NEW ERA UNIVERSITY COLLEGE
新纪元大学学院
DKU040(B)

GROUP ASSIGNMENT

Course code:
TGEN133 PC Maintenance

Subject:
TGEN133 PC Maintenance

Lecturer :
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Group members :

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TOPIC

In this report we will briefly show the three systems we have assembled. The system is primarily designed for Photo, Video Editing and Rendering. The budget is RM5000.

SYSTEM 1

1.HARDWARE SELECTION

CPU	AMD Ryzen 9 5900x
MOTHERBOARD	MSI MAG B550 Tomahawk
COOLER	DEEPCOOL AK620 Zero Dark
GPU	EVGA RTX 3080 10GB XC3
RAM	Corsair Vengeance DDR4 32GB (16x2) 3600MHz
SSD	Samsung PCIe NVMe M.2 SSD 512GB Model: PM981
HDD	WD 1TB hard drive 7200rpm and Seagate 16 TB HDD Exos X16
PSU	Fsp hydro 700w power supply used
CASE	Aigo darkFlash A290

2.SOFTWARE

Operating System

- window 11 pro

Softwer Photo Editing

- Photoshop FREE TRIAL FOR 7 DAYS (RM65/M AFTER TRIALS)

Softwer Video Editing

- Davinci resolve FREE FOREVER AND PRO FOR RM1,490

3.TOTAL AMOUNT

list	compoment	Quantity	price(RM)
CPU	AMD Ryzen 9 5900x	1	set
MOTHERBOARD	MSI MAG B550 Tomahawk		set
COOLER	DEEPCOOL AK620 Zero Dark	1	1700
GPU	EVGA RTX 3080 10GB XC3	1	1750
RAM	Corsair Vengeance DDR4 32GB (16x2) 3600MHz	1	180
SSD	Samsung PCIe NVMe M.2 SSD 512GB Model: PM981	1	100
HDD	WD 1TB hard drive 7200rpm and Seagate 16 TB HDD Exos	1	50+800
PSU	Fsp hydro 700w power supply used	1	180
CASE	Aigo darkFlash A290	1	50
SOFTWARE	-		-
	Total price		4810
	Budget Left		190

SYSTEM 2

1.HARDWARE SELECTION

CPU	AMD Ryzen 5 5600X
MOTHERBOARD	MSI B550M PRO-VDH WiFi
COOLER	Cooler Master Hyper 212 Halo
GPU	NVIDIA GeForce RTX 4060 8GB
RAM	Corsair Vengeance LPX 16GB (2x8GB) DDR4 3200MHz
SSD	Western Digital Blue SN580 1TB NVMe SSD *2
HDD	-
PSU	Corsair CV550, 80 PLUS Bronze
CASE	NZXT H510

2.SOFTWARE

Operating System

- window 11 pro

Softwer Photo Editing

- Photoshop FREE TRIAL FOR 7 DAYS (RM65/M AFTER TRIALS)

Softwer Video Editing

- PowerDirector Essential FREE

3.TOTAL AMOUNT

list	compoment	Quantity	price(RM)
CPU	AMD Ryzen 5 5600X	1	605
MOTHERBOARD	MSI B550M PRO-VDH WiFi	1	485
COOLER	Cooler Master Hyper 212 Halo	1	135
GPU	NVIDIA GeForce RTX 4060	1	1619
RAM	Corsair Vengeance LPX 16GB (2x8GB) DDR4 3200MHz	1	195
SSD	Western Digital Blue SN580 1TB NVMe SSD	2	800
HDD	-	-	-
PSU	Corsair CV550, 80 PLUS Bronze	1	175
CASE	NZXT H510	1	350
SOFTWARE	-		-
	Total price		4364
	Budget Left		636

