate***

- Introduce a guided system for new users, providing interactive tutorials and tooltips.
- Implement a real-time compatibility validation engine for component selection.
- Add a budget planner and recommendation engine that suggests parts within price limits.
- Integrate community features such as build sharing, commenting, and following others' configurations.
- Incorporate visual build representation to enhance understanding and engagement.

## Requirements Generation

### Personas and Scenarios

Based on our survey data and the key insights, we developed six personas. The following section details these six personas, authored by Ruon Kitahara (4) and Eranda Hettiarachchilage (2).

#### ***Persona 1: Alex***

Profile:

- Age: 19
- Occupation: University Student
- Experience Level: Novice (I have little to no technical knowledge)
- Motivation: Gaming Performance, Cost Savings
- Challenges: "Ensuring all components are compatible", "Choosing the best components for my budget"
- Confidence: 1/5 (Not at all confident)

Scenario: Building a First PC

1. Alex downloads BuildMate after a friend recommends it.
2. He opens the app and is greeted with a "Guided Mode" for beginners
3. He inputs his total budget: \$1,000. The app displays a budget tracker at the top of the screen
4. The app guides him to select a CPU first. He selects one.
5. When he moves to the Motherboard section, BuildMate automatically filters the list to show only compatible motherboards.
6. He confidently selects a motherboard and RAM. The app provides a green checkmark icon, confirming 100% compatibility
7. He uses the "Performance Simulation" to see the estimated FPS for Fortnite at high settings, confirming his build meets his gaming goals.
8. Alex completes his part list, staying \$20 under budget, and exports the list to purchase the parts. He feels accomplished and confident.

#### ***Persona 2: Sarah***

Profile:

- Age: 24
- Occupation: Junior Content Creator (Video)
- Experience Level: Beginner (I have some knowledge but need guidance)
- Motivation: Professional Work (video editing)
- Resources: YouTube tutorials, Friends
- Challenges: "The physical assembly process," "Understanding performance differences."

## Scenario: Upgrading for Performance

1. Sarah needs to upgrade her PC for 4K video rendering. She uses BuildMate to import her current parts list.
2. She explores new GPUs. The app's "Performance Simulation" shows her how much faster a new GPU will render her Adobe Premiere projects compared to her old one.
3. She finds a powerful GPU but isn't sure if her power supply (PSU) can handle it. BuildMate automatically flags the incompatibility and suggests a compatible PSU upgrade.
4. Before buying, Sarah uses the "Virtual Builder" (a drag-and-drop interface) to practice installing the new GPU and PSU, which eases her anxiety about the physical assembly.
5. She also uses the AR Preview to check if the new, larger PC case she wants will fit on her small desk.
6. Confident in her choices and the assembly steps, she purchases the components.

## ***Persona 3: Kenji***

Profile:

- Age: 32
- Occupation: IT Technician
- Experience Level: Expert (I am very comfortable building and troubleshooting multiple PCs)
- Motivation: As a Hobby, Self-expression
- Resources: PCPartPicker, Reddit
- Confidence: 5/5 (Very confident)

## Scenario: Sharing a High-End Build

1. Kenji has just finished a custom liquid-cooled build. He logs into BuildMate and navigates to the "Community Hub".
2. He creates a new post, uploading photos and linking all the components from the BuildMate database.
3. His build is featured on the main community page, and he receives comments from other Expert users and questions from Novice users (Persona 1).
4. He browses other builds, filtering by "Expert" and "Water-Cooled."
5. He sees a build from Sarah (Persona 2) asking for advice on her video editing upgrade. He leaves a comment suggesting a specific RAM configuration.
6. Kenji feels engaged in a community of peers, fulfilling his motivation for "self-expression" and hobbyist interaction.

### ***Persona 4: David***

Profile:

- Age: 28
- Occupation: Accountant
- Experience Level: Intermediate (I've built or upgraded once)
- Motivation: Gaming Performance
- Resources: PCPartPicker, YouTube
- Challenges: "Ensuring all components are compatible", "Finding trustworthy information."

Scenario: A Mid-Life Upgrade

1. David wants to play the latest Call of Duty but his PC is too slow. He opens BuildMate, where he has his original build saved.
2. He clicks the "Upgrade Recommendation" button.
3. The app scans his components (CPU, Motherboard, PSU) and suggests three modern GPUs that are 100% compatible with his existing setup
4. The app also warns him that one of the GPUs will be "bottlenecked" by his older CPU, helping him understand the "Performance differences".
5. He chooses a mid-range GPU that balances performance and cost.
6. He feels confident he is making the right purchase and won't have to return a part that doesn't work.

