

**NEW ERA UNIVERSITY COLLEGE**

**FACULTY OF COMPUTER SCIENCE AND INFORMATION COMPUTING TECHNOLOGY**

**DIPLOMA IN COMPUTER SCIENCE**

**TGEN133**

**PC MAINTENANCE**

**ASSIGMENT REPORT**

**DESKTOP PC FOR GAME DEVELOPMENT**

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# LECTURER: LEE JIA KHANG

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**Introduction**

Building a PC tailored for game development involves selecting components that not only handle gaming but also support the demanding tasks of game creation. Unlike a standard gaming PC, a game development PC needs to balance performance, reliability, and multitasking capabilities. We build two different type of gaming development PC, it is Intel and AMD each of them are below to RM5000.

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Component for building **INTEL** Desktop PC:

1. **CPU**: **Intel Core i5-12600KF Processor**

Intel Core i5-12600KF is a powerful desktop processor. It have 10 cores(6 performance cores and 4 efficiency cores) and 16 threads, it can handle gaming several tasks. It has a maximum turbo boost frequency of 4.9 GHz and a base clock speed of 3.7 GHz. This processor's lack of integrated graphics, so for those who want to utilize a separate graphics card, it is excellent.

1. **GPU: Gigabyte GeForce RTX 3060 WINDFORCE OC 12GB GDDR6**

**Gigabyte GeForce RTX 3060 WINDFORCE OC 12GB GDDR6** is a high-performance graphics card designed for gamers and creators. It has a 192-bit memory interface, 12GB of GDDR6 memory. It have two fans and three copper heat pipes to help in cooling. It also supports real-time ray tracing and AI-enhanced graphics to make it ideal for those demanding work or gaming.

1. **Motherboard**: **GIGABYTE Z690 UD DDR4**

**GIGABYTE Z690 UD DDR4 ATX motherboard** designed for Intel's 12th, 13th and 14th generation processors featuring the LGA 1700. It have 4 memory slots and it can handle up to 128GB DDR4 memory with speed from 2133MHz to 5333MHz. It also have one PCIe 5.0, three PCIe 4.0 M.2 slots with thermal guards, and a 2.5 GbE LAN for fast networking. Furthermore, it provides improved cooling options with Smart Fan 6 technology and completely covered MOSFET heatsinks.

1. **RAM: Corsair Vengeance LPX Gaming RAM** **16GB DDR4 3200MHZ (x2)**

**Corsair Vengeance LPX Gaming RAM 16GB DDR4 3200MHz** is designed for high-performance overclocking. It provides a total of 32GB of DDR4 RAM with a speed of 3200MHz. His low-profile design makes it suitable for smaller cases, and the aluminum heat spreader ensures efficient heat dissipation, ensuring a stable performance while doing a heavy task. It also supports Intel XMP 2.0 for easy overclocking with a single setting.

1. **SSD: Kingston NV2 1 TB SSD (x2)**

**Kingston NV2 1 TB SSD** is a high-performance storage. Using the PCIe 4.0 NVMe interface, it can read and write speeds up to 3,500 MB/s and 2,800 MB/s. It can also be used in laptops and small-form-factor PCs, provide a huge storage capacity and efficient power consumption.

1. **CPU Cooler: Invasion Cooler DX-240-ARGB 240MM AIO**

**Invasion Cooler DX-240-ARGB 240MM AIO** is a high-performance liquid cooling. It use pure copper CPU cooling block and 5V RGB sync. The 5V RGB synchronization of the CPU Cooler can ensure compatibility and proper power with the motherboard.

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1. **Power Supply: 1st Player Steampunk PS-750AX**

**1st Player Steampunk PS-750AX** is a high-performance power supply unit(PSU) designed for gaming and high-demand systems. His sleek design and controllable LED fan add a stylish touch to any build.

