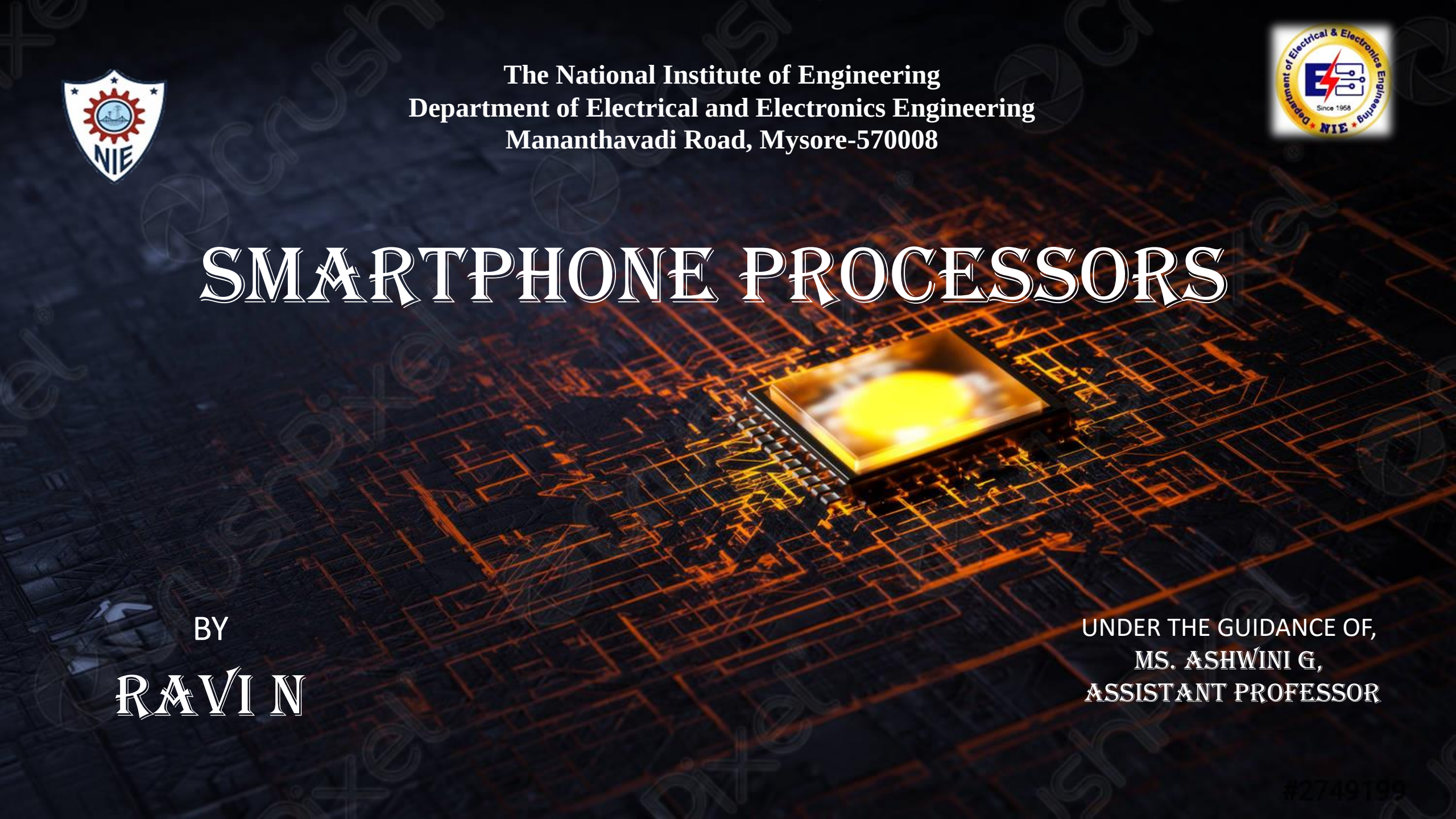
The National Institute of Engineering
Department of Electrical and Electronics Engineering
Mananthavadi Road, Mysore-570008