### ***Persona 5: Mia Patel***

Profile:

- Age: 22
- Occupation: Graphic Design Student
- Experience Level: Beginner
- Motivation: Smooth creative workflow, long-term performance on a student budget
- Resources Used: YouTube, ChatGPT, Friends
- Challenges: "I get confused about which parts actually work together" and "I don't want to overspend on something unnecessary."
- Confidence: 2/5

Scenario: Building a Design Workstation on a Budget

1. Mia decides to build her first PC for graphic design projects. She installs BuildMate after watching a short tutorial on YouTube.
2. She begins with the Budget Mode, setting her maximum spend at \$900.
3. Engine generates a balanced part list optimized for Adobe tools and 3D rendering speed.

4. Mia clicks “Explain My Build,” which shows easy to understand justifications for each component.
5. When she swaps a GPU, the compatibility checker automatically updates PSU requirements.
6. She views a 3D model preview of her case to ensure all parts fit visually
7. She saves her configuration, exports the list, and shares it with classmates through the community hub for feedback.
8. She appreciates that BuildMate turned what felt like a “techie task” into an intuitive guided experience.

### ***Persona 6: Nipun Maitipe***

Profile:

- Age: 26
- Occupation: Entry Level Engineer
- Experience Level: Intermediate
- Motivation: Balancing performance and cost efficiency for both work and gaming
- Resources Used: Reddit / Online Forums, Manufacturer Sites, PCPartPicker
- Challenges: “There’s too much conflicting information online,” “I want performance proof before spending.”
- Confidence: 3/5

Scenario: Planning a Balanced Performance Build

1. Nipun opens BuildMate to plan a workstation that can handle CAD design and casual gaming.
2. Using the Advanced Mode, he inputs target workloads “3D modeling” and “AAA gaming.”
3. BuildMate generates three balanced configurations with clear benchmarks.
4. The app’s Performance Simulator shows expected FPS and rendering times for his preferred software, helping him make data driven choices.
5. Unsure about cooling requirements, nipun uses the Community Q&A feature to ask experts.
6. He adjusts his build accordingly and uploads it as “Work + Play Setup,” asking community feedback.
7. Nipun completes his purchase confident that his system is efficient, future-proof, and validated by peers.

## Requirements Generated by Designers

Based on the personas and our creative vision for BuildMate, we generated the following requirements that complement the direct findings from the survey.

- (D-1) Guided Onboarding: A step-by-step "Wizard" or "Guided Mode" must exist for Novice personas like Alex, completely hiding the complexity of the full database.
- (D-2) Visual Build Interface: A primary feature must be a "drag-and-drop" visual builder that simulates the physical assembly process, not just a text-based list.
- (D-3) Robust Community Hub: The app must support more than just sharing; it needs commenting, user profiles, and filtering to build a true community.
- (D-4) AR Visualization: To help users like Sarah, an AR preview feature is necessary to visualize the physical footprint of components (especially PC cases).
- (D-5) Performance Simulation: The app must provide estimated performance metrics (e.g., FPS) to help users understand the value of their components, not just the compatibility.
- (D-6) Import/Save Builds: Users must be able to save their build or import existing builds to plan upgrades.

## Synthesis: Final Prioritized Requirements List

This definitive list combines the insights from Requirements Gathering and Requirements Generation and is prioritized into Must Have, Should Have, and Could Have.

### Functional Requirements (FR)

ID	Requirement	Description	Priority
FR-1	Real-Time Compatibility Engine	The system must automatically check component compatibility (CPU-Mobo, RAM-Mobo, PSU-GPU) and provide instant visual warnings.	MUST HAVE
FR-2	Budget/Price Tracker	The system must track the total cost of components in real-time against a user-defined budget.	MUST HAVE
FR-3	Core Component Database	The system must have a searchable database of core PC parts (CPU, GPU, Mobo, RAM, PSU, Storage, Case).	MUST HAVE

FR-4	Community Build Sharing	The system should allow users to create profiles, publish their builds (with photos/parts list), and comment on other builds.	SHOULD HAVE
FR-5	Visual Drag-and-Drop Builder	The system should provide a visual representation of a motherboard/case where users can drag and drop components.	SHOULD HAVE
FR-6	Performance Simulation	The system should provide estimated performance metrics (e.g., FPS, render time) for a build.	SHOULD HAVE
FR-7	Saved Build / Upgrade Path	The system should allow users to save their builds and import them for future upgrade analysis.	SHOULD HAVE
FR-8	Augmented Reality (AR) Preview	The system could allow users to visualize their PC case in their physical space using a smartphone camera.	COULD HAVE

### Non-Functional Requirements (NFR)

ID	Requirement	Description	Priority
NFR-1	Usability	The UI must be extremely simple, clean, and provide tooltips or a "Guided Mode" for first-time users.	MUST HAVE
NFR-2	Data Accuracy	The component database (compatibility, price)	MUST HAVE

		must be accurate and regularly updated.	
NFR-3	Performance	The app interface must be fast and responsive, especially the real-time compatibility checks.	MUST HAVE
NFR-4	Aesthetics	The app's visual design should be modern, clean, and engaging, appealing to a gamer/enthusiast audience.	SHOULD HAVE

## AI Usage

This section outlines the AI tools used to support the development of the BuildMate prototype. It shows the specific purpose of each tool and highlights how the team added value beyond the AI outputs.

