

Day1

Date: 05-08-2024

Computer Architecture

1.What is processor and types of Processor?

Ans. A processor (CPU) is the logic circuitry that responds to and processes the basic instructions that drive a computer.

A processor is an integrated electronic circuit that performs the calculations that run a computer. A processor performs arithmetical, logical, input/output (I/O) and other basic

instructions that are passed from an operating system (OS).

Types of Processors:

There are different types of processors in the embedded system which include the following.

General Purpose Processor

There are five types of general-purpose processors they are, Microcontroller, Microprocessor, Embedded Processor, DSP and Media Processor.

--> Microprocessor:

The microprocessor is also a general-purpose processor that consists of a control unit, ALU, a bunch of registers also called scratchpad registers, control registers and status

registers.

--> microcontroller:

The microcontroller is an IC (Integrated Circuit) which is designed to perform specific functions in an embedded system.

--> Embedded Processor

An embedded processor is one type of processor which is designed to control mechanical functions and electrical functions.

--> Digital Signal Processor

The digital signal processor is one type of processor used for measuring, filtering and/or compress digital or analog signals.

--> Media Processor

The image/video processor is the media processor that is designed or created to deal with the data in real-time.

2. what is memory and its types of memory?

Ans. Computer memory is just like the human brain. It is used to store data/information and instructions. It is a data storage unit or a data storage device where data is to be processed and instructions required for processing are stored. It can store both the input and output can be stored here.

Types of memory:

*** RAM: RAM is a type of volatile memory that stores data and instructions actively used by the computer. RAM provides quick access to information, allowing the processor to read and write data rapidly.

*** ROM: ROM is a type of non-volatile memory that contains firmware or software instructions that are permanently stored and cannot be modified by normal computer operations. ROM retains its data even when the power is turned off.

*** Cache Memory: Cache memory is a small and extremely fast type of memory that sits between the processor and main random access memory (RAM). It stores frequently accessed data and instructions to provide faster access than fetching from RAM or secondary storage. It helps reduce the time the processor spends waiting for data, improving overall system performance.

*** Virtual Memory: Virtual memory is a memory management technique that allows the computer to compensate for limited physical random access memory (RAM) by using a portion of the hard disk drive (HDD) or solid state drive (SSD) as an extension of RAM.

3. Vendors that make Processor?

Ans.

1. Intel Corporation:

Overview: Intel is a pioneer in the microprocessor industry, renowned for its innovative CPUs that power a wide range of computing devices.

2. Advanced Micro Devices, Inc. (AMD):

Overview: AMD is a key player in the microprocessor market, offering a competitive range of CPUs and GPUs designed for gaming, data centers, and enterprise computing.

3. Qualcomm Incorporated:

Overview: Qualcomm is a leading provider of microprocessors for mobile devices, offering Snapdragon processors that power smartphones, tablets, and other wireless devices.

4. NVIDIA Corporation:

Overview: NVIDIA is renowned for its graphics processing units (GPUs) and increasingly for its high-performance computing (HPC) and artificial intelligence (AI) accelerators.

5. IBM Corporation:

Overview: IBM is a leading provider of microprocessors for enterprise computing, offering POWER processors designed for high-performance computing (HPC) and mission-critical workloads.

6. ARM Limited (Acquired by NVIDIA):

Overview: ARM is a major player in the microprocessor market, known for its energy-efficient CPU designs licensed to semiconductor companies worldwide.

7. MediaTek Inc.:

Overview: MediaTek is a leading provider of system-on-chip (SoC) solutions for smartphones, smart TVs, and IoT devices, offering a range of affordable and feature-rich microprocessors.

8. Apple Inc.:

Overview: Apple designs and manufactures its own custom microprocessors, known as Apple Silicon, for its Mac computers, iPhones, iPads, and other devices.

9. Samsung Electronics Co., Ltd.:

Overview: Samsung is a major player in the microprocessor market, producing a wide range of chips for its smartphones, tablets, and consumer electronics products.

