# Ahmad Ali Ahmad Othman - Section 1 - Assignment 1

## Suggested PC Build

### 1. **Processor (CPU)**: **AMD Ryzen 5 5600X**

* **Description**: The Ryzen 5 5600X is a 6-core, 12-thread processor known for its high performance in gaming and light content creation, making it ideal for most users without overspending.
* **Specifications**:
  + Cores/Threads: 6/12
  + Clock Speed: Up to 4.6 GHz
  + Power Draw: 65W
* **Importance**: The CPU acts as the computer’s “brain,” executing instructions for all processes, from game logic to data processing. The multi-core setup handles modern gaming requirements, providing smooth performance across tasks.
* [Product Link](https://computecheg.com/en/product/cpu-amd-ryzen-5-5600/?gad_source=1&gclid=CjwKCAjwyfe4BhAWEiwAkIL8sKKjciV60X0kvFO4wlexO99gQQs4flPf4ETHG739L3pbuxZ15jx4XhoCELYQAvD_BwE)

### 2. **Graphics Card (GPU)**: **NVIDIA GeForce RTX 3060**

* **Description**: The RTX 3060 balances excellent gaming performance with support for ray tracing and DLSS, which enhance graphical detail and frame rates.
* **Specifications**:
  + VRAM: 12GB GDDR6
  + Core Clock: 1.32 GHz (boost up to 1.78 GHz)
  + Ray Tracing and DLSS support
* **Importance**: The GPU handles rendering tasks, transforming data into visuals on-screen. The RTX 3060 provides high-quality graphics and supports advanced features like ray tracing for realistic lighting in games.
* [Product Link](https://www.sigma-computer.com/item?id=2826)

### 3. **Motherboard**: **MSI B450 Tomahawk Max**

* **Description**: A robust B450 motherboard that offers stability and multiple connectivity options. It supports Ryzen CPUs and fast RAM for gaming performance.
* **Specifications**:
  + Socket: AM4
  + RAM Slots: 4 (up to 128GB)
  + Expansion Slots: PCIe 3.0 x16, PCIe x1
* **Importance**: The motherboard interconnects all hardware, allowing components to communicate effectively. This model supports future upgrades, offering flexibility and a stable platform.
* [Product Link](https://www.sigma-computer.com/item?id=1115)

### 4. **Memory (RAM)**: **Corsair Vengeance LPX 16GB (2x8GB) DDR4-3200**

* **Description**: A dual-channel 16GB RAM kit optimized for gaming and multi-tasking. The 3200 MHz speed complements the Ryzen CPU.
* **Specifications**:
  + Capacity: 16GB (2x8GB)
  + Speed: 3200 MHz
  + Latency: CL16
* **Importance**: RAM temporarily stores active data for quick access by the CPU and GPU, directly impacting system responsiveness and multitasking.
* [Product Link](https://www.sigma-computer.com/item?id=1527)

### 5. **Storage**: **Crucial P3 1TB NVMe SSD**

* **Description**: A high-speed NVMe SSD that offers ample space and rapid read/write speeds for quick load times.
* **Specifications**:
  + Type: NVMe SSD
  + Capacity: 1TB
  + Read/Write Speeds: Up to 3500 MB/s
* **Importance**: Storage is essential for saving data. NVMe SSDs reduce load times, speeding up system boot-up and gameplay loading.
* [Product Link](https://www.sigma-computer.com/item?id=4917&name=Crucial_P3_1TB_M.2_PCIe_Gen3_NVMe_Internal_SSD_-_Up_to_3500MB/s)

### 6. **Power Supply Unit (PSU)**: **EVGA 600 W1, 80+ White 600W**

* **Description**: A 600W PSU with an 80+ White efficiency rating, providing stable power delivery for all components.
* **Specifications**:
  + Wattage: 600W
  + Efficiency Rating: 80+ White
  + Cables: Fully sleeved
* **Importance**: The PSU powers all components, converting AC to DC while ensuring stable voltage to prevent hardware damage.
* [Product Link](https://www.amazon.com/EVGA-Certified-100-W1-0600-K1-Power-Supply/dp/B0160XJAQK)

### 7. **Case (Chassis)**: **NZXT H510**

* **Description**: A mid-tower case with efficient airflow, a minimalist design, and two pre-installed fans.
* **Specifications**:
  + Form Factor: ATX mid-tower
  + Pre-installed Fans: 2
  + Front I/O Ports: USB 3.1, USB-C, Audio
* **Importance**: The case houses all components and aids cooling. Good airflow is crucial for maintaining stable temperatures.
* [Product Link](https://sigma-computer.com/item?id=2605)

### 8. **Cooling System**: **Cooler Master Hyper 212**

* **Description**: An efficient air cooler that improves thermal performance compared to the stock cooler.
* **Specifications**:
  + Type: Air cooler
  + Fan Speed: 600-2000 RPM
  + Compatibility: AM4, LGA 1200, etc.
* **Importance**: Proper cooling prevents overheating and helps the CPU sustain high performance under load, prolonging its lifespan.
* [Product Link](https://www.sigma-computer.com/item?id=1728)

### 9. **Operating System (OS)**: **Windows 11 Pro**

* **Description**: Windows 11 Pro is the latest version of Microsoft’s operating system, designed for performance, security, and compatibility with modern hardware. It offers an intuitive interface, optimized gaming features, and support for a wide range of productivity applications.
* **Specifications**:
  + **Edition**: Pro (Professional)
  + **Gaming Features**: DirectStorage for faster loading times, Auto HDR for improved visuals
  + **Security Features**: BitLocker encryption, Windows Hello, advanced malware protection
* **Importance**: The OS manages hardware resources and provides an interface for users to interact with software applications. Windows 11 Pro is particularly well-suited for gaming, offering enhanced performance features and compatibility with the latest games and applications.
* [Product Link](https://www.microsoft.com/en-us/windows/get-windows-11)

### **Assembly Steps**

1. **Prepare the Case**: Open the case and organize screws/accessories.
2. **Install the CPU**: Open the CPU socket latch, align the CPU, and slot it in carefully.
3. **Install the CPU Cooler**: Mount the cooler on the CPU with brackets and thermal paste as needed.
4. **Insert RAM**: Place RAM sticks in slots until they click.
5. **Install Storage**: Secure the NVMe SSD onto the motherboard’s M.2 slot.
6. **Mount the Motherboard**: Secure the motherboard to the case with screws.
7. **Install GPU**: Slot the GPU into the PCIe x16 slot and secure with screws.
8. **Connect the PSU**: Attach PSU cables to the motherboard, GPU, and storage.
9. **Cable Management**: Organize cables neatly to maximize airflow.
10. **Boot and Install OS**: Power up the system, enter BIOS, and install the OS.

### **Total Estimated Cost**: **$700 - $800 (34,000 - 39,000 L.E)**

This build ensures a well-rounded experience, balancing performance and cost. It’s optimized for high settings in 1080p and 1440p gaming while allowing for future upgrades. Each component has been carefully selected to achieve an efficient, reliable setup.