1. **PC Case: SEGOTEP ENDURA PRO+ TRANSPARENT PANORAMA ATX CASE COME WITH 3\*120mm ARGB FAN**

The SEGOTEP Endura Pro+ Transparent Panorama ATX Case is a stylish and functional case designed for gaming and high-performance builds. It have tempered glass front and side panels, allow you to show components. Although the PC name is ATX, but it also suitable for E-ATX, ATX, M-ATX, Mini-ITX.

|  |  |  |  |
| --- | --- | --- | --- |
| NO. | Component | Component\_Name | Price(RM) |
| 1 | CPU | Intel Core i5-12600KF Processor | **1050.00** |
| 2 | GPU | Gigabyte GeForce RTX 3060 WINDFORCE OC 12GB GDDR6 | **1489.00** |
| 3 | Motherboard | GIGABYTE Z690 UD DDR4 | **779.00** |
| 4 | RAM | Corsair Vengeance LPX Gaming RAM 16GB DDR4 3200MHZ (x2) | **365.00** |
| 5 | SSD | Kingston NV2 1 TB SSD (x2) | **570.00** |
| 6 | CPU Cooler | Invasion Cooler DX-240-ARGB 240MM AIO | **190.00** |
| 7 | Power Supply | 1st Player Steampunk PS-750AX | **299.00** |
| 8 | PC Case | SEGOTEP ENDURA PRO+ TRANSPARENT PANORAMA ATX CASE COME WITH 3\*120mm ARGB FAN | **219.00** |
|  |  | **Total:** | **4961.00** |

**The table below are shown that the price of each component and total price:**

After we finish built up this **INTEL** PC, we have RM 39 left from the budget. Theres all for the Intel PC.

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The 2nd choice of Desktop PC for game development is **AMD**:

1. **CPU: AMD RYZEN 7 5700 x 4.6GHz**

**Performance:** The AMD Ryzen 7 5700X is an 8-core, 16-thread processor with a boost clock up to 4.6GHz, which is ideal for multi-threaded workloads common in game development, such as compiling code, running simulations, and rendering scenes.

**Efficiency:** Its architecture provides high efficiency, making it suitable for long development sessions without overheating or throttling.

1. **GPU: ZOTAC RTX 4060 8GB TWIN EDGE**

**Features:**

* + - Powered by GeForce RTX 4060
    - Ultra-compact design with 2 Slot footprint
    - Memory capacity: 8GB GDDR6
    - IceStorm 2.0 Advanced Cooling
    - FREEZE Fan Stop, Active Fan Control
    - Compact 2.2 Slot Footprint
    - SPECTRA RGB Lighting
    - Metal Backplate

**Ray Tracing and AI**: It supports real-time ray tracing and AI-enhanced graphics, which can be useful for developing cutting-edge visual effects and optimizing performance in games.

1. **Motherboard: MSI B450M BAZOOKA MAX WIFI**
   * + SUPPORTS 1ST, 2ND AND 3RD GEN AMD RYZEN™ / RYZEN™ WITH RADEON™ VEGA GRAPHICS AND 2ND GEN AMD RYZEN™ WITH RADEON™ GRAPHICS / ATHLON™ WITH RADEON™ VEGA GRAPHICS DESKTOP PROCESSORS FOR SOCKET AM4
     + Supports DDR4 Memory, up to 4133(OC) MHz
     + Lightning Fast Game experience: 1x TURBO M.2, Store MI technology
     + **Core Boost:** With premium layout and fully digital power design to support more cores and provide better performance.
     + DDR4 Boost: Advanced technology to deliver pure data signals for the best gaming performance and stability
     + MULTI-GPU: With PCI-E STEEL ARMOR slot. Supports 2-Way AMD Crossfire™
2. **RAM: CORSAIR VENGEANCE DDR5 32GB(2X16) 5600MHZ**

* **Memory:** 32GB (16×2)
* **Speed:** 5600MHz
* **Type:** DDR5

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1. **SSD: XPG SX8200 PRO 500GB**

