

برنامه نویسی سیستمی



Windows Internals

کاوه حقیقی

مفاهیم سخت افزار

کاوه حقیقی - برنامه نویسی سیستمی

قطعات کامپیوتر



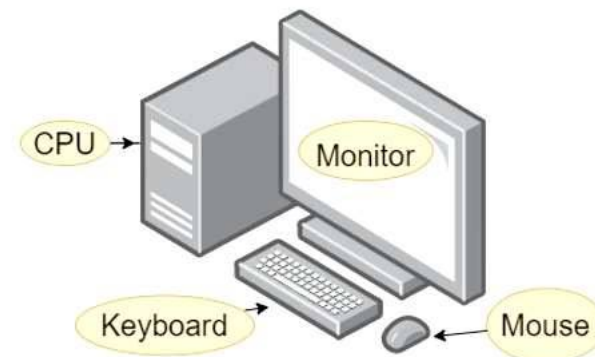
- پردازنده
- رم یا حافظه اصلی
- هارد یا حافظه جانبی
- کارت گرافیک
- کارت شبکه
- مادر برد
- پاور یا منبع تغذیه
- موس و کیبورد
- مانیتور یا صفحه نمایش

کامپیوتر چیست؟

2 به علاوه 2 همیشه 4

اگر ساعت 5 بود بوق بزن

What is Computer

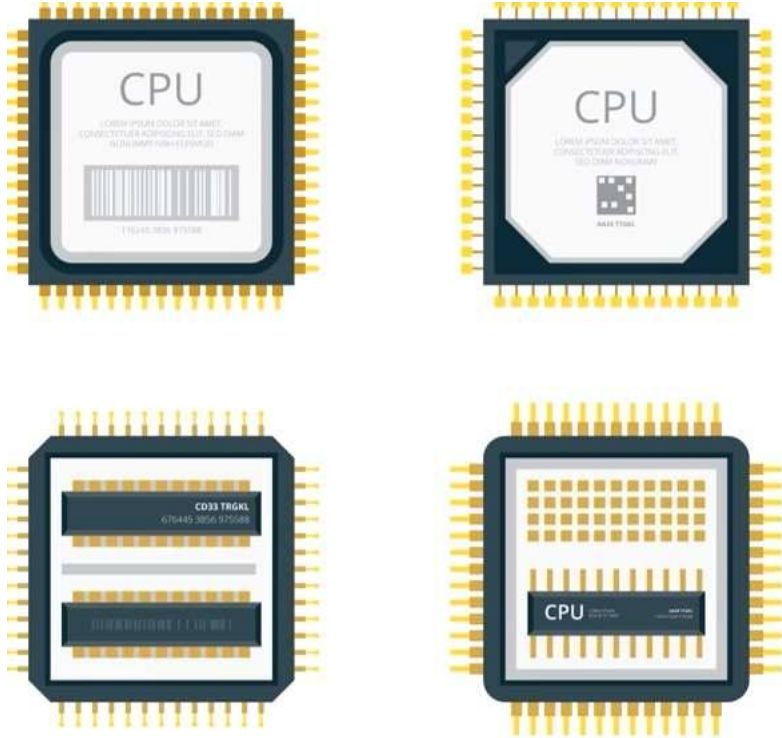


انواع کامپیوتر



کاوه حقیقی - برنامه نویسی سیستمی

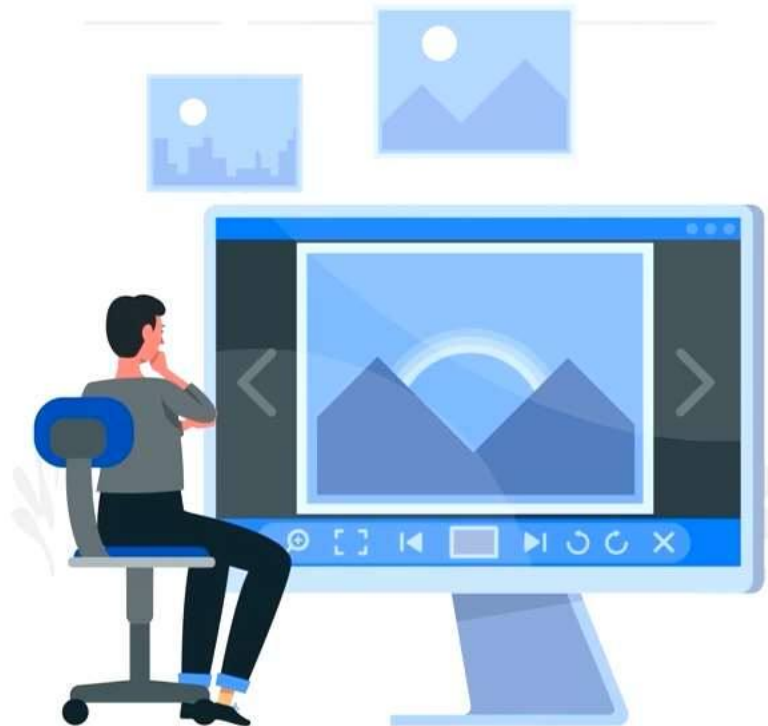
پردازنده چیست؟



Central Processing Unit