SMARTPHONE PROCESSORS



BY

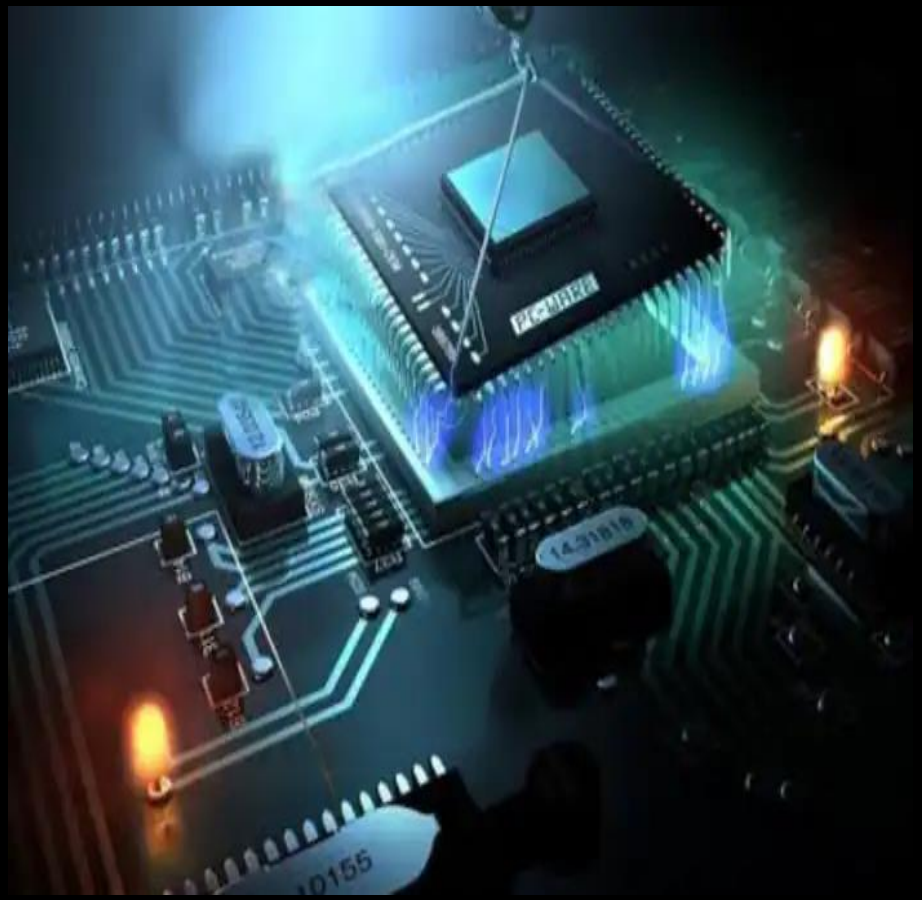
RAVI N

UNDER THE GUIDANCE OF,
MS. ASHWINI G,
ASSISTANT PROFESSOR

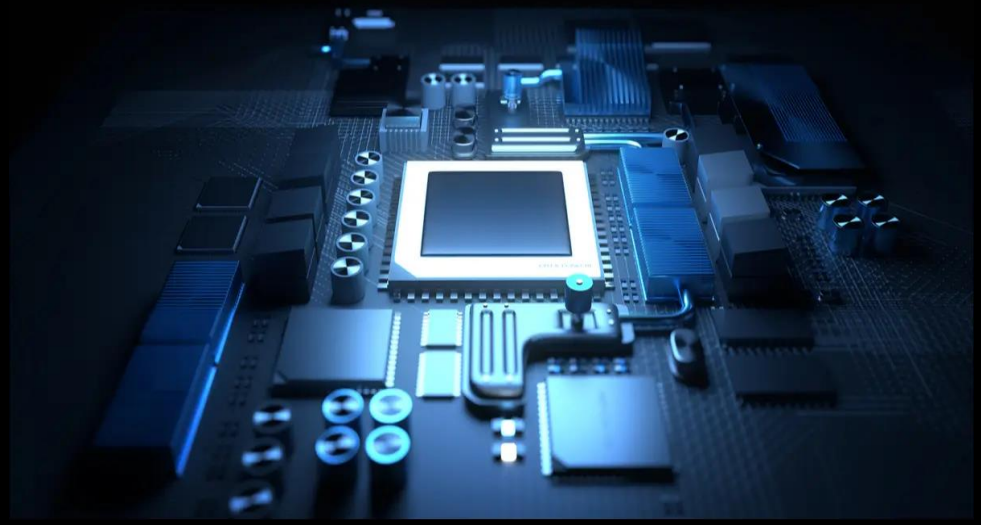
CONTENTS

ABSTRACT

- Today’s smartphone processors are very powerful, so powerful that it is almost as powerful as a desktop computer.
- Processors are now coming with more cores. The processing speed has reached upto 3-3.5 GHz.
- The ability to include GPU (Graphic Processing Unit) inside mobile processors has enabled devices to best graphics picture, 3D capability, Virtual Reality capability and 4K recording.
- The improved processor technology also made today’s modern mobile devices more power efficient