* **PCIe Gen3x4**
* **Capacity: 256GB**
* **Form Factor: M.2 2280**
* **Dimension: 80 x 22 x 3.5mm**
* **Read Speed: 3500MB/s**
* **Write Speed: 3000MB/s**

1. **HDD: SEAGATE SKYHAWK HDD 1TB**

* **Rotation Speed:** 7200rpm
* **Memory Type:** DDR
* **Storage Capacity:** 1TB
* **Dimension (L x W x H):** 3.5

**WHY we choosing both SSD and HDD:**

* **Capacity: The 1TB HDD provides additional storage for assets, backups, and project files, ensuring that space constraints are minimized.**
* **Speed: The 500GB SSD ensures fast boot times, quick loading of large projects, and smooth performance when working with large files.**

1. **Power Supply: CORSAIR 750 Watt 80 PLUS® Gold Certified Fully Modular PSU**

**Features:**

* **Intel ATX 3.0 Certified**: Compliant with the ATX 3.0 power standard, supporting the PCIe Gen 5 platform and resisting transient power spikes.
* **Keeps Quiet**: A 120mm rifle bearing fan with a specially calculated fan curve keeps fan noise down, even when operating at full load.
* **105°C-Rated Capacitors**: Delivers steady, reliable power and dependable electrical performance.
* **Modern Standby Compatible**: Extremely fast wake-from-sleep times and better low-load efficiency.

1. **PC Case: NZXT H510 ATX MID TOWER CASING**

**Features:**

* + Iconic cable management bar and uninterrupted tempered-glass side panel
  + USB 3.2 Gen2-compatible USB-C connector on the front panel
  + Cable routing kit with pre-installed channels and straps
  + Two Aer F120mm fans and removable filter on PSU intake
  + Removable bracket designed for radiators up to 280mm

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1. **Liquid Cooler: COOLER MATER MASTERLIQUID 240L CORE ARGB**

**Features:**

* + **Dual Chamber Pump**
  + **Enlarged Radiator Surface Area**
  + **Sleeved FEP Tubing**
  + **Dual ARGB Fans**
  + **CryoFuze Thermal Grease**

1. **Fan Cooler: COOLER MASTER MASTERFAN MF120 HALO2**

**Features:**

* UPGRADED DRIVER IC
* An upgraded driver IC boosts cooling
* performance while minimizing fan noise.
* HYBRID FRAME DESIGN
* A hybrid frame structure maintains stability
* without sacrificing fan blade size or performance.

1. **WINDOWS 11 PRO license key**

|  |  |  |  |
| --- | --- | --- | --- |
| NO. | Component | Component\_Name | Price(RM) |
| 1 | CPU | AMD RYZEN 7 5700X 4.6GHZ 36MB CACHE PROCESSOR AM4 | **748.00** |
| 2 | GPU | ZOTAC GAMING GeForce RTX 4060 8GB Twin Edge OC White Edition Graphic Card | **1559.00** |
| 3 | Motherboard | MOTHERBOARD MSI B450M PRO-VDH MAX/ AM4 / MATX / RAM x 4 / M.2 x 1 / PCIEx16 x 1 | **329.00** |
| 4 | RAM | Corsair Vengeance LPX 32GB (2x16GB) DDR5 5600MHz | **600.00** |
| 5 | SSD | ADATA XPG SX8200 Pro PCIe Gen3x4 Internal SSD 512GB | **239.00** |
| 6 | HDD | seagate HDD 1TB | **130.00** |
| 7 | Liquid Cooler | COOLER MASTER MASTERLIQUID 240L CORE ARGB CPU WATER LIQUID COOLER / AIO | **229.00** |
| 8 | Fan Cooler | COOLER MASTER MASTERFAN MF120 HALO2 (x2) | **138.00** |
| 9 | Power Supply | CORSAIR 750 Watt 80 PLUS® Gold Certified Fully Modular PSU | **440.00** |
| 10 | PC Case | NZXT H510 | **347.00** |
| 11 | OS | Window 11 Home | **90.00** |
|  |  | **Total:** | **4849.00** |

After we finish built up this **AMD** PC, we have RM 151 left from the budget. Theres all for the Intel PC.