واحد پردازشگر مرکزی

زبان کامپیوتر

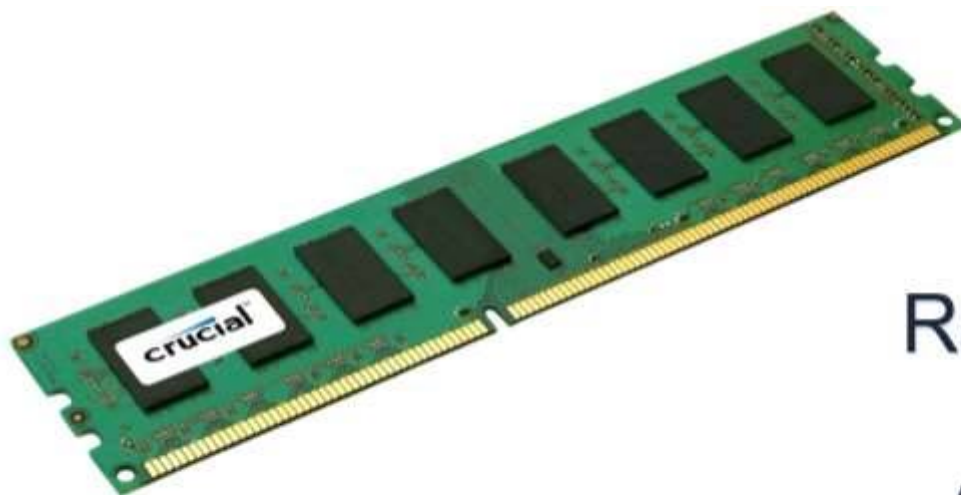


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فضای ذخیره سازی



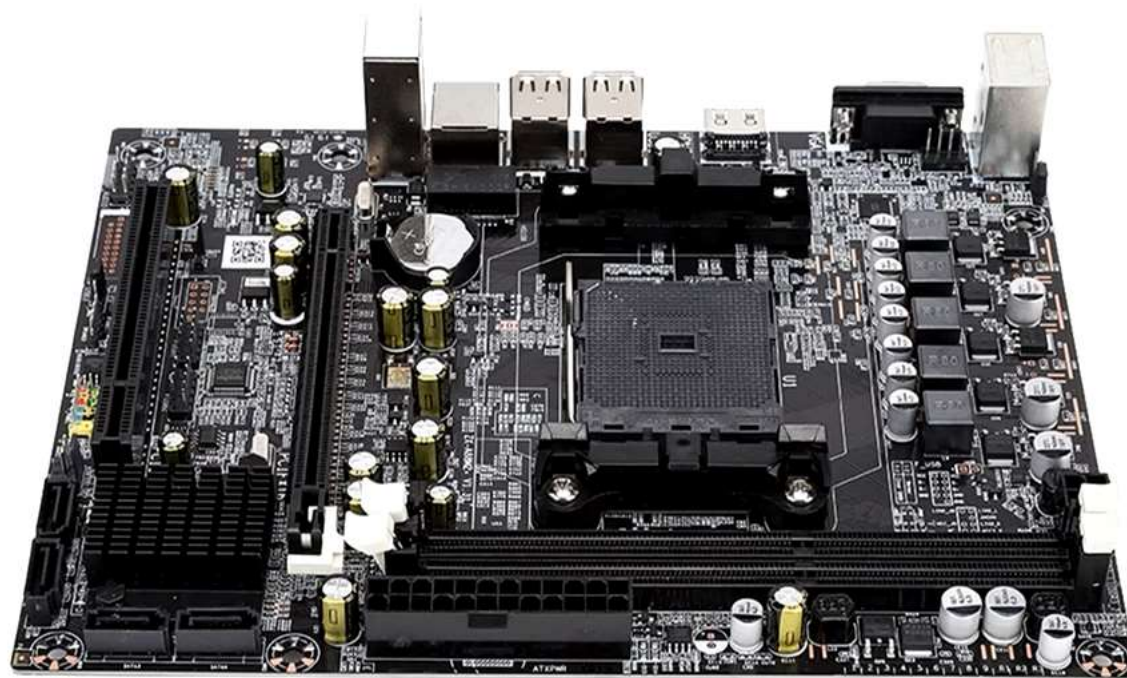
حافظه اصلی Ram



Random Access Memory

حافظه با دسترسی تصادفی

مادربرد - مین برد



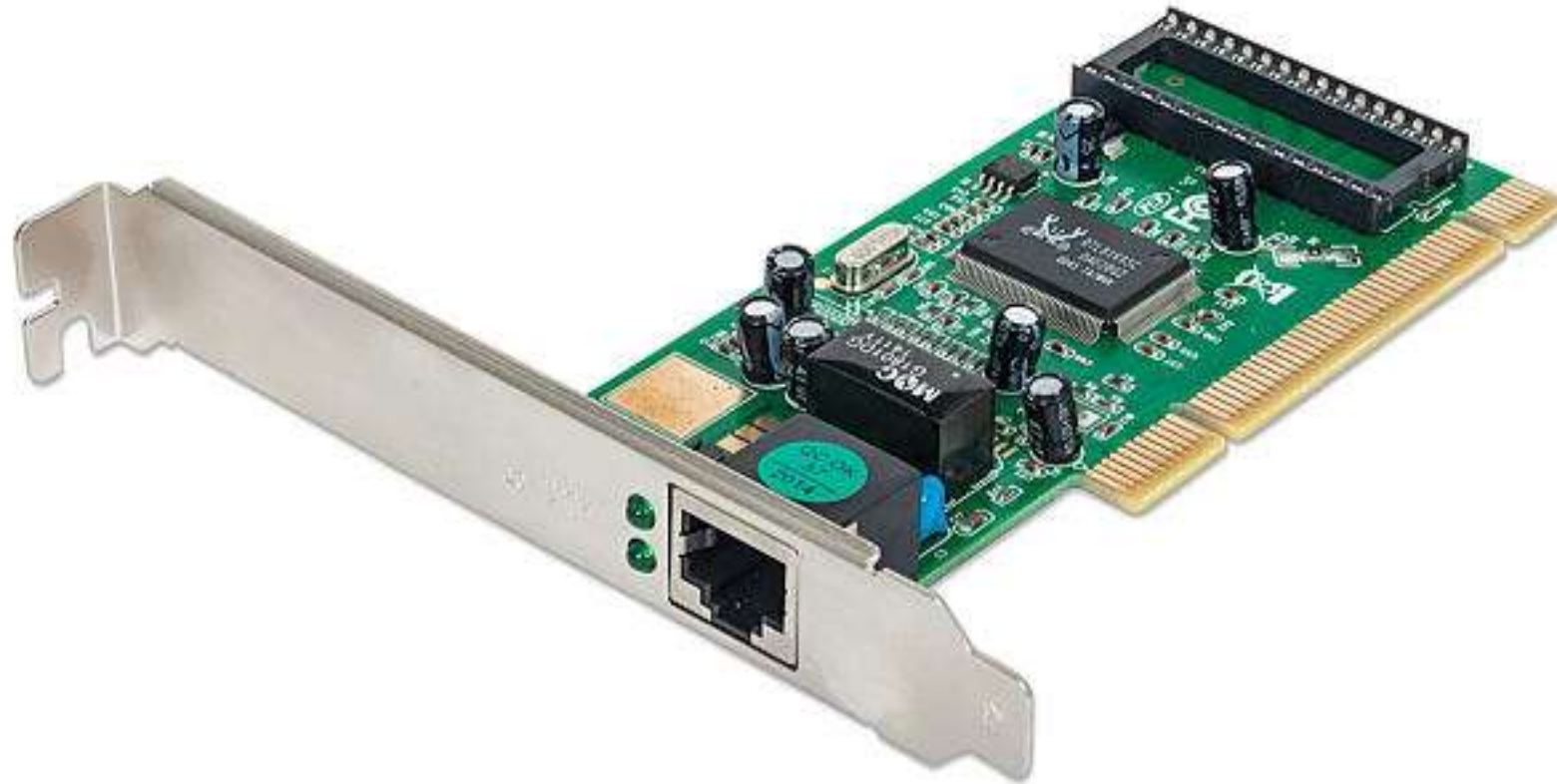
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پردازنده گرافیکی



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کارت شبکه



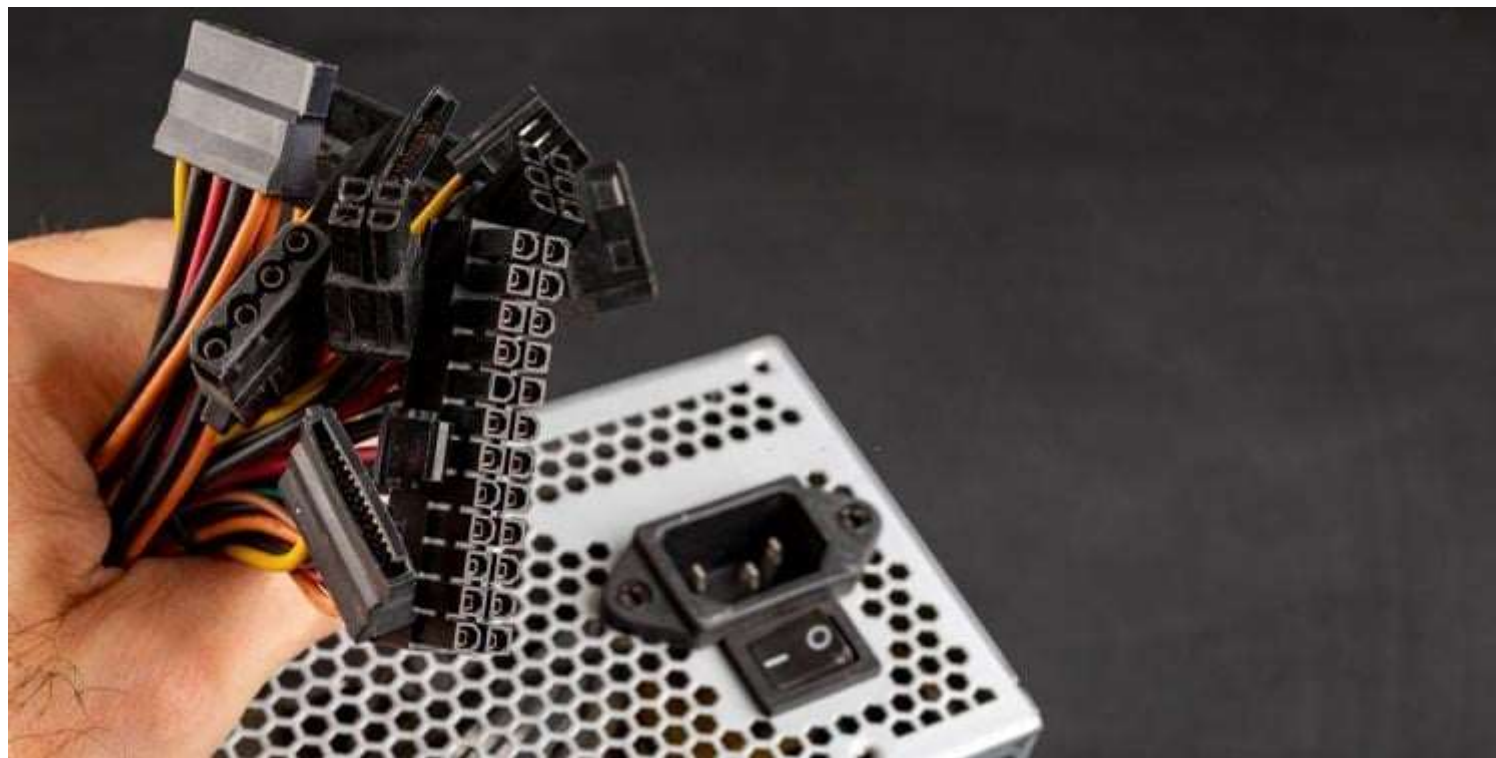
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منبع تغذیه