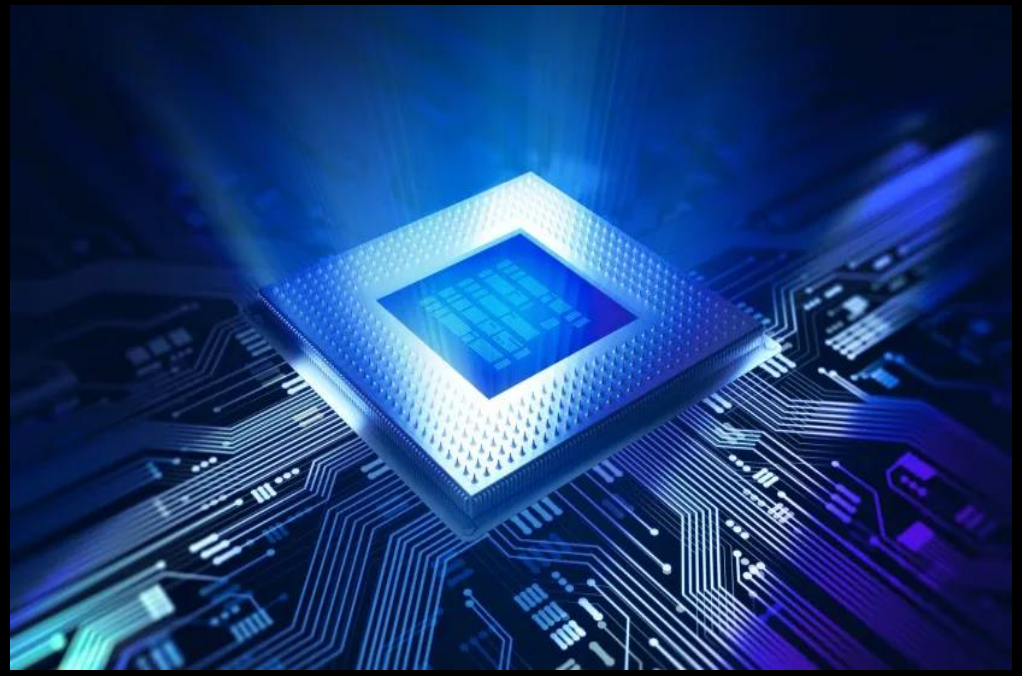
What determines the processor speed?



- The speed of a smartphone determines whether the device can run demanding apps without slowing down. In addition, a smartphone with a lot of processing power boots apps faster.
- The processor performs tasks and runs apps. The more powerful the processor, the more demanding apps you can use
- Processors with low clock speeds and (sometimes) a smaller number of processor cores work more slowly than processors with high clock speeds and a large number of processor cores.
- as that's what you're paying for, in the end. Actions performed on a cheaper smartphone will be processed more slowly than on a more expensive model.

Clock speed

- The clock speed determines how many instructions the processor can execute per second.
- A processor with a 1-Gigahertz (GHz) clock speed can process 1 billion instructions per second.
- The general rule is that higher clock speeds make for faster phones. user can often see this with more expensive smartphones. Their processor cores have higher clock speeds than those of more affordable devices.
- The number of processor cores also influences the speed of the smartphone.



NANOMETER TECHNOLOGY

- nm stands for nanometer, a unit of measure for length. 1nm is equal to 0.000000001 meters—which is absolutely minute.
- In a CPU, nm is used to measure the size of the transistors that make up a processor.
- There are billions of transistors in a CPU that perform calculations through electrical signals by switching on and off.
- Lower nm is better for your machine due to More Power Efficient, Less Cooling Required, Transistors Are Faster