10. Fujitsu Limited:

Overview: Fujitsu is a leading provider of microprocessors for enterprise computing, offering SPARC processors designed for high-performance computing and mission-critical applications

4. Octeon

Ans. OCTEON was a family of 64-bit multi-core MIPS microprocessors designed by Cavium and introduced in mid-2005. These processors are primarily marketed towards makers of network infrastructure (commercial, enterprise, and data center switches, routers, etc..). Cavium offers OCTEON processors with anywhere from one to sixteen cores.

Industry's first processor family based on 5nm ARM Neoverse

N2 platform: OCTEON 10 DPU family is built on TSMC's 5nm process and incorporates 64-bit ARM Neoverse N2 cores.

5. Ocelot

Ans. The Ocelot operating system is a Lisp Machine-inspired, developer-oriented Linux distribution, based on NixOS. The driving idea behind Ocelot is that everything running on a computer,

from the kernel to the user interface, should be easily, instantly, and safely extensible by the user.

** The main functionality of an Ocelot API Gateway is to take incoming HTTP requests and forward them on to a downstream service, currently as another HTTP request.

Assignment

Binary To Decimal Conversion

128 64 32 16 8 4 2 1 Answers

1 0 0 1 0 0 1 0 146

0 1 1 1 0 1 1 1 119

1 1 1 1 1 1 1 1 255

1 1 0 0 0 1 0 1 197

1 1 1 1 0 1 1 0 246

0 0 0 1 0 0 1 1 19

1 0 0 0 0 0 0 1 129

0 0 1 1 0 0 0 1 49

0 1 1 1 1 0 0 0 120

1 1 1 1 0 0 0 0 240

0 0 1 1 1 0 1 1 59

0 0 0 0 0 1 1 1 7

00011011-----27

10101010-----170

01101111-----111

11111000-----248

00100000-----32

01010101-----87

00111110-----62

00000011-----3

11101101-----237

11000000-----192

Decimal to Binary Conversion

128 64 32 16 8 4 2 1 Answers