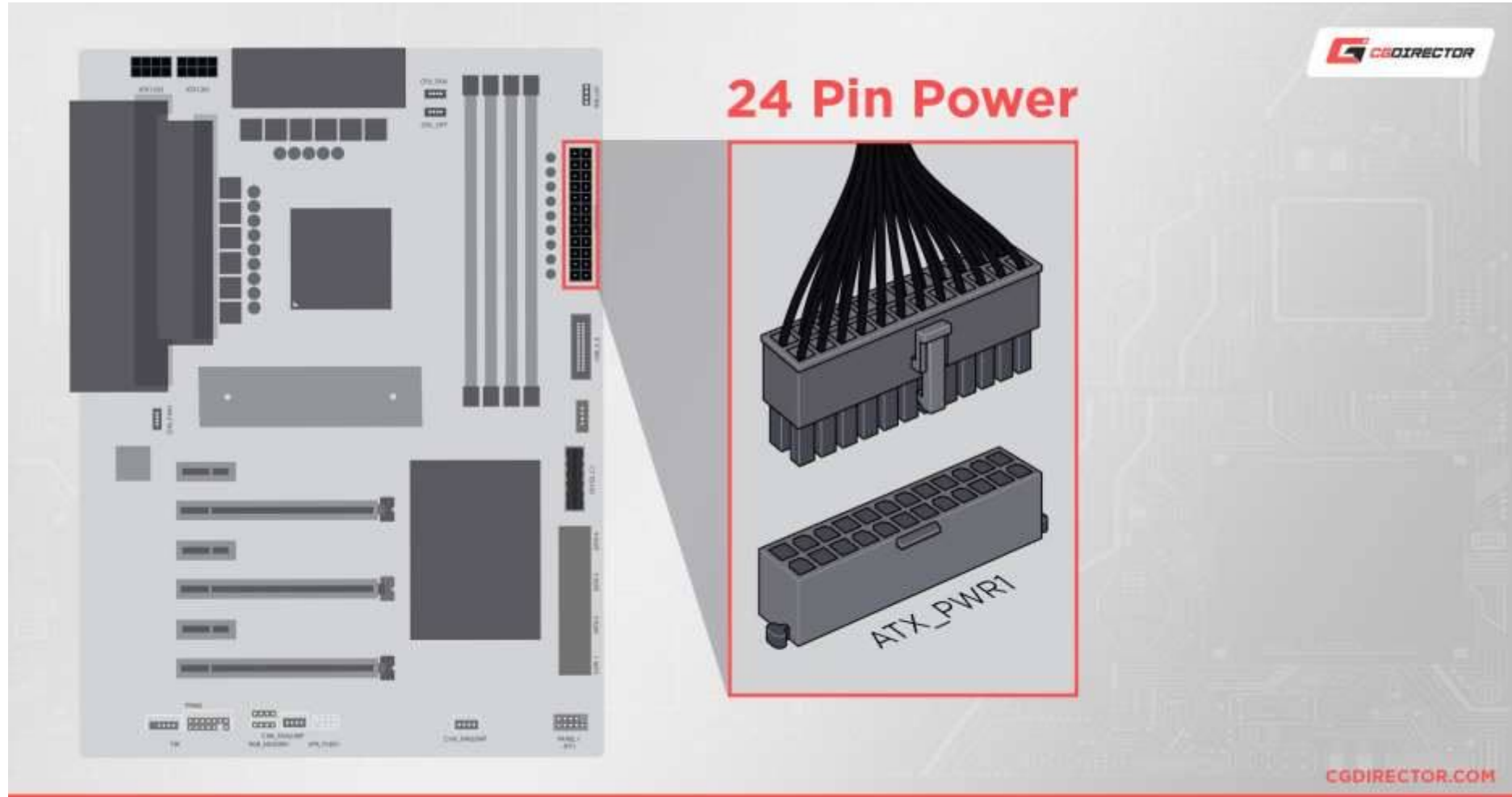
کاوه حقیقی - برنامه نویسی سیستمی

کابل‌های منبع تغذیه



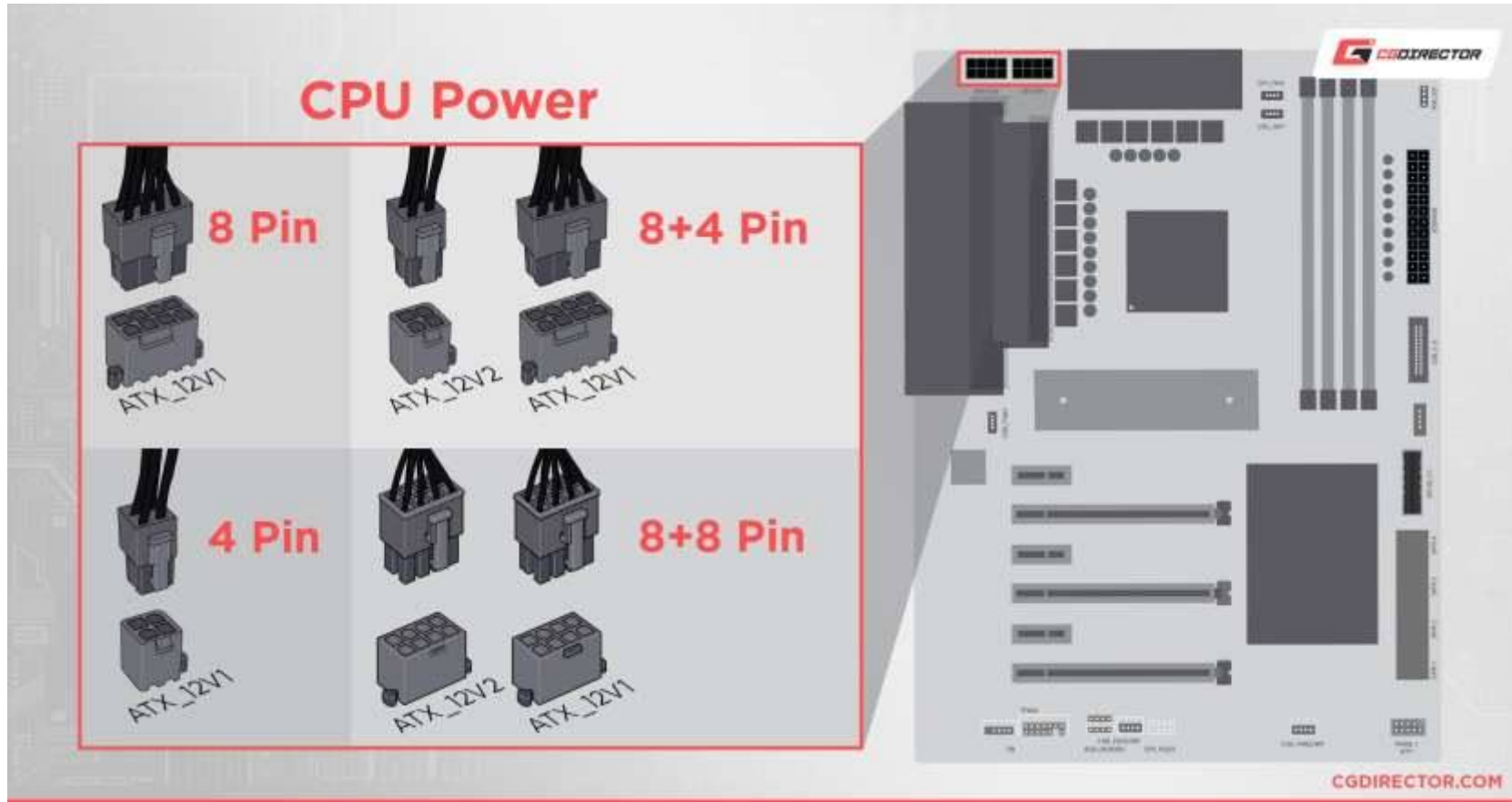
کاوه حقیقی - برنامه نویسی سیستمی

کابل‌های منبع تغذیه



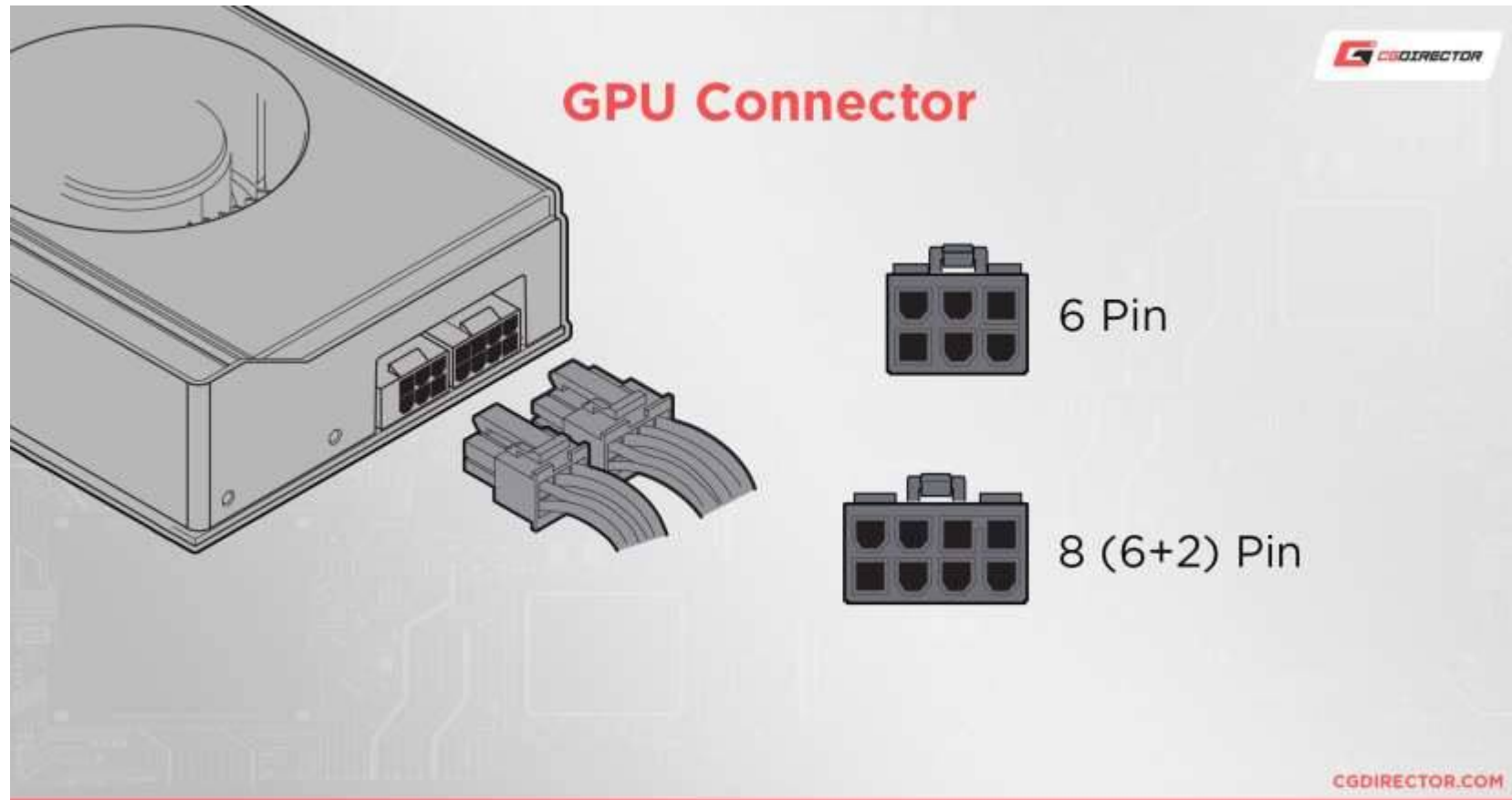
کاوه حقیقی - برنامه نویسی سیستمی

کابل‌های منبع تغذیه



کاوه حقیقی - برنامه نویسی سیستمی





کابل‌های منبع تغذیه











کابل‌های منبع تغذیه









کابل های سیستم

VGA		Available in lengths from 1.8m to 40m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		VGA (15-Pin D-Sub) 17mm x 8.5mm	Analogue Video Although largely replaced by DVI, VGA inputs and outputs are still common on laptops and TVs.	Personal Computers, Monitors, Projectors & Televisions.
		Mini VGA 10.6mm x 5mm	Analogue Video Not to be confused with Mini-DisplayPort, this older Apple connection is making a comeback on tablets and netbooks	Select Tablets & Laptops.