WHY NANOMETER TECHNOLOGY IS USED

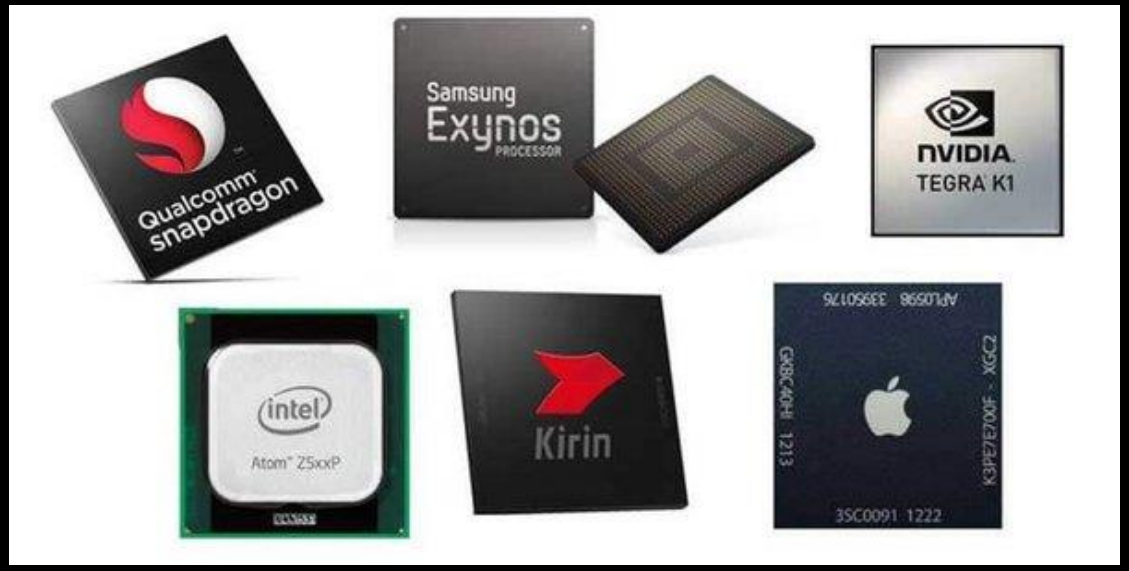
- **More Power Efficient:** a lower nm transistor means there is less power required for it to work. When you look at all the transistors in a CPU, lower power consumption makes a processor more power-efficient compared to a higher nm processor.
- **Less Cooling Required:** when the transistors in your CPU consume less power, less heat is generated overall.
- **Transistors Are Faster:** When the transistor size is smaller, there is less distance between them. Less distance means the electric signal will travel faster, making the overall performance of the CPU faster.

Smartphone Processors Ranking

#	Processor	Rating	AnTuTu 9	Geekbench 5*	Cores	Clock**	GPU
1	A16 Bionic Apple	99 A+	967484	1895 / 5392	6 (2+4)	3460 MHz	Apple GPU
2	Snapdragon 8 Gen 2 Qualcomm	96 A+	1245135	1498 / 4981	8 (1+4+3)	3200 MHz	Adreno 740
3	Dimensity 9200 MediaTek	95 A+	1274308	1306 / 4990	8 (1+3+4)	3050 MHz	Mali-G715 Immortalis MC11
4	Dimensity 9000 Plus MediaTek	93 A+	1156870	1342 / 4368	8 (1+3+4)	3200 MHz	Mali-G710 MC10
5	Snapdragon 8 Plus Gen 1 Qualcomm	92 A+	1033148	1326 / 4171	8 (1+3+4)	3200 MHz	Adreno 730
6	A15 Bionic Apple	92 A+	805607	1758 / 4821	6 (2+4)	3240 MHz	Apple GPU
7	Dimensity 9000 MediaTek	91 A+	1008560	1272 / 4333	8 (1+3+4)	3050 MHz	Mali-G710
8	Snapdragon 8 Gen 1 Qualcomm	90 A+	1041109	1286 / 3842	8 (1+3+4)	3000 MHz	Adreno 730
9	Dimensity 8200 MediaTek	87 A+	870686	992 / 4226	8 (1+3+4)	3100 MHz	Mali-G610 MC6
10	Exynos 2200 Samsung	85 A+	953039	1163 / 3589	8 (1+3+4)	2800 MHz	Samsung Xclipse 920