1 1 1 0 1 1 1 0 = 238

0 0 1 0 0 0 1 0 = 34

0 1 1 1 1 0 1 1 = 123

0 0 1 1 0 0 1 0 = 50

1 1 1 1 1 1 1 1 = 255

1 1 0 0 1 0 0 0 = 200

0 0 0 0 1 0 1 0 = 10

1 0 0 0 1 0 1 0 = 138

0 0 0 0 0 0 0 1 = 1

0 0 0 0 1 1 0 1 = 13

1 1 1 1 1 0 1 0 = 250

0 1 1 0 1 0 1 1 = 107

1 1 1 0 0 0 0 0 = 224

0 1 1 1 0 1 0 0 = 114

1 1 0 0 0 0 0 0 = 192

1 0 1 0 1 1 0 0 = 172

0 1 1 0 0 1 0 0 = 100

0 1 1 1 0 1 1 1 = 119

0 0 1 1 0 0 0 1 = 57

0 1 1 0 0 0 1 0 = 98

1 0 1 1 0 0 1 1 = 179

0 0 0 0 0 0 1 0 = 2

Image-1

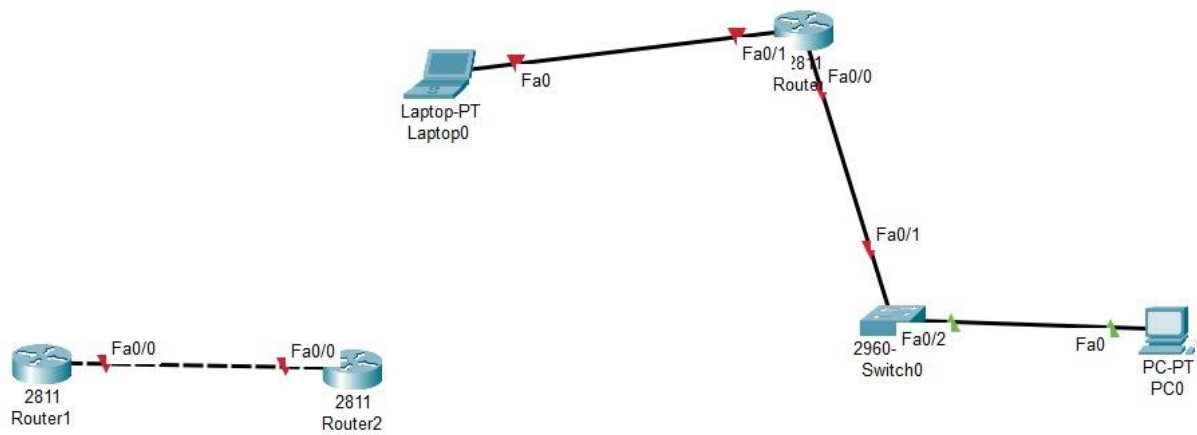


Image-1: Basic Connections

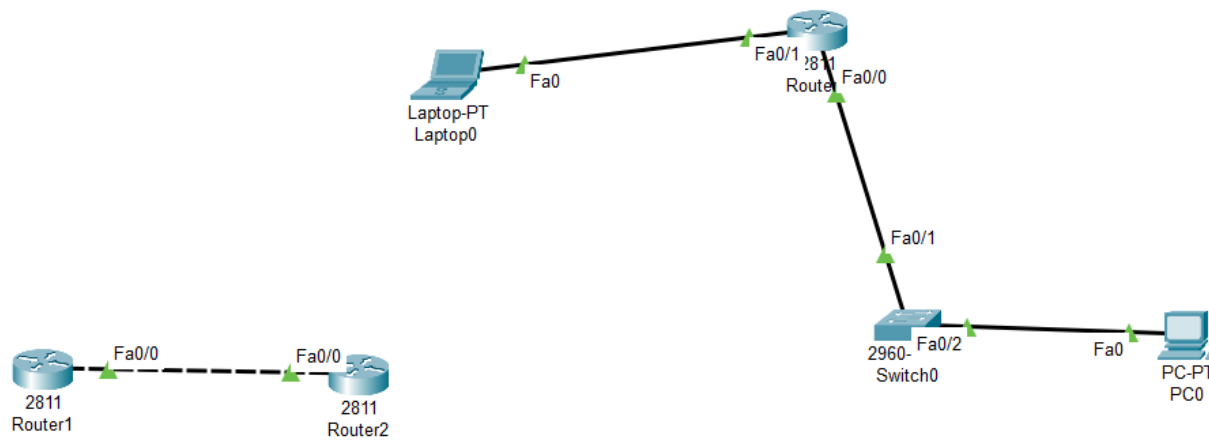


Image-2: Ip Address

The diagram on the left is identical to the one in Image-2, showing the network topology with two routers, a laptop, a switch, and a PC.

The screenshot on the right shows the Command Prompt window in Cisco Packet Tracer. The output is as follows:

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...: 
    Link-local IPv6 Address . . . . .: FE80::20C:85FF:FE23:B56D
    IPv6 Address . . . . .: ::
    IPv4 Address. . . . .: 10.0.0.2
    Subnet Mask . . . . .: 255.0.0.0
    Default Gateway . . . . .: ::
                                0.0.0.0

Bluetooth Connection:

    Connection-specific DNS Suffix...: 
    Link-local IPv6 Address . . . . .: ::
    IPv6 Address . . . . .: ::
    IPv4 Address. . . . .: 0.0.0.0
    Subnet Mask . . . . .: 0.0.0.0
    Default Gateway . . . . .: ::
                                0.0.0.0

C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=2ms TTL=128
Reply from 10.0.0.2: bytes=32 time=1ms TTL=128
Reply from 10.0.0.2: bytes=32 time=7ms TTL=128
Reply from 10.0.0.2: bytes=32 time=8ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 1ms, Average = 7ms