کابل های سیستم

DVI		Available in lengths from 1m to 10m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		DVI-A (Analogue) 25mm x 8mm	Digital or Analogue Video Signals are compatible with both VGA (analogue) and HDMI (digital) for easy conversion.	Personal Computers, Monitors & Televisions.
		DVI-D Dual Link (Digital) 25mm x 8mm	This is the only common standard that includes both digital and analogue signals. Connectors can range from 12+5 to 24+5 pins.	Personal Computers, Monitors & Televisions.
		DVI-I Dual Link (Integrated Analogue and Digital) 25mm x 8mm	The flat pin on a DVI-I male connector is wider than the same pin on a DVI-D connector.	Personal Computers, Monitors & Televisions.
		Mini DVI (Integrated Analogue and Digital) 11.2mm x 7.1mm	Digital or Analogue Video Supports up to 1920x1200 resolution for compatibility with HDMI, VGA and DVI (single link) Replaced by Mini-DisplayPort	Select Apple computers and laptops





کابل های سیستم

HDMI		Available in lengths from 0.5m to 100m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		Type A 13.9mm x 4.45mm	Digital Video + Audio (& Ethernet v1.4) HDMI is the latest commercial standard for high-definition digital video and audio signals in the one connection.	Modern Televisions, Monitors, Laptops, Blu-ray, DVD, PVR, Projectors, X-Box 360, PS3, Personal Computers & more!
		Type C (Mini HDMI) 10.42mm x 2.42mm	v1.3 cables are capable of current-generation high-definition and 3D output, while v1.4 will cater to the next-gen 2k x 4k super-high definition and even better 3D signals along with wired network support.	Camcorders, Digital Cameras, Notebooks, Tablet PCs and other small A/V devices.
		Type D (Micro HDMI) 6.4mm x 2.8mm		Tablet PCs, Camcorders, Digital Cameras and other miniaturized A/V devices.

کابل های سیستم

DisplayPort & Mini-DisplayPort		Available in lengths from 1m to 5m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		DisplayPort 16mm x 4.5mm	Digital Video Designed to replace DVI and VGA Thunderbolt Multi-purpose Data transfer. Thunderbolt uses the same form factor and plug type as Mini-DisplayPort, but expands the standard to support use for file transfer, Firewire and more.	Apple PCs and Laptops, Computer Monitors and PC Video Cards/GPUs.
		Mini-DisplayPort & Thunderbolt 7.5mm x 4.5mm	* Not all Mini-DisplayPort sockets are Thunderbolt compatible!	Apple Notebooks and Netbooks.

کابل های سیستم

TOSLINK		Available in lengths from 1m to 15m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		TOSLINK (S/PDIF Digital Optical) 7mm x 6mm	Digital Audio TOSLINK is a compact and convenient method of carrying high-quality digital audio signals over fibre optic cable. Digital Optical connections are a popular auxiliary output for when quality matters.	CD, DVD, Blu-ray, Personal Computers & Gaming Consoles Socket is commonly found with a flap/door covering to protect against dust and dirt.
		Mini-TOSLINK (3.5mm Digital Optical) 14.5mm x 3.5mm		Apple Computers, MiniDisc Players & other personal audio devices. Socket can be easily confused with 3.5mm stereo audio jack.









کابل های سیستم

Audio Jack (TS, TRS & TRRS) Available in lengths from 30cm to 10m





Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		2.5mm Stereo Audio Jack (TRS Connector) 11mm x 2.5mm	Analogue Audio (Stereo or Mono) TRS stands for 'Tip, Ring, Sleeve', and describes the three-part construction that carries the stereo left, stereo right and ground currents respectively.	Pocket PCs and other miniaturized PDA devices. Sometimes found on telephone headsets.
		2.5mm Mono Audio Jack (TRS Connector) 11mm x 2.5mm		
		3.5mm Stereo Audio Jack (TRS Connector) 14mm x 3.5mm	They have been the ubiquitous audio connection for most of the last century, and offer high audio quality for headphones and small stereo speakers.	Personal Computers, Laptops, Headphones, MP3 players, Mobile Phones, PDAs, DVD Players, Radios and much more!
		3.5mm Mono Audio Jack (TRS Connector) 14mm x 3.5mm		
		3.5mm 4-Pole Audio Jack (TRRS Connector) 14mm x 3.5mm	TRRS jacks have an extra connection, typically for microphone input but sometimes used for composite video. They are the same physical size as a regular jack and are most common in the 3.5mm pin size.	Smartphones, Microphone Headsets, Balanced Audio, In-Car AV systems.
		6.5mm Stereo Audio Jack (Quarter-Inch TRS Connector) 30mm x 6.5mm	TRS, TRRS and Mini-TOSLINK ports can be easily confused (especially on Apple products), and are not always compatible with each other.	High-end Stereo Headphones, A/V and Stereo Receivers, Aviation Headsets, Mixing Decks and other audio equipment.
		6.5mm Mono Audio Jack (Quarter-Inch TRS Connector) 30mm x 6.5mm		

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کابل های سیستم

RCA (A/V Connections)		Available in lengths from 75cm to 20m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		Component Video (YPbPr) 15mm x 12mm	High Definition Analogue Video Supports up to 1080p video, and is typically combined with Left & Right RCA Audio.	Receivers, Televisions, Media Players, etc.
		Composite Video with Left & Right Audio 15mm x 12mm	Standard Definition Analogue Video Supports up to 480i (720 x 576i) video, plus stereo (L&R) audio.	Receivers, Televisions, VCRs, Laserdiscs, Old-School Consoles and A/V Equipment
		Digital Coaxial Audio (S/PDIF) 15mm x 12mm	High Quality Digital Audio Supports Dolby Digital and DTS Audio up to 7.1 surround sound.	Receivers, Televisions, Media Players, and other high-end audio equipment.
		Subwoofer RCA (1RCA to 2RCA) 15mm x 12mm	Left & Right Stereo Audio / Dedicated Subwoofer Channel For Analogue Stereo Audio and connecting amplifiers/receivers to subwoofers with 2 RCA Inputs	Subwoofers, Stereo Amplifiers, DVD Players

کابل‌های سیستم

SCART & S-Video		Available in lengths from 1.5m to 10m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		SCART (EIA Multiport) 43mm x 13mm	Standard Definition Video and Audio Common in European devices and some Foxtel units.	Foxtel Boxes & some TV's
		S-Video (SVHS, Y/C) 6mm x 8.5mm	Analogue Video S-Video is still found as an auxiliary input or output on many types of AV Equipment.	Laptops, VCRs, Set Top Boxes, DVD Players, Receivers and Televisions, etc. Not to be confused with PS/2 ports for keyboards and mice.






کابل های سیستم

کاوه حقیقی - برنامه نویسی سیستمی







Available in lengths from 50cm to 5m

Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		USB Type A (Standard A USB) 12mm x 4.2mm	Data Transfer & Gadget Charging USB cables are everywhere these days. There's a size and a type for everything, from flash drives to external sound cards, and from printers to camcorders. If it has data on it, or can be charged at low voltage, it's likely going to have at least one USB port!	USB Flash Drives, USB Novelty Gadgets, Media Players, Computers, Printers, Laptops, etc.
		USB Type B (Standard B USB) 8mm x 7mm		External Hard Drives, Printers, etc.
		Mini USB 4 Pin (USB Mini-B) 4.5mm x 3.5mm	Proprietary Design USB Connectors If your USB cable / socket does not look like any listed here, it is possible your device features one of many non-standard 'proprietary' USB connectors, where the shape of the connector is modified by a manufacturer to prevent the use of standard USB cables. In such cases, you may need to contact the product supplier for a suitable USB cable.	Kodak Cameras, Other Digital Cameras, etc.
		Mini USB 5-Pin (USB Mini-B) 7mm x 3mm		Cameras, Portable Hard Drives, Mobile Phones, Portable Media Players, etc.
		Micro USB (USB Micro-B) 7mm x 2mm		Mobile Phones & some Android Smartphones, Tablets, GPS and other miniature electronic devices
		USB 3.0 Type A 12mm x 4.2mm	Data Transfer & Gadget Charging	Personal Computers, External Hard Drives & High Speed PC Peripherals.
		USB 3.0 Type B 8mm x 10.5mm	Designed to be backwards compatible where possible, USB 3.0 can be identified by the blue plastic spacers and sometimes by additional connector pins attached to common USB 2.0 shaped sockets.	External Hard Drives, Printers and other high-speed devices
		USB 3.0 Micro B 12.5mm x 2mm		External Hard Drives, Cameras and other high-speed devices
		USB 3.1 Type-C (USB-C) 8.2mm x 2.4mm	Super-Speed 10Gbps USB Type-C can have many abilities from fast data transfer to carrying power and multimedia signals.	Newer Smartphones, PCs, Laptops and Apple computers

کابل های سیستم

Speaker Wire		Available in lengths from 10m to 100m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		Speaker Cable & Binding Post	<p>Speaker Audio</p> <p>Speaker wire terminals are typically optional, with bare wire to a binding post offering one less 'link in the chain' between devices. Banana plugs may appear tidier and are easier to remove and replace on equipment that is moved or changed regularly.</p>	<p>Loudspeakers, Subwoofers, Amplifiers, Receivers, Audio Switches, Mixing Decks and other high-end audio equipment.</p>
		Banana Plug & Binding Post 17mm x 4mm		
		Speaker Wire & Push-Terminals (Grip Connector)		

کابل های سیستم

TV Coaxial		Available in lengths from 75cm to 15m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		BNC (RF Coaxial) 13.5mm (diam)	Analogue Video & Networking Largely replaced by RCA and digital alternatives.	Network adaptors, radio antennas, closed-circuit and other specialist video equipment.
		F-Type (F Connector) 8.5mm x 10.5mm	Radio Frequency & Data Transfer Cable Internet and Terrestrial Television can run over F-Type connections.	Cable Modems, Foxtel and other Cable Television sources, TV Aerials, etc.
		TV Aerial (Belling-Lee / PAL TV) 8.5mm x 9mm	Radio Frequency & Data Transfer European & Australian standard for Terrestrial Television antenna connections.	Televisions, Roof Antennas, Radio Receivers, etc.