TYPES OF PROCESSORS

1. Apple bionic chips
2. Qualcomm snapdragon processors
3. Mediatek
4. Exynos
5. Kirin
6. Intelrom
7. Arm cortex

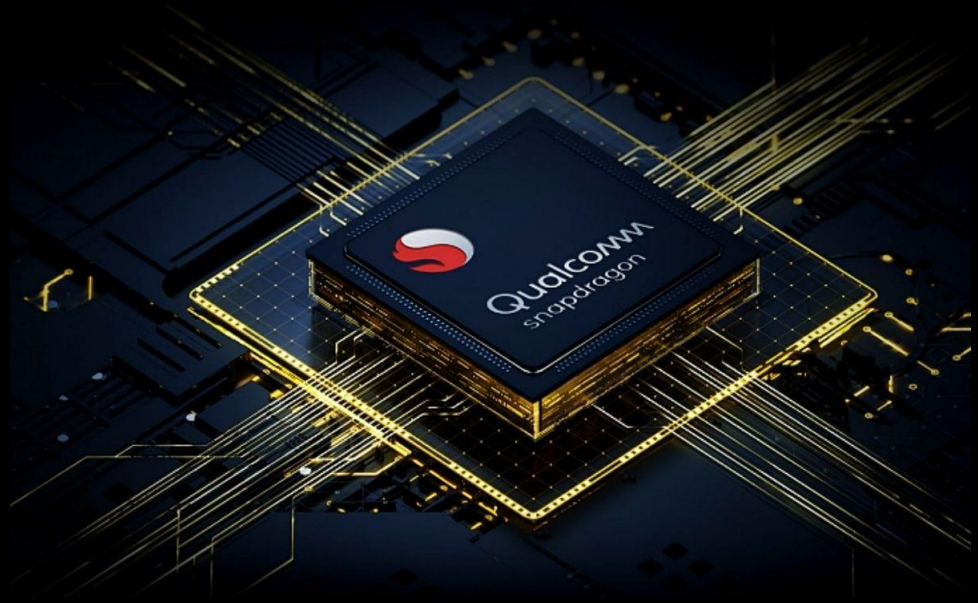


Apple bionic chips

- The Apple A16 Bionic features an Apple-designed 64-bit six-core CPU implementing ARMv8.6-A. with two "Everest" high-performance cores running at 3.46 GHz
- The A16 contains 16 billion transistors, a 6.7 % increase from the A15's transistor count of 15 billion.
- this used in the iPhone 14 Pro and 14 Pro Max models only.

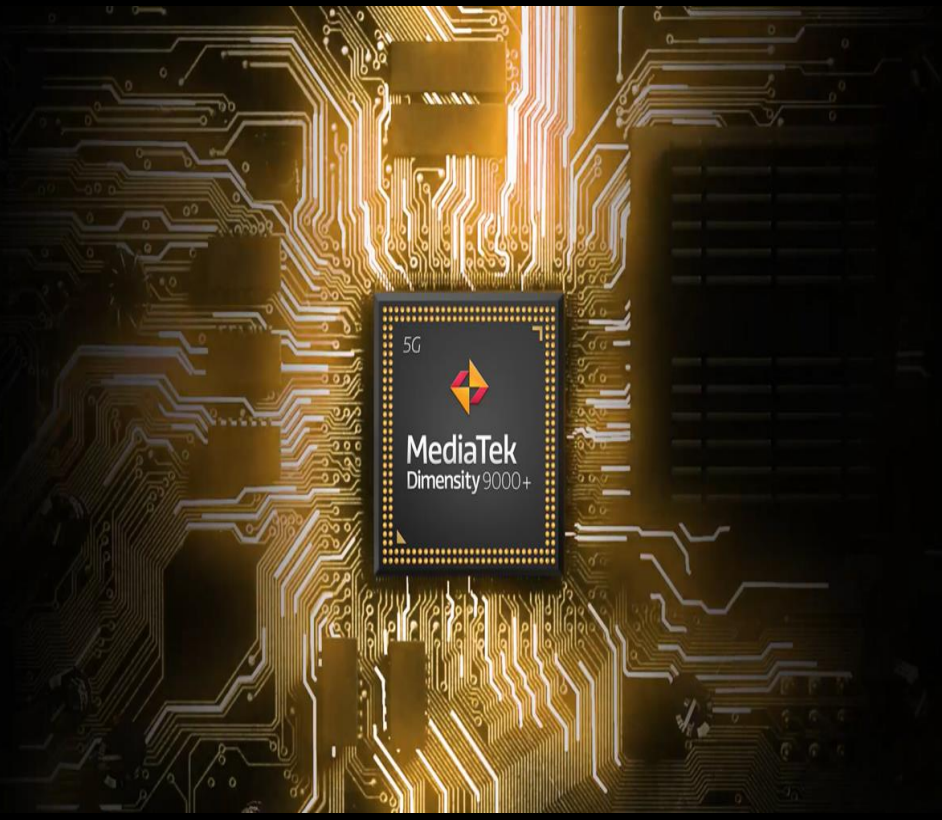
Qualcomm snapdragon processors

- Qualcomm Snapdragon 8 Gen 2 – an 8-core chipset that was announced on November 15, 2022, and is manufactured using a 4-nanometer process technology
- The Snapdragon 8 Gen 2 Mobile Platform is latest premium-tier powerhouse.
- This is the company's front runner and that which will power most of the flagships of 2022.
- Some of the smartphones which use this processor are Vivo X90 Pro Plus, OnePlus 11 and Motorola Moto X40 etc



