Project: Internal Components Exploration

Objective:
Students will demonstrate their understanding of internal computing components by researching, designing, and presenting a functional computer system based on given specifications.

Project Steps:

Phase 1: Research & Component Selection

1. Will work in groups of two.
2. Each group is assigned a specific type of user (e.g., casual home user, gaming enthusiast, video editor, office worker, etc.).
3. Students will research and select the appropriate internal components (CPU, RAM, storage, GPU, motherboard, power supply, etc.) based on their assigned user type.

Phase 2: Visual Representation

4. **Create a labeled diagram** (hand-drawn or digital) of their proposed computer, showing where each component fits inside the system.
5. They must include:
   o **Motherboard** (brand and model)
   o **CPU** (brand, model, clock speed, cores, 32/64-bit)
   o **RAM** (amount, type, speed)
   o **Storage** (HDD or SSD? Capacity?)
   o **GPU** (if applicable)
   o **Cooling System** (air or liquid?)
   o **Power Supply** (wattage)

Phase 3: Justification & Presentation

6. **Each group presents their build** to the class, explaining:
   o Why they chose each component
   o How their choices benefit their assigned user type
   o The cost vs. performance considerations
7. Dr. Russell will challenge their choices by asking questions like:
   o "Why did you choose an SSD instead of an HDD?"
   o "Would this build support future upgrades?"
   o "How would cooling affect this build's performance?"

Additional Bonus Activities:

- **Budget Challenge:** Give each group a budget, and they must optimize their build while staying within cost limits.
- **Troubleshooting Scenario:** Provide a scenario where a component fails, and students must propose a fix.

Deliverables:

- **Diagram** (labeled)
- **Component List** (with explanations)
- **Presentation (5-10 minutes)**

Grading Criteria:

- Accuracy of research (20%)
- Completeness of the diagram (20%)
- Justification of choices (20%)
- Presentation skills (20%)
- Creativity and engagement (20%)

Additional Information to help you along…

Casual User (Basic Home Use)

- **Motherboard:** Mid-range motherboard (e.g., ASUS Prime B560M-A)
- **CPU:** Intel Core i3-12100 (4 cores, 8 threads, 3.3GHz, 64-bit) or AMD Ryzen 3 5300G
- **RAM:** 8GB DDR4 (2666MHz or higher)
- **Storage:** 500GB SSD (for fast boot times and application launching)
- **GPU:** Integrated graphics (Intel UHD Graphics or AMD Radeon Vega)
- **Cooling System:** Stock air cooling
- **Power Supply:** 400W 80+ Bronze

Justification:

- Budget-friendly, enough for web browsing, office tasks, and media consumption.
- SSD ensures fast responsiveness.
- No discrete GPU needed as integrated graphics can handle casual needs.
- Low power consumption.

Gaming Enthusiast

- **Motherboard:** High-performance gaming motherboard (e.g., MSI MAG B550 TOMAHAWK)
- **CPU:** AMD Ryzen 7 7800X (8 cores, 16 threads, 4.2GHz, 64-bit) or Intel Core i7-13700K
- **RAM:** 32GB DDR5 (6000MHz)
- **Storage:** 1TB NVMe SSD (fast game loading) + optional 2TB HDD (for extra storage)
- **GPU:** NVIDIA RTX 4070 Ti or AMD Radeon RX 7900 XT
- **Cooling System:** High-performance air cooling or AIO liquid cooling
- **Power Supply:** 750W 80+ Gold

Justification:

- High clock speed and multiple cores for gaming performance.
- 32GB RAM allows smooth multitasking and gaming.
- Dedicated GPU for high FPS at 1440p or 4K resolution.
- SSD ensures fast game loading, while HDD provides storage for larger files.
- Strong cooling is needed due to high power usage.

Video Editor

- **Motherboard:** Workstation-class motherboard (e.g., ASUS ProArt X670E-Creator)
- **CPU:** Intel Core i9-14900K (24 cores, 32 threads, 3.2GHz base, 64-bit) or AMD Ryzen 9 7950X
- **RAM:** 64GB DDR5 (6000MHz)
- **Storage:** 2TB NVMe SSD (for fast read/write speeds) + 4TB HDD (for project storage)
- **GPU:** NVIDIA RTX 4080 or AMD Radeon Pro W6800
- **Cooling System:** High-end liquid cooling system (to handle CPU-intensive tasks)
- **Power Supply:** 850W 80+ Platinum

Justification:

- Multi-core CPU speeds up rendering and editing tasks.
- High RAM ensures smooth workflow in Adobe Premiere Pro, DaVinci Resolve, etc.
- Large, fast storage to accommodate 4K/8K video files.
- High-end GPU accelerates rendering and playback.
- Efficient cooling is critical for stability under load.

Office Worker

- **Motherboard:** Basic reliable motherboard (e.g., Gigabyte B560M DS3H)
- **CPU:** Intel Core i5-12400 (6 cores, 12 threads, 2.5GHz, 64-bit) or AMD Ryzen 5 5600G
- **RAM:** 16GB DDR4 (3200MHz)
- **Storage:** 1TB SSD (for fast file access)
- **GPU:** Integrated graphics (Intel UHD 730 or Radeon Vega)
- **Cooling System:** Stock air cooling
- **Power Supply:** 500W 80+ Bronze

Justification:

- Balanced performance for office applications, spreadsheets, and conferencing.
- 16GB RAM ensures smooth multitasking.
- SSD allows quick startup and application responsiveness.
- Low power consumption and minimal heat generation.

Component	Casual User	Gaming Enthusiast	Video Editor	Office Worker
Motherboard	Mid-range	High-end gaming	Workstation	Budget-friendly
CPU	Intel i3 / Ryzen 3	Intel i7 / Ryzen 7	Intel i9 / Ryzen 9	Intel i5 / Ryzen 5
RAM	8GB DDR4	32GB DDR5	64GB DDR5	16GB DDR4
Storage	500GB SSD	1TB NVMe + 2TB HDD	2TB NVMe + 4TB HDD	1TB SSD
GPU	Integrated	RTX 4070 TI	RTX 4080	Integrated
Cooling	Stock air	High end air or liquid	Liquid cooling	Stock air
Power Supply	400W	750W	850W	500W