**Preliminary Data Features for PC Recommendation System:**

Components included: cpu, gpu, ram, storage, motherboard, psu, and case. (cooler?)

Compatability

**Motherboard and CPU: Determine through cpu socket type (am4, lg1700, ..)**

**Motherboard and GPU: Form factor of motherboard & Length of GPU:**

Form Factor | Length

Mini ITX: | 170 - 190mm

DTX: | 170 - 190mm

Micro ATX: | 200 - 220mm

ATX: | 250 - 270mm

EATX: | 250 - 270mm

**Motherboard and RAM : Max memory supported and max slots from motherboard and memory\_size, num of modules, and speed\_mhz**

**Motherboard and Case: Form factor of motherboard and case (atx / microatx)**

**Motherboard and Powersupply: Form factor of motherboard and power supply**

**Motherboard and Storage: check if motherboard has m.2 slots (if yes recommend m.2 , if no then recommend 2.5 or 3.5 hard disk**

Motherboard | Power supply

Mini ITX: | SFX (Small form factor extended)

DTX: | SFX (Small form factor extended)

Micro ATX: | SFX or ATX

ATX: | ATX (Advanced technology extended)

EATX: | ATX (Advanced technology extended)

Bottlenecks

For CPU and GPU:

if (cpu\_core\_clock <= gpu\_core\_clock <= cpu\_boost\_clock) and (gpu\_vram >= target\_vram):

balanced\_combinations.append((cpu, gpu))

For RAM:   
(cpu\_core\_clock <= gpu\_core\_clock <= cpu\_boost\_clock) and

(ram\_speed >= cpu\_core\_clock and ram\_speed >= gpu\_core\_clock)

Gpu\_core\_clock / 1000 #Mhz to Ghz

Performance Metrics

CPU: coreclock + boostclock + cores / 3

GPU: coreclock + boostclock + vram / 3

RAM

Motherboard

Case

Storage

PSU

Gaming CPU:

Core Count: 6 to 8 cores.

Core Clock: Above 3.5 GHz.

TDP: Moderate (65W to 105W).

Graphics: Discrete GPU is usually used.

SMT: Optional but can be beneficial for multitasking.

If core clock not hit requirement, Check if boost clock exist, if so check if boost above 3.5

Content Creation CPU:

Core Count: 8 cores or more.

Core Clock: Above 3.5 GHz.

TDP: Can be moderate to higher (e.g., 105W).

Graphics: Discrete GPU is usually preferred.

SMT: Beneficial for multitasking and rendering.

General Use CPU:

Core Count: 4 to 6 cores.

Core Clock: Above 3.0 GHz.

TDP: Lower (around 65W) for energy efficiency.

Graphics: Integrated graphics are useful.

SMT: Enhances multitasking capabilities.

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Gaming GPU:

VRAM: 4GB or more for modern gaming, with higher resolutions and settings requiring more.

Core Clock: Above 1,500 MHz for solid gaming performance.

Boost Clock: Crucial for smoother and consistent gaming frame rates.

Content Creation GPU:

VRAM: 8GB or more for handling large files and high-resolution content.

Core Clock: Higher core clock speeds reduce rendering times for content creation tasks.

Boost Clock: Faster render times and smoother workflow during content creation.

General Use GPU:

VRAM: 2GB to 4GB is sufficient for everyday tasks like web browsing, office work, and multimedia playback.

Core Clock: Adequate for general tasks (1,000 MHz to 1,500 MHz).

Boost Clock: Not critical for general use but can improve overall performance.

General  
**Name:** Manufacturer/Model of a component. Distinguishes between different versions or variations of components from the same or different brand.

**Price:** The price of the component. A higher-priced component can affect the overall budget available for other components.

CPU

**Core Clock Speed (GHz):** The base clock speed of the CPU. A higher core clock can result in better single-threaded performance, but it also affects power consumption and heat generation.

**Boost Clock Speed (GHz):** The maximum clock speed the CPU can achieve under load. A higher boost clock indicates better performance potential, especially for tasks that require burst performance.

**Cores:** The number of processing cores in the CPU. More cores generally lead to better multi-threaded performance, especially in tasks that can utilize multiple cores.

**Integrated Graphics:** Indicates whether the CPU has integrated graphics. CPUs with integrated graphics can save costs by not requiring a separate graphics card, but they have lower graphics performance.

**TDP (Thermal Design Power):** The amount of power the CPU is designed to consume and dissipate as heat. TDP affects the choice of cooling solution and power supply.