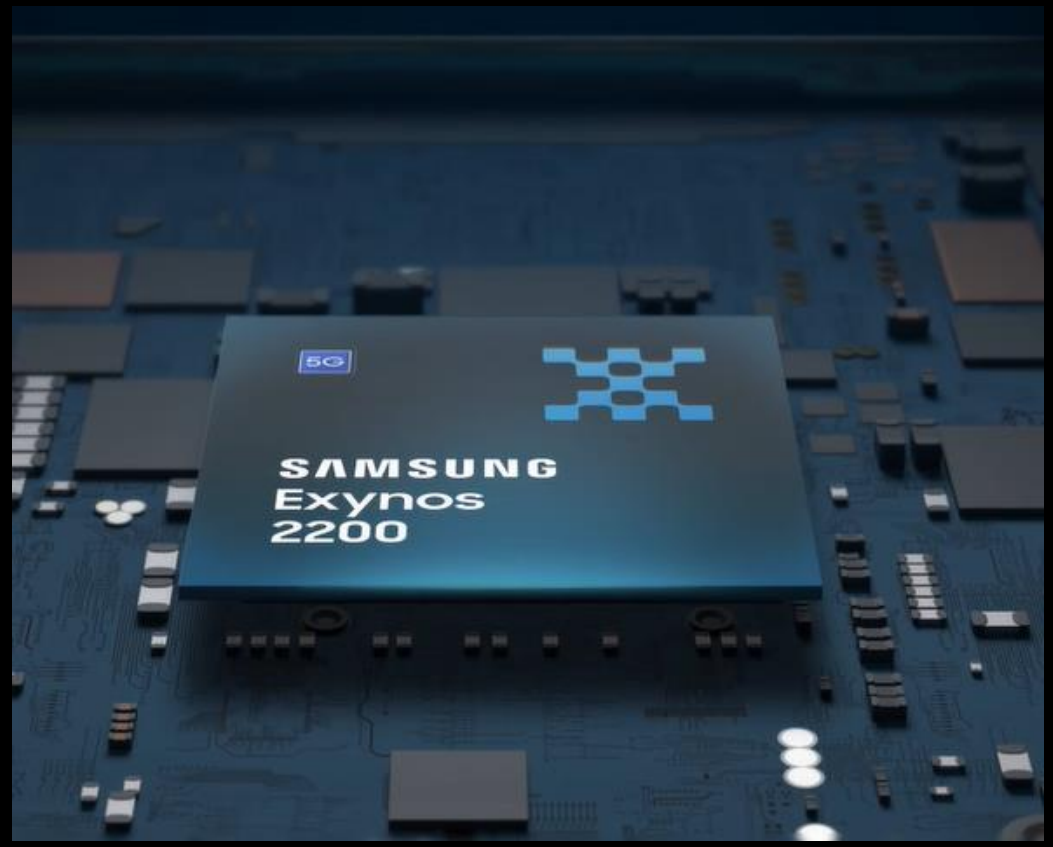
Mediatek Dimensity

- The top mobile chip in MediaTek's stable is described as a "milestone of innovation," and that "everything inside its super powerful—yet super power efficient—4nm package screams flagship chip."
- The Dimensity 9200 delivers a sizable 35 percent performance advantage over other Android flagships, and is reportedly 37 percent more power efficient too.
- Some of the smartphones which use this processor are Vivo X90 Pro 5G, OnePlus Nord 5 and Vivo S17 Pro etc



EXYNOS

- The Samsung Exynos 2200 is a high end SoC with 8 cores in three clusters.
- Samsung Exynos 2200 – an 8-core chipset that was announced on January 18, 2022, and is manufactured using a 4-nanometer process technology.
- Some of the smartphones which use this processor are **Samsung Galaxy S22 Ultra, Samsung Galaxy S22+ and Samsung Galaxy S22**



CONCLUSION

- Processors have a major role to play in any device with its various components for processing and executing instructions.
- The latest processors are coming up with a greater efficiency
- The technology advancement expects to build up the more power proficient versatile processor designs for portable devices.


Thank you!