SYSTEM 3

1.HARDWARE SELECTION

CPU	Intel® Core™ i7-12700K Processor
MOTHERBOARD	Intel® H610 (LGA 1700) mic-ATX motherboard
COOLER	Assassin X 120 Refined SE Single Tower CPU Heatsink Cooler (LGA1700)
GPU	Palit GeForce RTX3060 Dual 12GB GDDR6 Graphics Card
RAM	Kingston FURY Beast DDR4 RAM 16GB 3600MHz Desktop *2
SSD	WD Blue SN570 M.2 2280 PCIe NVMe SSD 1TB
HDD	1TB 7200 RPM 64MB Cache
PSU	Zalman Decamax 700W Power Supply
CASE	AVF-AC-MX3000 PREMIUM M-ATX TOWER PC CASE

2.SOFTWARE

Operating System

- window 11 pro (free to use with watermark,pay to remove watermark RM1,299.00.)

Software Photo Editing

- GIMP
- Photoshop (free trial for 7 days, then RM67/mo)

Software Video Editing

- DaVinci Resolve 19(free to use with limit some limitation, pay to
- CapCut

Software Blender

- blender
- 3D Max

3.TOTAL AMOUNT

list	compoment	Quantity	price(RM)
CPU	Intel® Core™ i7-12700K Processor	1	1,615.00
MOTHERBOARD	Intel® H610 (LGA 1700) mic-ATX motherboard	1	425.49
COOLER	Assassin X 120 Refined SE Single Tower CPU Heatsink Cooler (LGA1700)	1	70
GPU	Palit GeForce RTX3060 Dual 12GB GDDR6 Graphics Card	1	1,379.00
RAM	Kingston FURY Beast DDR4 RAM 16GB 3600MHz Desktop	2	474.00
SSD	WD Blue SN570 M.2 2280 PCIe NVMe SSD 1TB	1	249
HDD	1TB 7200 RPM 64MB Cache	1	179
PSU	Zalman Decamax 700W Power Supply	1	199
CASE	AVF-AC-MX3000 PREMIUM M-ATX TOWER PC CASE	1	69
	Total price		4,659.49
	Budget		5000
	Budget Left		340.51