کابل های سیستم

کاوه حقیقی - برنامه نویسی سیستمی







Computer Cables Available in lengths from 50cm to 5m

Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		SATA Data (Serial ATA) 14mm x 3.5mm	Internal Hard Drive I/O Data Has largely replaced IDE cables for internal computer hard drive data access.	SATA Hard Disk Drives and PC Motherboards. (SATA 1, 2 & 3 compatible)
		SATA Power (Serial ATA) 24mm x 3.5mm	Internal Hard Drive Power Replaces 4-pin Molex connectors (below) on newer hard drives.	SATA Hard Disk Drives. (SATA 1, 2 & 3 compatible)
		eSATA (External Serial ATA) 14.5mm x 4.5mm	External Hard Drive Data I/O High speed data transmission (3Gb/s) for external devices.	External/Portable Hard Drives and HDD Caddies, etc. (SATA 1, 2 & 3 compatible)
		IDE (ATAPI) 54.5mm x 6mm	Internal Disk Drive Data I/O Max 133 MB/s data rate for optical and hard disc drives.	IDE Hard Drives, Floppy Drives, CD and DVD ROM Drives, PC Motherboards.
		Molex Power 21mm x 6.5mm	Internal PC Peripheral Power Ubiquitous power feed between PSUs and PC components.	Hard Disk Drives, Fan Controllers, DVD ROM Drives, etc.
		ROM Audio (Internal SP/DIF) 5mm x 2.5mm	Direct Digital Audio This cable facilitates music playback on ROM drives that don't feature Digital Audio Extraction.	Internal PC DVD- and CD-ROM Drives.
		Firewire 400 4-Pin (IEEE 1394b 4-Pin) 5.5mm x 3mm	Real-Time High-Speed Data Transfer Also known as i.LINK and Lynx, the Firewire standard is typically used on digital audio, digital video and data storage devices for PC and Apple computers.	Apple Notebooks and Computers, Digital Video Cameras and Camcorders, Data Storage Devices and External Hard Drives.
		Firewire 400 6-Pin (IEEE 1394a 6-Pin) 11mm x 6mm	Potential speeds range between 400 and 3200-Mb/s. Plug types can be converted using adapters, and run at the rate of the slowest port capacity.	
		Firewire 800 (IEEE 1394 9-Pin) 10mm x 7.5mm		
		PS/2 (6-Pin Mini-DIN) 6mm x 8.5mm	Mouse and Keyboard I/O Now replaced by USB on new computers and laptops.	Personal Computers and other legacy PC peripherals including mice and keyboards. Don't confuse with visually similar S-Video ports.

کابل های سیستم

Power Leads		Available in lengths from 50cm to 5m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		Australian Mains Power (AS 3112 / Type I) 20mm x 39mm	Mains Power Also common in an unearthed version with only two angled pins.	Australian Mains Power Points, Powered consumer white goods and electronic devices.
		IEC Power (IEC C13 / C14) 23mm x 26mm	Mains Power S-Video is still found as an auxiliary input or output on many types of AV Equipment.	PCs, Televisions, Monitors, Amps, UPSs, and many other electronic devices.

کابل های سیستم

Communications & Networking		Available in lengths from 30cm to 305m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		Ethernet RJ45 (8P8C / LAN / Cat5 / Crossover) 11.5mm x 6.5mm	Network Data Transfer Capable of speeds up to 100 Gbit/sec for local area networks Cable colours vary.	PCs, Laptops, Modems, Ethernet Routers and Switches, Blu-ray Players, Gaming Consoles, etc.
		Australian Telephone Jack (600 Series) 41.5mm x 10.5mm	Telephone Slowly being phased out and replaced by RJ12 sockets (below).	Older model Telephones and Fax machines.
		RJ12 Telephone Jack (6P4C Modular) 9mm x 6mm	Telephone Found on all modern home and office telephony equipment including faxes.	ADSL & Dial-Up Modems, Telephones, Faxes and other telephony equipment.

کابل های سیستم

Pro Audio		Available in lengths from 50cm to 25m		
Plug (Male)	Socket (Female)	Name	Format/Use	Found On
		XLR Connector (XLR3) 16-18mm x 13mm	Balanced Audio Connector High quality microphone connection.	Microphones and performance music equipment.
		Speakon 20mm x 17mm	High Current Professional Audio For connecting microphones to loudspeakers and amplifiers.	Microphones, loudspeakers, amplifiers and performance music equipment.
		MIDI (Musical Instrument Digital Interface) 10mm x 12.5mm	Musical Instrument Communications Allows synchronisation between instruments and computers.	Keyboards, synthesizers, audio controllers, mixers and other specialised computer hardware.