C:\>
  
```

Image-3: Command

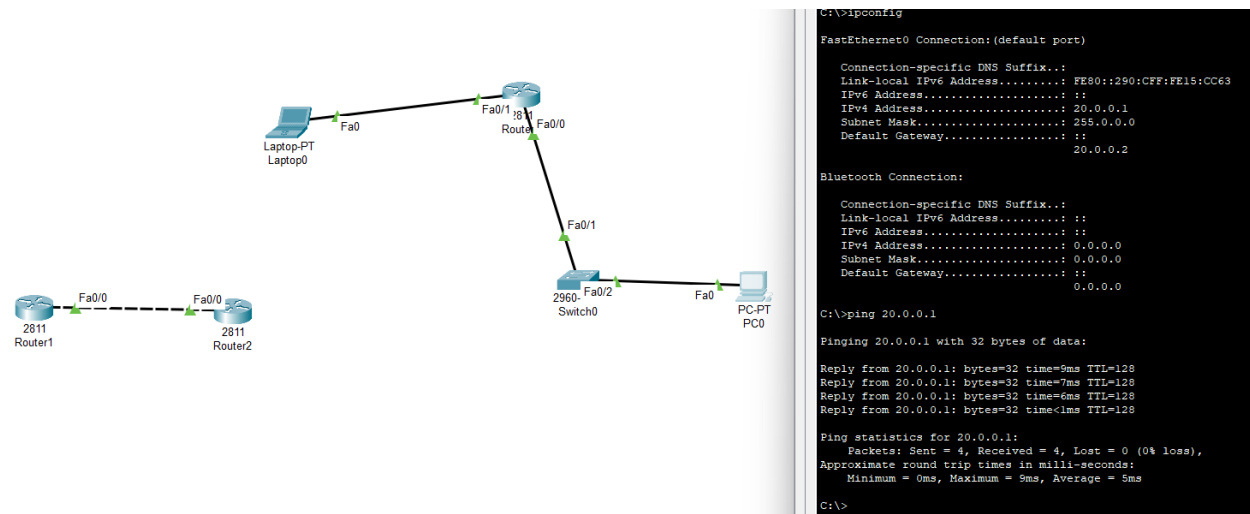


Image-4: Command

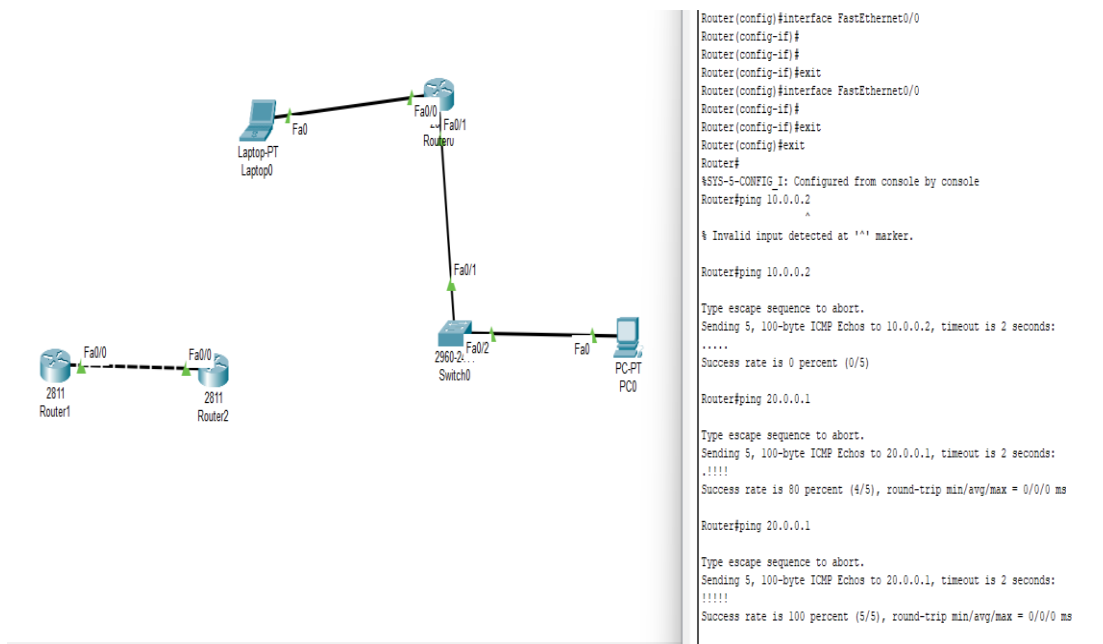


Image-5: CLI