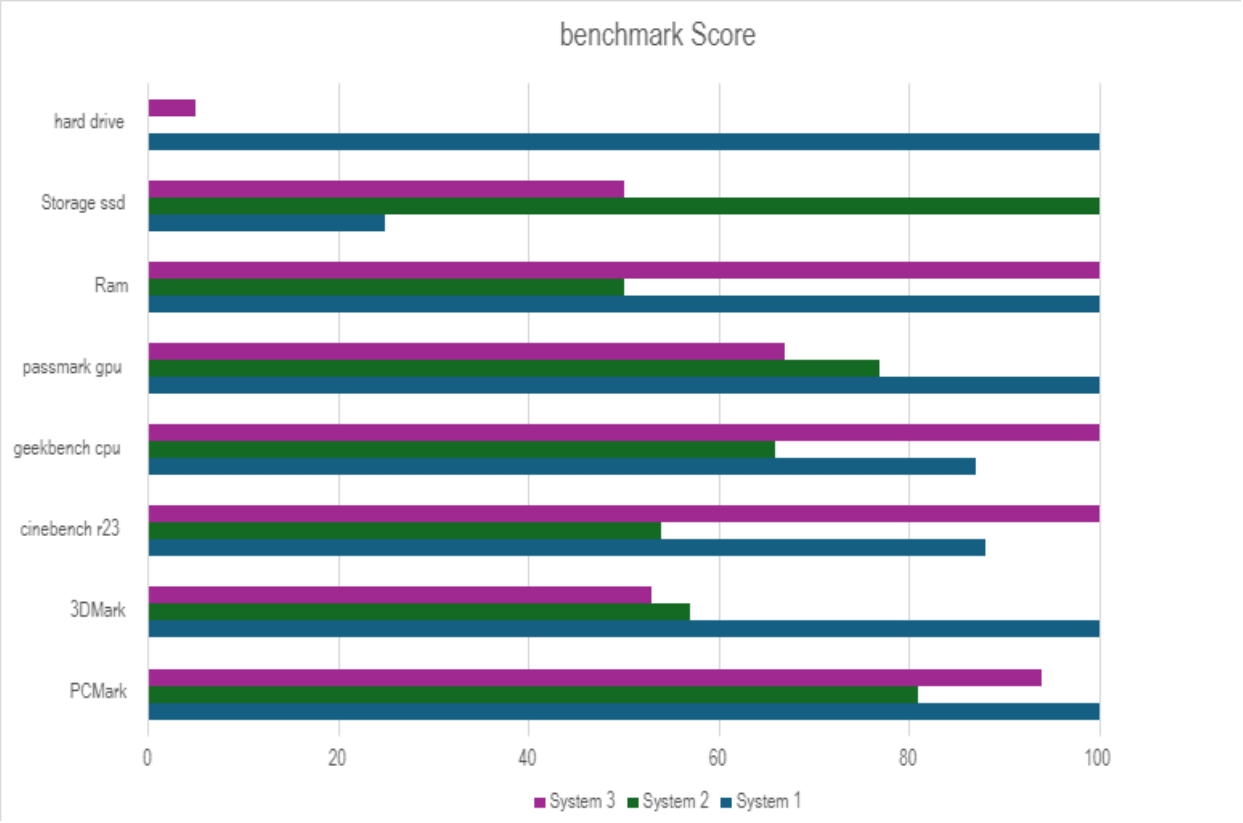
COMPARISONS

Benchmark	System 1	System 2	System 3
PCMark	9319	7609	8836
3DMark	20090	11469	10667
cinebench r23	22017	13284	24,795
geekbench cpu	14190	10,759	16197
passmark gpu	25275	19591	17030

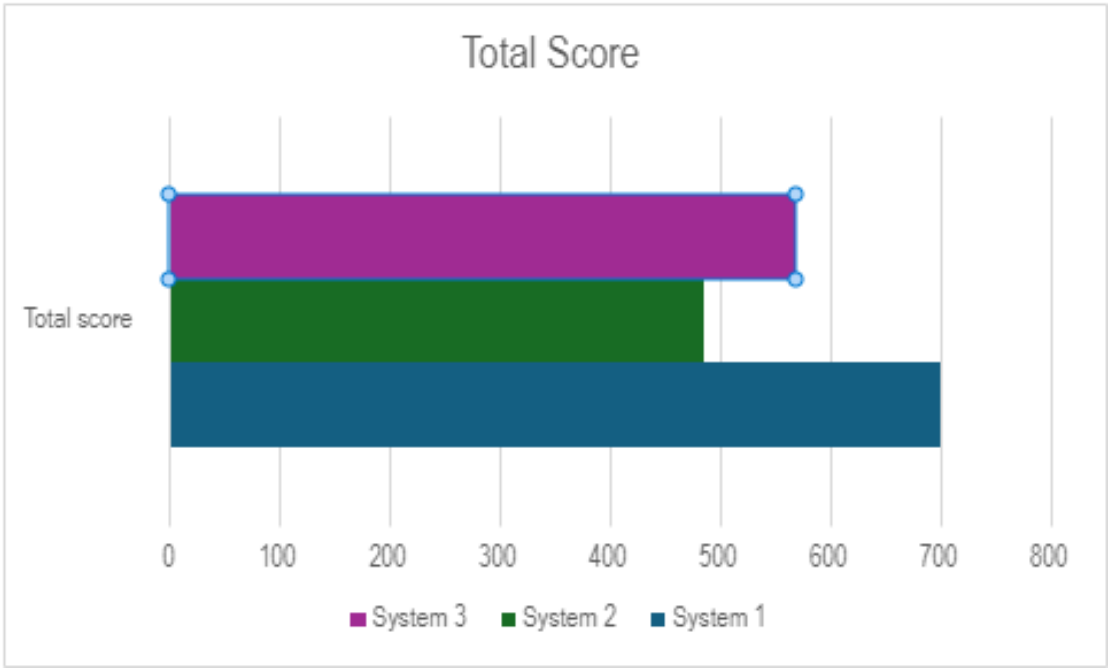
This is the benchmark score we calculate with 3DMARK. In this graph we can see all the Benchmark which is ,PCMark,3DMark,cinebench r23,geekbench cpu,passmark gpu.