کابل‌های سیستم



کاوه حقیقی - برنامه نویسی سیستمی

سیستم عامل



OPERATING SYSTEMS



Windows



Mac OS X



Linux

DESKTOP

MOBILE

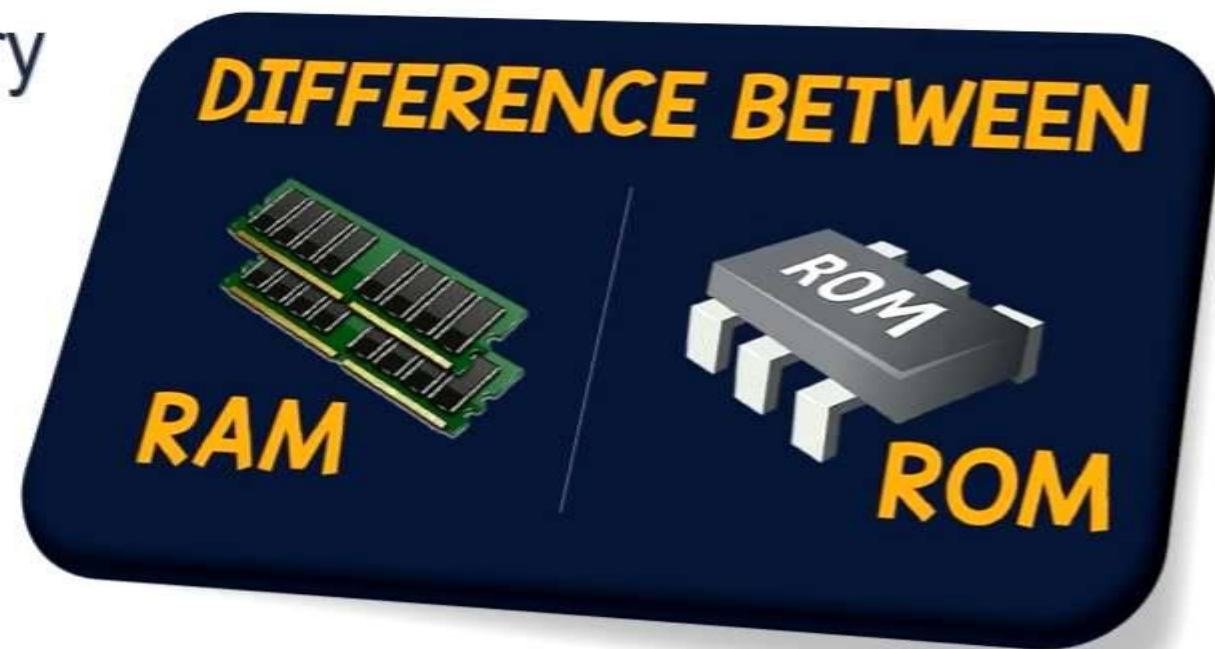


کاوه حقیقی - برنامه نویسی سیستمی

Ram vs Rom

Random Access Memory

Read Only Memory

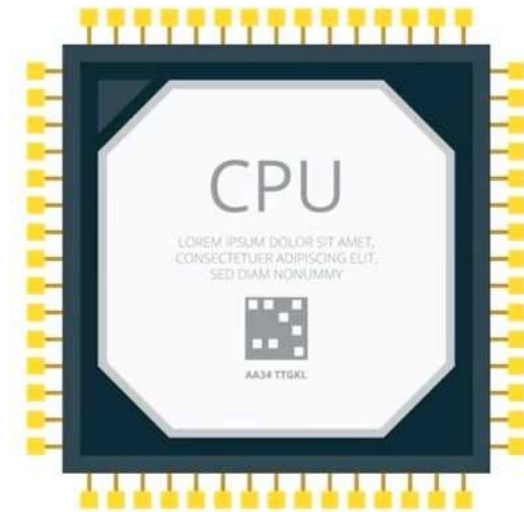


روند اجرای نرم افزار

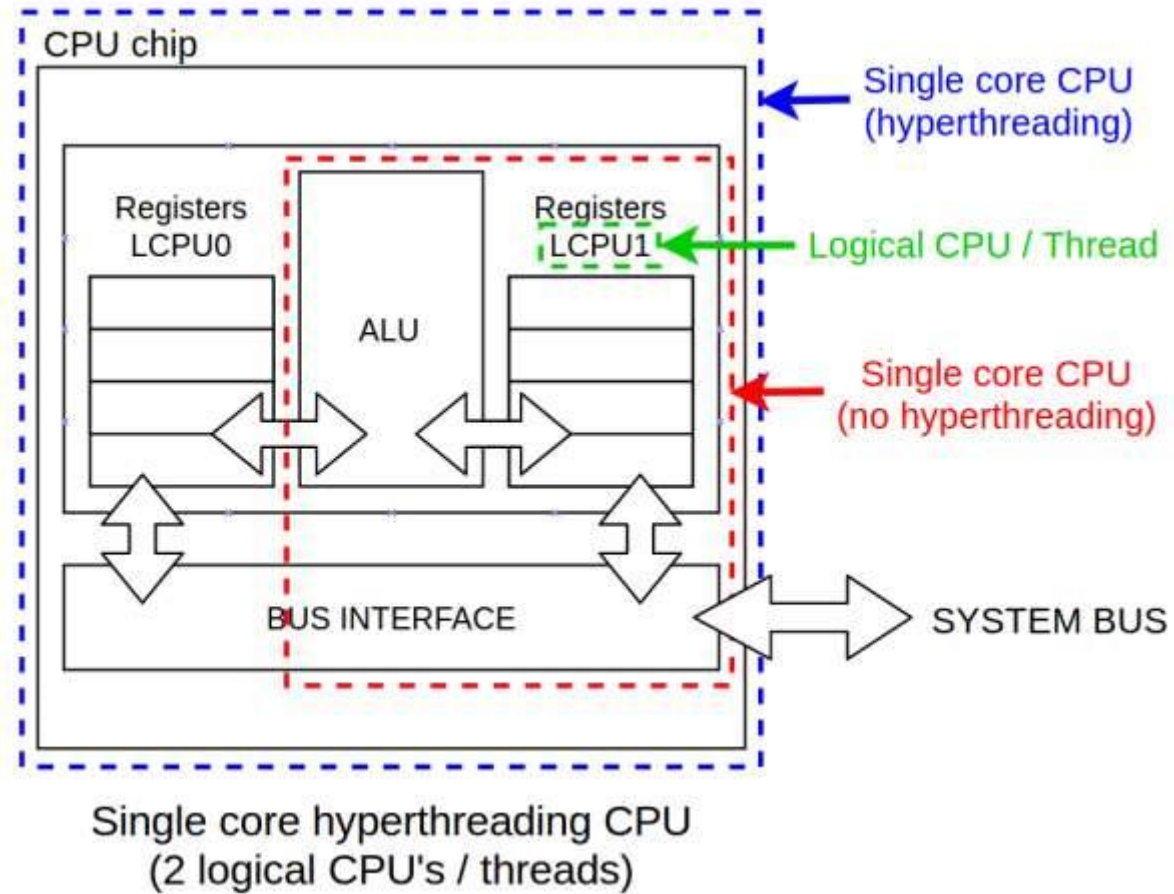


کاوه حقیقی - برنامه نویسی سیستمی

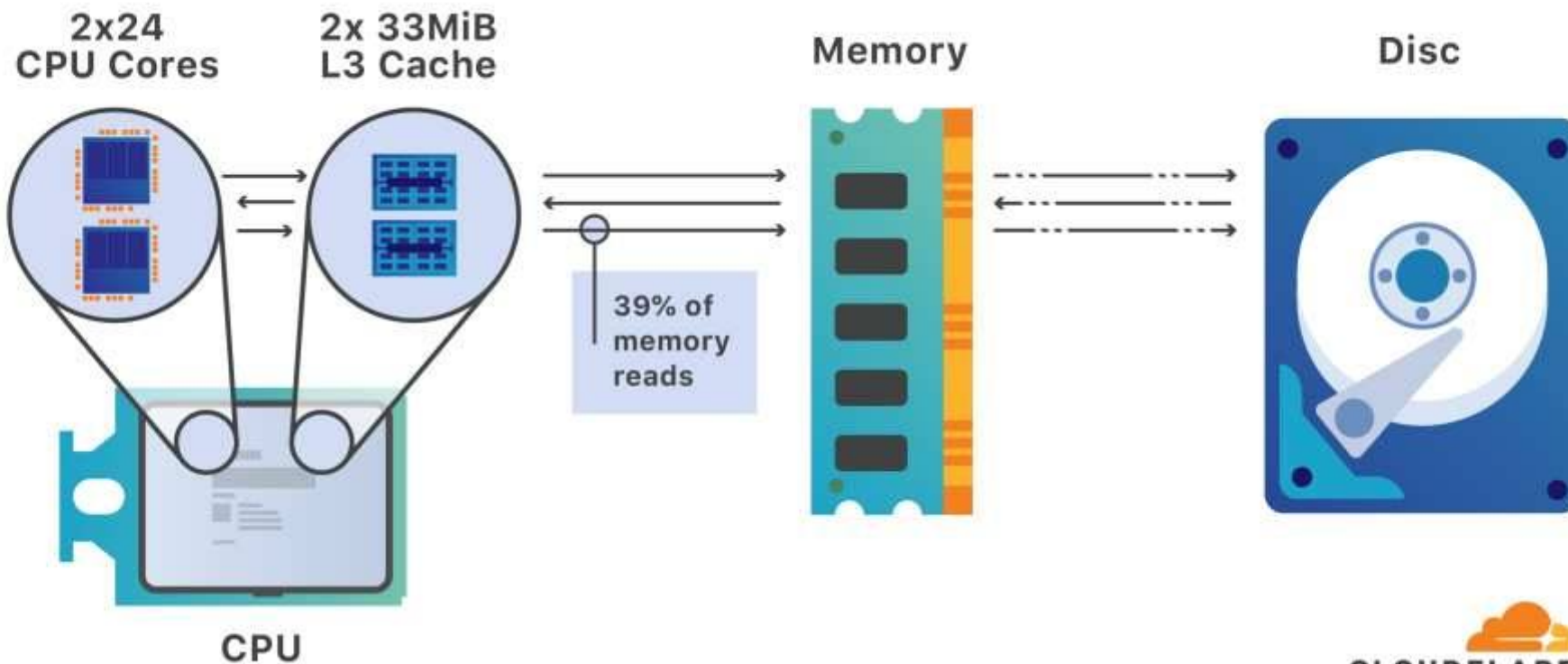
همروندی، هسته و ترد در پردازنده