**SMT (Simultaneous Multi-Threading):** Indicates whether the CPU supports SMT (Hyper-Threading for Intel). SMT allows each physical core to handle multiple threads, improving multi-tasking performance.

**Performance Metrics:** Clock Speed \* Cores / Price

GPU

**Core Clock Speed (GHz)**: The base clock speed of the GPU. A higher core clock can lead to better performance, but it also affects power consumption and heat generation.

**Boost Clock Speed (GHz):** The maximum clock speed the GPU can achieve under load. A higher boost clock generally indicates better performance potential, but it also affects power and heat.

**Chipset:** The chipset or GPU architecture. This information can influence compatibility with other components, especially the motherboard.

**Graphics VRAM (GB)**: The amount of onboard memory (VRAM) of the GPU. More memory can allow for better performance, especially at higher resolutions and in memory-intensive tasks.

**Performance Metrics:** Clock Speed \* CUDA Cores / Price

RAM

**Memory Size:** The total memory capacity of the RAM kit, measured in gigabytes (GB). Larger memory sizes are beneficial for multitasking and memory-hungry applications.

**Speed (MHz):** The clock speed at which the RAM operates, measured in megahertz (MHz). Higher RAM speeds can lead to improved performance in memory-intensive tasks.

**DDR Type:** Indicates the generation of DDR (Double Data Rate) technology used by the RAM (e.g., DDR3, DDR4, DDR5). Different DDR types offer varying levels of performance and efficiency.

**Number of Modules:** The number of individual RAM modules included in the kit. This affects the number of available RAM slots on the motherboard required for installation.

**First Word Latency:** The latency between the initiation of a read operation and the start of data delivery. Lower latency values can result in snappier system responsiveness.

**CAS Latency:** The Column Address Strobe (CAS) latency, which represents the number of clock cycles between the memory controller requesting data and the actual data being available. Lower CAS latency values indicate quicker data access.

STORAGE

**Storage Type:** The type of storage drive, such as SSD (Solid State Drive) or HDD (Hard Disk Drive). SSDs offer faster data access compared to HDDs (5400, 7200).

**Capacity:** The total storage capacity of the drive, typically measured in gigabytes (GB) or terabytes (TB). The capacity affects the amount of data the drive can store.

**Form Factor:** The physical size and shape of the storage drive, such as M.2 or 3.5-inch. Form factor compatibility with the motherboard is crucial for proper installation.

**Interface:** The connection interface used by the drive to communicate with the motherboard, such as SATA or PCIe. The interface affects data transfer speeds and compatibility.

PSU

**PSU Wattage (W):** The PSU's maximum power output in watts. It should provide enough power for all components while allowing headroom for future upgrades.

**PSU Type:** The PSU type, such as ATX. It determines the physical size and compatibility with cases.

**Modular:** Indicates whether the PSU is modular (cables can be detached) or non-modular (cables are fixed). Modular PSUs offer cleaner cable management.

**Efficiency:** The PSU's energy efficiency rating, often indicated by certifications like Bronze, Silver, Gold, etc. A higher efficiency rating reduces energy waste.

MOTHERBOARD

**Motherboard Form Factor**: The physical size and layout of the motherboard. It affects the case compatibility and available expansion slots.

**Memory Slot:** The number of slots available for RAM modules. It affects the total memory capacity and potential upgrades.

**Max Memory:** The maximum amount of RAM the motherboard can support. It influences the system's potential memory capacity.

**CPU Socket:** The type of CPU socket on the motherboard. It determines which CPUs are compatible with the motherboard.

CASE

**Type:** The type of PC case, such as ATX Mid Tower. It determines the case's size, shape, and compatibility with components.

**PSU:** Indicates whether the case includes a power supply unit (PSU) or not. If it includes a PSU, it's important to consider the PSU's wattage and efficiency.

**External 5.25" Bays:** The number of external 5.25-inch drive bays. These bays can accommodate optical drives or other devices.

**Internal 3.5" Bays:** The number of internal 3.5-inch drive bays. These bays are used for mounting hard drives or SSDs.

CPU COOLER

**RPM:** The range of revolutions per minute (RPM) at which the cooler's fans operate. It affects the cooling performance and noise level of the cooler.

**Noise Level:** The range of noise levels produced by the cooler, measured in decibels (dB). It determines how quiet or noisy the cooler is during operation.

**Size:** The size of the CPU cooler, often represented as the size of the radiator in millimeters (mm) for liquid coolers. Size affects compatibility with the case and the clearance around other components.