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**Performance comparison**

**CPU**

1. Architecture & Technology

Intel Core i5-12600KF: Based on Intel's Alder Lake architecture, this CPU features a hybrid architecture with both performance (P) cores and efficiency (E) cores. It has 6 P-cores and 4 E-cores, totaling 10 cores and 16 threads.

AMD Ryzen 7 5700X: Based on AMD's Zen 3 architecture, this CPU has 8 cores and 16 threads, which means all cores are of the same type (no hybrid architecture).

2. Performance

Single-Core Performance: The i5-12600KF generally has superior single-core performance due to its higher clock speeds and newer architecture, making it better for tasks that depend on single-threaded performance.

Multi-Core Performance: The Ryzen 7 5700X has more cores with equal threads, which can give it an edge in certain multi-threaded workloads, though the hybrid architecture of the i5-12600KF might balance this out depending on the task.

1. Clock Speeds

i5-12600KF: Has a base clock of 3.7 GHz and can boost up to 4.9 GHz.

Ryzen 7 5700X: Has a base clock of 3.4 GHz and a boost clock up to 4.6 GHz.

4. Power Consumption

i5-12600KF: Typically has a higher power consumption (TDP of 125W) due to the hybrid architecture and performance cores.

Ryzen 7 5700X: Has a lower power consumption with a TDP of 65W, making it more power-efficient.

5. Integrated Graphics

i5-12600KF: Does not come with integrated graphics, meaning you’ll need a dedicated GPU.

Ryzen 7 5700X: Also lacks integrated graphics.

6. Motherboard Compatibility

i5-12600KF: Requires a 600-series or 700-series chipset motherboard, such as Z690, B660, or newer.

Ryzen 7 5700X: Compatible with AM4 socket motherboards, which have been around longer, giving more options in terms of price and features.

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7. Price

The prices of these CPUs can fluctuate based on market conditions, but generally, the i5-12600KF might be slightly more expensive than the Ryzen 7 5700X, depending on the region and retailer.

8. Gaming

i5-12600KF: Tends to perform better in gaming, thanks to its strong single-core performance and the hybrid architecture that can handle gaming and background tasks efficiently.

Ryzen 7 5700X: Still very capable in gaming but may not match the i5-12600KF in certain titles, especially those that are heavily single-threaded.

Conclusion:

Intel Core i5-12600KF: Better if you're looking for top gaming performance and are okay with slightly higher power consumption and potentially higher costs.

AMD Ryzen 7 5700X: Better if you're looking for a more power-efficient option with solid multi-core performance at a possibly lower price point.

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**GPU**

1. Architecture & Technology

GIGABYTE RTX 3060 WINDFORCE OC 12GB: Based on NVIDIA’s Ampere architecture, it has 3584 CUDA cores and is designed for solid 1080p and some 1440p gaming.

ZOTAC RTX 4060 8GB TWIN EDGE: Based on NVIDIA’s newer Ada Lovelace architecture, it has 3072 CUDA cores and features DLSS 3.0 and improved ray tracing capabilities, making it more efficient and capable in newer games.

2. Performance

RTX 3060: With 12GB of GDDR6 memory, it has a wider memory bus (192-bit), which can be beneficial in games with large texture packs or higher resolutions. It’s generally optimized for 1080p and some 1440p gaming, performing well in most modern titles.

RTX 4060: Despite having 8GB of GDDR6 memory and a narrower 128-bit bus, it benefits from the more advanced architecture, offering better performance per watt and generally better gaming performance, especially in titles that leverage DLSS 3.0 and ray tracing. It’s also aimed at 1080p gaming but can handle 1440p in certain scenarios.