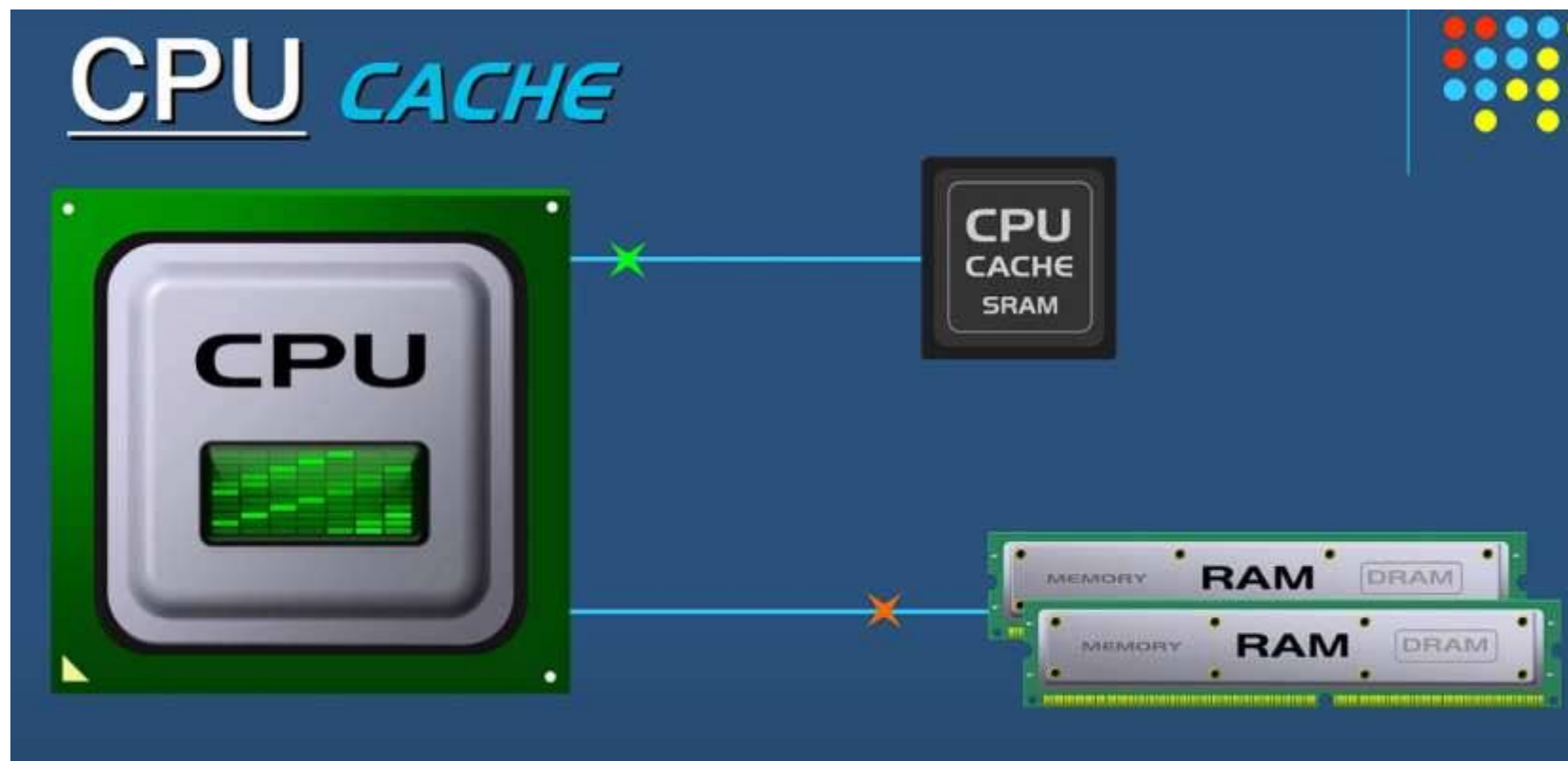
هسته و ترد در پردازنده



کش در پردازنده

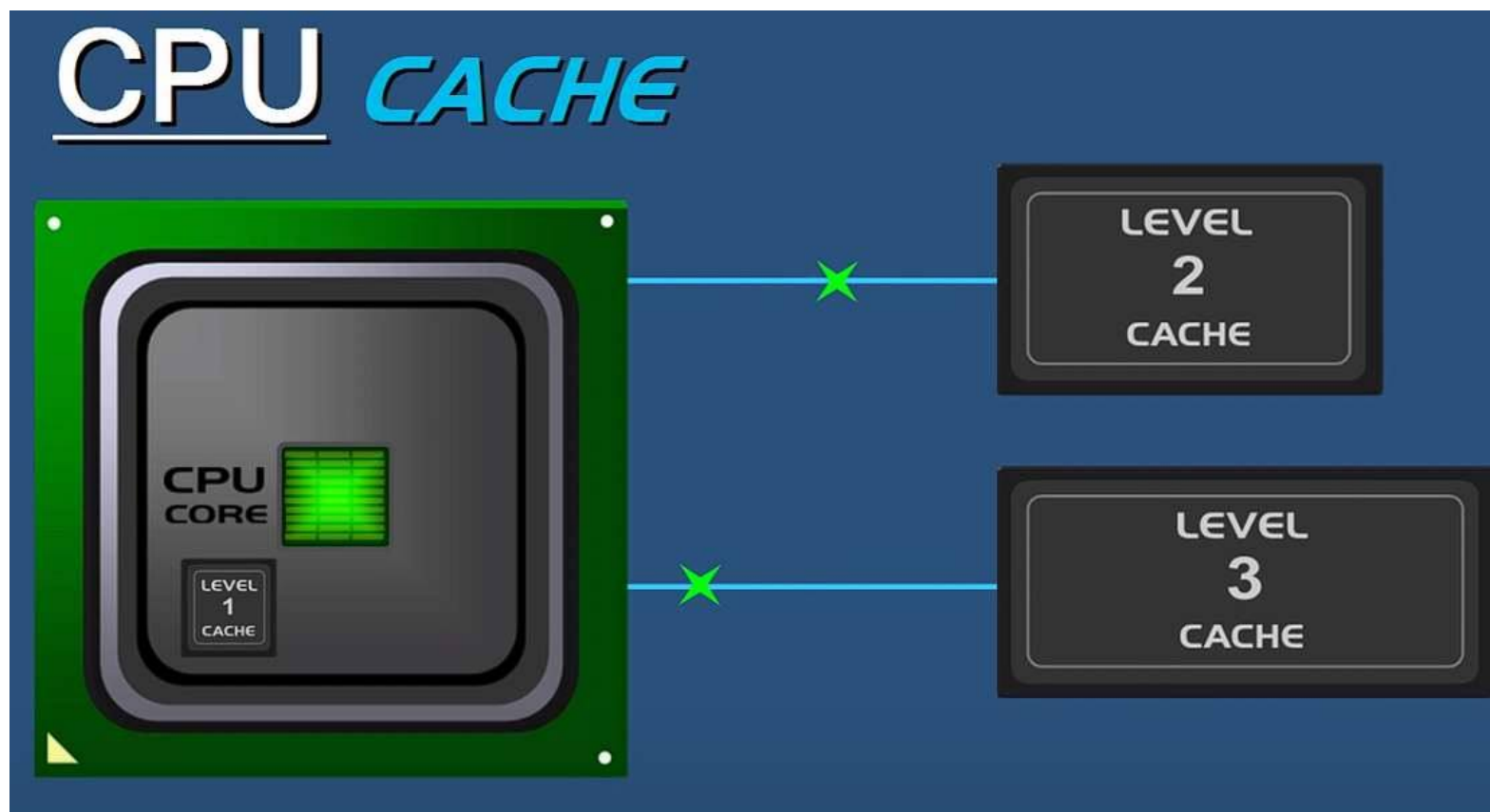


کش در پردازنده



کاوه حقیقی - برنامه نویسی سیستمی

کش در پردازنده



کش در پردازنده



انواع پردازنده



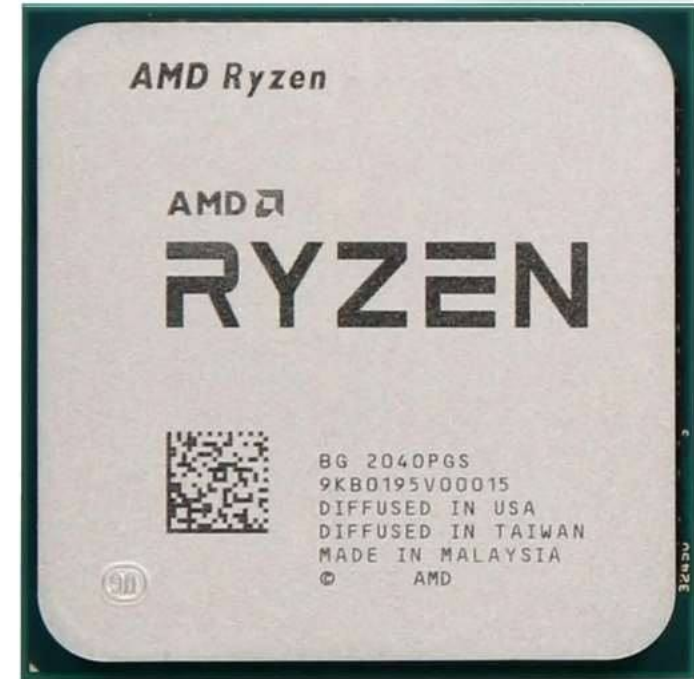
انواع پردازنده

- Core i3
 - Core i5
 - Core i7
 - Core i9
- } ←
- اینتل سری Celeron
 - اینتل سری Pentium
 - اینتل سری Core
 - اینتل سری Xeon
-
- نسل پردازنده
 - تعداد هسته
 - حافظه کش