score converted to cpu	System 1	System 2	System 3
Benchmark	Score(%)	Score(%)	Score(%)
PCMark	100	81	94
3DMark	100	57	53
cinebench r23	88	54	100
geekbench cpu	87	66	100
passmark gpu	100	77	67
Ram	100	50	100
Storage ssd	25	100	50
hard drive	100	0	5
Total score	700	485	569
score per RM 1	0.145	0.111	0.122

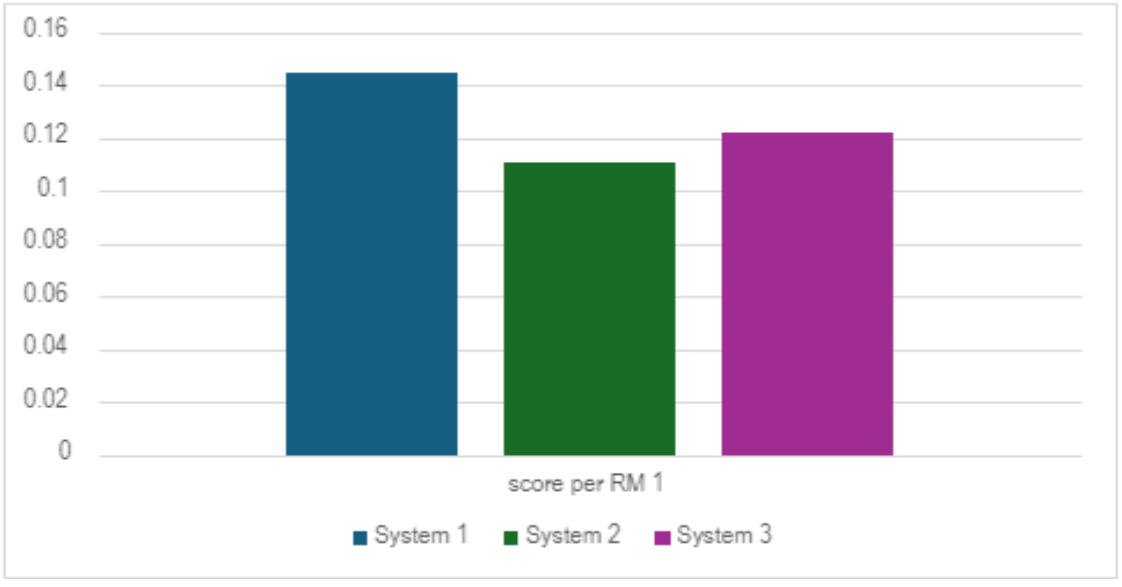
In this table, we can see the score and the score per RM1.We use a formula to calculate the score which is score divide by the highest score and multiply 100.For example, PCmark's System 2, 7609 divide by 9319 multiply 100 equal 81.



(GRAPH 1)



(GRAPH 2)



(GRAPH 3)
(USING TOTAL SCORE DIVIDED BY THE TOTAL PRICE)

CPU COMPARISONS

Name	AMD Ryzen™ 9 5900X	AMD Ryzen™ 5 5600X	Intel® Core™ i7-12700K
Total Cores	12	6	12
Threads	24	12	20
Base Clock	3.7 GHz	4.6 GHz	2.70 GHz
Boost Clock	4.8GHz	4.6GHz	5.00 GHz
Total amount of Cache	70MB	35MB	37MB
Default TDP	105W	65W	125 W
Unlocked for Overclocking	Yes	Yes	Yes
Processor Technology for CPU Cores	TSMC 7nm FinFET	TSMC 7nm FinFET	10 nm
Max operating Temperature(Tjmax)	90°C	95°C	100 °C
Integrated Graphics	No	No	Intel® UHD Graphics 770
PCI Express® Version	PCIe® 4.0	PCIe® 4.0	5.0 and 4.0
System Memory Type	DDR4	DDR4	DDR5 and DDR4
System Memory Specification	Up to 3200 MT/s	Up to 3200 MT/s	Up to DDR5 4800 MT/s Up to DDR4 3200 MT/s
Lauch Date	11/5/2020	11/5/2020	**4/11/2021**
Price	RM1100	RM605	**RM1615**