AI Tool Name	Version, Account Type	Specific feature for which the AI tool was used
Gemini/ Chat GPT	Free Account	Persona Generation Support, Language & Tone refinement, and Translation

### Value Addition

AI was used as a creative accelerator and a refinement tool, not as the primary source of requirements.

- Persona Generation: While AI helped brainstorm initial scenarios and names, the core attributes, motivations, and challenges of all six personas were manually derived by the team directly from the survey data and the Key Insights. We (the designers) ensured the personas reflected real user data, not AI fiction.
- Requirements Definition: The AI did not define the requirements. We (the designers) created the initial lists (FR/NFR) based on our synthesis of the survey insights and persona needs. AI was then used after this core work was complete to check for clarity and professional language, ensuring the final requirements were unambiguous for the prototyping phase.

## Work Date/Hours Logs

Student: Eranda		
Date	Number of Hours	Description
Sep 25, 2025	0.5	Discuss project ideas with instructor
Sep 28, 2025	0.1	Select a project idea with team
Oct 03, 2025	2	Start writing project proposal
Oct 04, 2025	3	Continue with proposal and created Git repo
Oct 05, 2025	2	Complete proposal and compile all content and docs.
Oct 10, 2025	1	Conducted market research to identify competitive apps.
Oct 11, 2025	2	Explored Figma and reviewed my previous design drafts.
Oct 18, 2025	1	Discussed survey planning with Roun and we decided to design questions individually and combine into one.
Oct 19, 2025	2	Looked at our competitive apps to make our survey questions more accurate.
Oct 24, 2025	2.5	Had a team meeting to finalize survey questions and completed progress report.
Oct 29, 2025	2	Created required document and wrote the introduction section. Published the survey.
Oct 30, 2025	4	Received 34 responses from our friends, and community members. Completed data visualization and analysis.
Nov 2, 2025	2	Wrote personas and reviewed the document for any corrections.

Student: Ruon		
Date	Number of Hours	Description
Sep 25, 2025	0.5	Discuss project ideas with instructor
Sep 28, 2025	0.1	Select a project idea with team
Oct 03, 2025	2	Start writing project proposal
Oct 04, 2025	2	Write PACT Framework and Value Proposition
Oct 05, 2025	4	Write Background Research and review the entire Project Proposal to ensure completeness, accuracy, and readiness for submission.
Oct 15, 2025	1.5	Review project proposal and slides on Requirements Gathering to plan the next steps and define survey objectives.
Oct 18, 2025	1	Team meeting with Eranda to brainstorm survey ideas and assign individual drafting tasks.
Oct 21, 2025	2	Draft and refine questions based on my individual tasks.
Oct 22, 2025	1	Compile my draft questions.
Oct 24, 2025	2	Team meeting with Eranda to finalize the complete survey draft. Work on Progress report as well.
Oct 27, 2025	0.5	Send the survey to the professor requesting feedback.
Oct 29, 2025	1	Modify and finalize the survey based on the feedback, and publish the Google Forms survey.
Oct 30, 2025	2	Create a Japanese version of the survey to expand reach. Distribute both English and Japanese survey links to 20 friends and receive 34 responses in total.

Nov 01, 2025	4	Review the Key Insights analyzed and provided by Eranda. Begin drafting 4 personas with detailed scenarios based on these insights.
Nov 02, 2025	4	Completed drafting the Requirements Generated by Designers and the Synthesis: Final Prioritized Requirements List.

## Appendix

Prompt 1: "Translate the following survey questions into natural-sounding Japanese, not a literal translation."

Prompt 2: "Based on this survey data, give me a name and a brief 3-bullet profile for a 'Novice Gamer' persona who is a student."

Prompt 3: "Review this persona story for clarity, following the narrative example from the file."

Prompt 4: "I have a list of functional and non-functional requirements. Rephrase this to be more professional."

Prompt 5: "I have categorized my requirements based on my survey insights. Can you review my prioritization list and check if it seems logical and consistent with the insights I'm providing?"

Prompt 6: "Check the grammar and modify sentences into professional one."