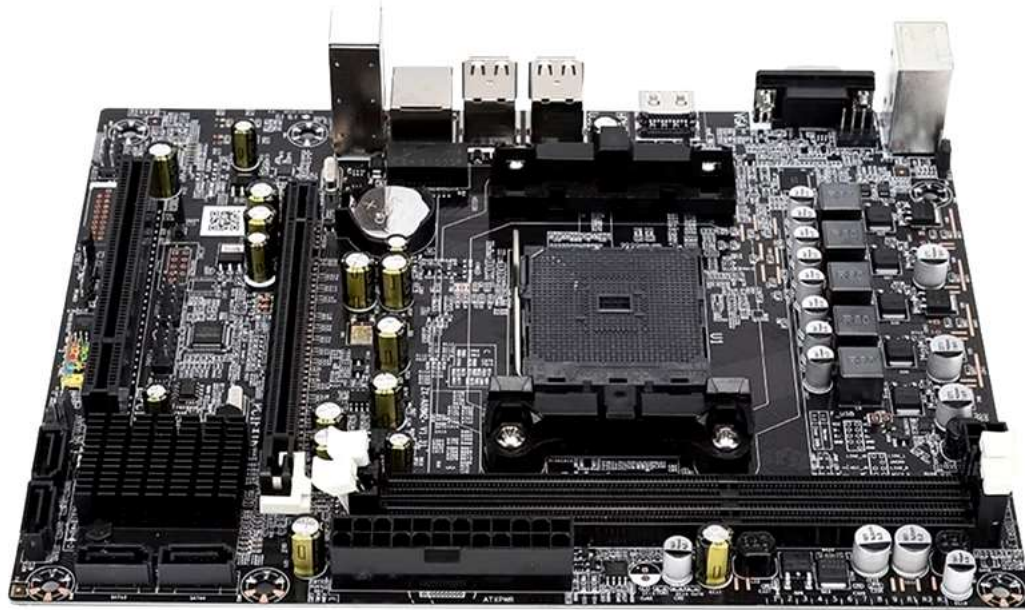


انواع پردازنده

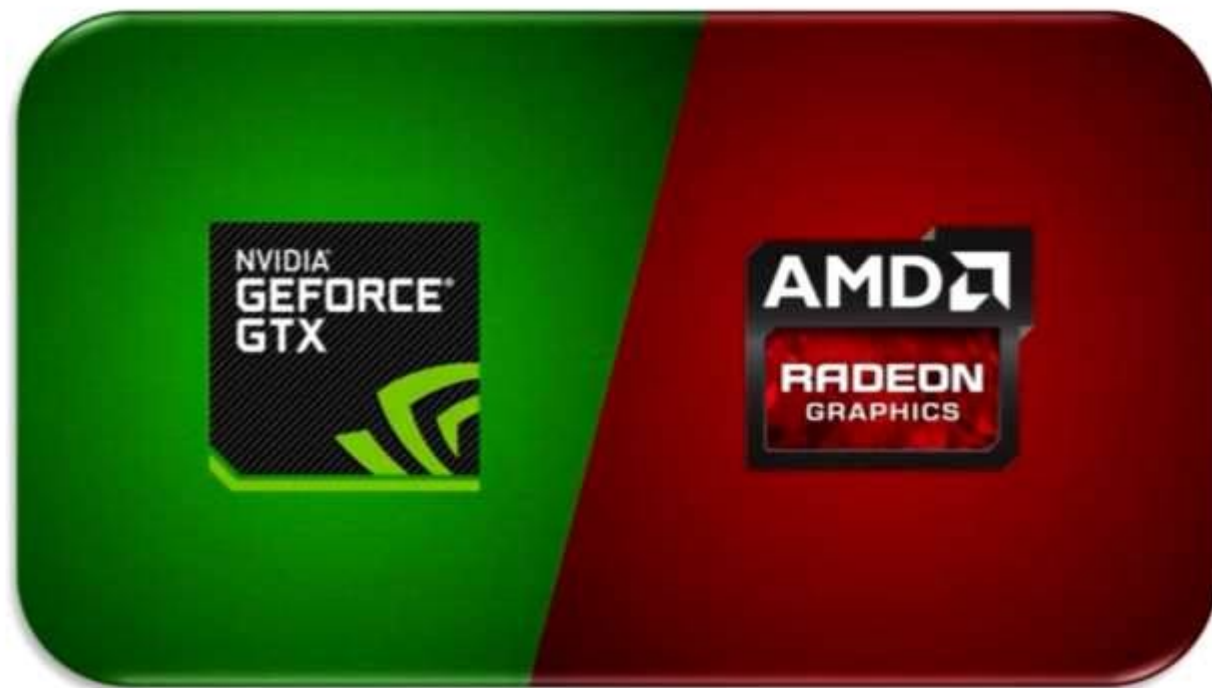
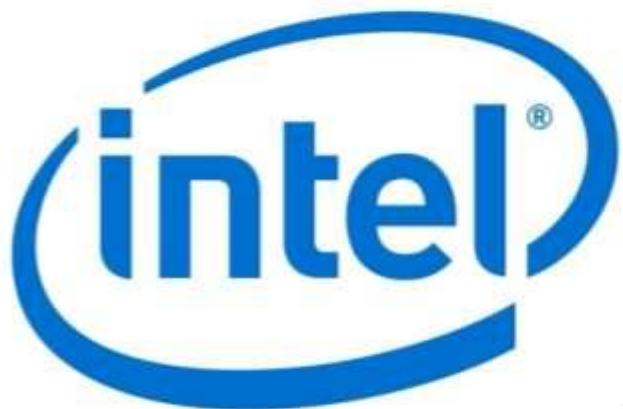
- سری Athlon
 - سری Ryzen
 - سری Threadripper
-
- Ryzen 3
 - Ryzen 5
 - Ryzen 7
 - Ryzen 9



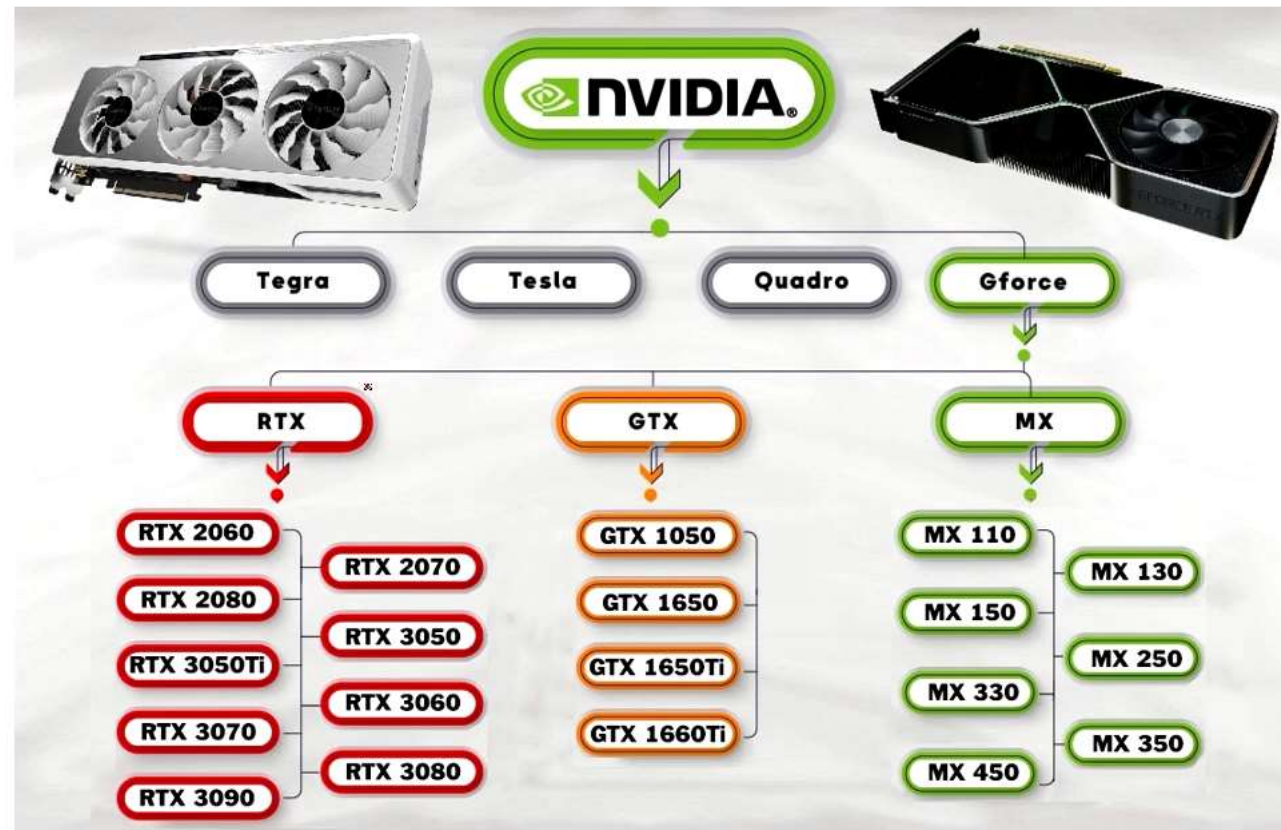
انواع مادربرد



انواع پردازنده‌های گرافیکی

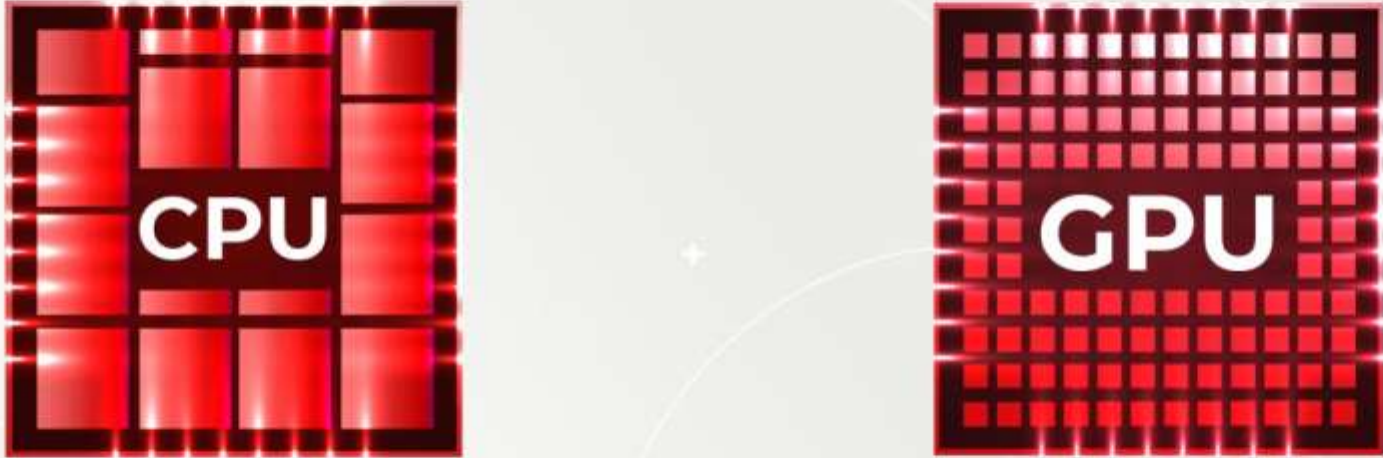


پردازنده‌های گرافیکی انویدیا



تفاوت CPU و GPU

Difference between GPU and CPU Cores



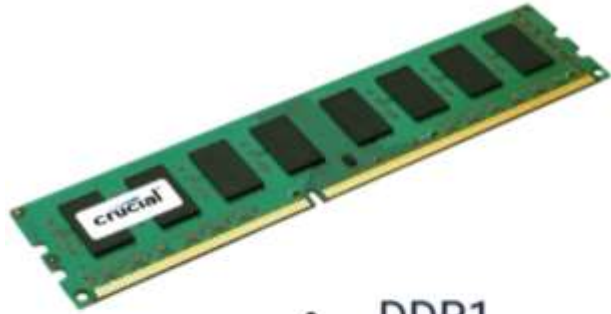
GPU

- CPUs have few strong cores
- Suited for serial workloads
- Designed for general purpose calculations

- GPUs have thousands of weaker cores
- Suited for parallel workloads
- Specialize in graphics processing

CGDIRECTOR.COM

انواع رم



- DDR1
- DDR2
- DDR3
- DDR4
- DDR5
- 1333MH
- 3200MH
- 1100MH
- 4600MH
- 1666MH



انواع حافظه ذخیره سازی