The AMD Ryzen 9 5900X has more cores and threads than the Ryzen 5 5600X and Intel i7-12700K, making it the best choice for multi-threaded tasks. The Intel i7-12700K combines high-performance cores and efficiency cores, providing a good balance in multi-threaded and single-threaded applications, and tends to outperform the Ryzen 9 5900X in some single-threaded applications. Although the i7-12700K has high-performance cores and efficiency cores, it is more expensive. The Ryzen 5 5600X is a more cost-effective choice for gaming and medium-load work. In summary, we chose the AMD Ryzen 9 5900X. Although its performance is not higher than the Intel i7-12700K, it is not bad at all. If you want the best performance for the budget, the AMD Ryzen 9 5900X will be a good choice.

GPU

Name	EVGA RTX 3080 10G XC3	RTX 4060 8GB	RTX3060 12GB
Gpu name	GA102	AD107	GA106
Process Size	8 nm	5 nm	8 nm
Transistors	28,300 million	18,900 million	12,000 million
Shading Units	8704	3072	3584
Base clock	1440 MHz	1830 MHz	1320 MHz
Memory Clock	1188 MHz 19 Gbps effective	2125 MHz 17 Gbps effective	1875 MHz 15 Gbps effective
Boost Clock	1710 MHz	2460 MHz	1777 MHz
RT Cores	68	24	28
TDP	320W		170 W
Memory Size	10GB	8 GB	12GB
Memory Type	GDDR6X	GDDR6	GDDR6
Memory Bus	320 bit	128 bit	192 bit
Memory Bandwidth	760.3 GB/s	272.0 GB/s	360.0 GB/s
Bus Interface	PCIe 4.0 x16	PCIe 4.0 x8	PCIe 4.0 x16

Transistors & Shading Units

The RTX 3080 has significantly more transistors and shading units than both the RTX 4060 and RTX 3060. **Transistors** are crucial for overall processing power, and **shading units** (or CUDA cores) are critical for tasks like rendering and 3D modeling. The RTX 3080's higher count means it can handle more complex computations simultaneously, making it ideal for video editing, rendering, and other GPU-intensive tasks.

RT Cores (Ray Tracing)

The **RTX 3080** has a significantly higher number of RT Cores compared to the other two. RT Cores are specialized for real-time ray tracing, a technique that simulates the way light interacts with objects in a scene to produce realistic images. More RT Cores mean better performance in rendering tasks that use ray tracing, which can be particularly useful in certain types of video editing and rendering workflows.

CONCLUSION

Our final choice is System 1 even it has the highest price between the 3 system. It is because System 1 have the highest benchmark score (GRAPH 1).Besides that, it also has the highest performance-price ratio which is 0.14/Rm1 (GRAPH 3).Below, I will briefly compare the hardware between System 1,2 and 3.

Higher Performance CPU

- The AMD Ryzen 9 5900X has 12 cores and 24 threads, which significantly enhances performance in multi-threaded applications like video editing and rendering. This is crucial for software such as Adobe Premiere Pro, After Effects, and other professional editing tools.

More Powerful GPU

- While not as critical as the CPU for editing, the EVGA RTX 3080 10GB provides excellent support for GPU-accelerated tasks in editing software, significantly speeding up effects rendering, 3D modeling, and other GPU-intensive processes.

Larger RAM Capacity

- With 32GB of RAM, System 1 is better equipped to handle large photo and video files, multiple layers, and complex projects. This capacity ensures smoother performance and faster rendering times compared to the 16GB in Systems 2 and 3.

Efficient Storage Setup:

- The combination of a fast 512GB NVMe SSD for the operating system and applications, along with a 16TB HDD for storage, offers both speed and ample storage space. This is ideal for storing large video files and extensive photo libraries, ensuring quick access and sufficient capacity.

Reference

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