3. Memory

RTX 3060: 12GB GDDR6 (192-bit) – The larger memory is advantageous for higher resolutions and more memory-intensive tasks like certain productivity applications or games with heavy texture requirements.

RTX 4060: 8GB GDDR6 (128-bit) – Although it has less memory, the faster architecture and improved efficiency often compensate for this in gaming performance.

4. Ray Tracing & DLSS

RTX 3060: Supports ray tracing and DLSS 2.0, which can enhance performance and visuals, but it’s generally more demanding on this card due to the older architecture.

RTX 4060: Comes with DLSS 3.0 and improved ray tracing capabilities, making it better suited for handling these features in modern games with less performance impact.

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5. Power Consumption

RTX 3060: Higher power consumption, with a TDP around 170W. It requires a more robust power supply.

RTX 4060: More power-efficient with a TDP around 115W, making it easier to cool and operate with a lower-wattage power supply.

6. Cooling & Design

GIGABYTE RTX 3060 WINDFORCE OC: Features a dual-fan WINDFORCE cooling solution, which is known for being effective but might run hotter due to the higher power draw.

ZOTAC RTX 4060 8GB TWIN EDGE: Comes with a dual-fan setup as well, but with the lower TDP of the 4060, it should run cooler and quieter compared to the 3060.

7. Price

RTX 3060: Generally more affordable than the 4060, especially as it’s based on the previous generation architecture.

RTX 4060: Newer technology often comes with a slightly higher price, though it may offer better value in the long term due to its efficiency and performance improvements.

8. Future-Proofing

RTX 3060: While still a solid card, it might age faster as newer games and technologies continue to push the limits of older architectures.

RTX 4060: With DLSS 3.0 and improved ray tracing, it’s more future-proof and better suited for upcoming game releases and software that take advantage of these features.

Conclusion:

GIGABYTE RTX 3060 WINDFORCE OC 12GB: Ideal if you need more VRAM and are working with a budget, or if you have specific tasks that benefit from the larger memory capacity.

ZOTAC RTX 4060 8GB TWIN EDGE: Better if you want the latest technology, improved efficiency, and better overall gaming performance, especially with ray tracing and DLSS 3.0

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  + [Invasion Cooler DX-240-ARGB 240MM AIO, DARK-120 120MM AIO, SC-90 90MM, SC-200 120MM (Compatible with Intel & AMD) | Shopee Malaysia](https://shopee.com.my/Invasion-Cooler-DX-240-ARGB-240MM-AIO-DARK-120-120MM-AIO-SC-90-90MM-SC-200-120MM-(Compatible-with-Intel-AMD)-i.13885824.3655163882?sp_atk=c2048148-db49-4a1d-a83f-14e8b3bcc40e&xptdk=c2048148-db49-4a1d-a83f-14e8b3bcc40e)
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* GPU (Graphics Card)
  + [ZOTAC GAMING GeForce RTX 4060 8GB Twin Edge OC White Edition Graphic Card - MT-TECNO IT MALL](https://mt-tecno.com/product/zotac-gaming-geforce-rtx-4060-8gb-twin-edge-oc-white-edition-graphic-card/)
* Motherboard
  + [MOTHERBOARD MSI B450M PRO-VDH MAX/ AM4 / MATX / RAM x 4 / M.2 x 1 / PCIEx16 x 1 / 3Y WARRANTY / | Shopee Malaysia](https://shopee.com.my/MOTHERBOARD-MSI-B450M-PRO-VDH-MAX-AM4-MATX-RAM-x-4-M.2-x-1-PCIEx16-x-1-3Y-WARRANTY--i.5529122.20445515408?sp_atk=b4892ce4-fe05-4060-9a2c-c2f2f2ede93e&xptdk=b4892ce4-fe05-4060-9a2c-c2f2f2ede93e&is_from_login=true)
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* Power Supply
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