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Cisco I-Intro to Networks
Week 12

Connect a Network Based on a Network Diagram

Cabling rules

- **PC/Laptop/Server ↔ Switch:** *Copper Straight-Through* (e.g., PC `FastEthernet0` → Switch `Fa0/1`)
- **Router ↔ Switch:** *Copper Straight-Through* (e.g., Router `G0/0` → Switch `G0/1`)
- **Switch ↔ Switch:** *Copper Crossover* (unless the activity explicitly says "auto-MDIX"; most PT gradings expect crossover)
- **Router ↔ Router (WAN Serial):** *Serial DCE ↔ DTE* (set **clock rate** on the **DCE** side)
- **Console setup:** *Console cable* (PC `RS-232` → device `Console`) for initial CLI access
- **Wireless end-hosts:** No cable; associate via Wireless settings to the AP/Router

> Tip: In many graded PKAs, the exact **cable type** matters even if auto MDIX would work. Don't use Auto-Connect unless the instructions say you can.

Physical view

Step 1 (color): The **Copper Straight-Through** cable in Packet Tracer is **green**.

Step 2 (make the connections with the *green* cable):

- **PC-A** `FastEthernet0` → **S1** `Fa0/1`
- **R1** `GigabitEthernet0/0/1` → **S1** `Gi0/1`
- **R1** `GigabitEthernet0/0/0` → **S1** `Gi0/2`

> If your router shows `G0/0` and `G0/1` instead of `G0/0/0` and `G0/0/1`, map them the same way: `R1 G0/1 → S1 Gi0/1` and `R1 G0/0 → S1 Gi0/2`

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Quick build order

Note each device model, interface type (Fa/Gi/Se), and the exact **port numbers** shown in the diagram.

If a router needs serial and doesn't have it, **power off**, add an appropriate **HWIC-2T** (or similar), then power on.

Place and cable

End-hosts → **Access switch** using Straight-Through.

Access switch → **Distribution/Core or Router** using Straight-Through on Gigabit if available.

Inter-switch link(s) with Crossover (often on `Gi0/1`↔`Gi0/1`).

WAN serial if shown: `R1 S0/0/0 (DCE)` ↔ `R2 S0/0/0 (DTE)`.

Bring up L2 (switch)

If VLANs are in the diagram, create them and assign access ports; set trunks on uplinks.

```
enable
configure terminal
vlan 10
vlan 20
interface range fa0/1-12
  switchport mode access
  switchport access vlan 10
interface range fa0/13-24
  switchport mode access
  switchport access vlan 20
```

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```
interface gi0/1
  switchport mode trunk
end
write
```

Address the end-hosts

Desktop → **IP Configuration**: set **IP**, **Subnet Mask**, **Default Gateway**, and **DNS** exactly as the diagram shows.

Address the router(s)

Enable LAN and WAN interfaces and match IPs/masks from the diagram. Turn interfaces **up**.

```
enable
configure terminal
interface g0/0
  ip address 192.168.10.1 255.255.255.0
  no shutdown
interface g0/1
  ip address 192.168.20.1 255.255.255.0
  no shutdown
interface s0/0/0
  ip address 10.0.0.1 255.255.255.252
  clock rate 64000     ! only on the DCE end
  no shutdown
end
write
```

Routing (pick one that matches your diagram)
Static default route:

```
 configure terminal

ip route 0.0.0.0 0.0.0.0 10.0.0.2

end
```

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`write`

Static inter-LAN routes: add `ip route <dest> <mask> <next-hop>` as needed.

RIP v2 (if requested):

```
router rip
  version 2
  no auto-summary
  network 192.168.10.0
  network 192.168.20.0
  network 10.0.0.0
```

OSPF (common in multi-area labs):

```
router ospf 1
  network 192.168.10.0 0.0.0.255 area 0
  network 192.168.20.0 0.0.0.255 area 0
  network 10.0.0.0 0.0.0.3 area 0
```

Default gateways on VLAN SVI (if Layer-3 switch is used)

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If a **router-on-a-stick** is used instead, create subinterfaces on the router and trunk on the switch uplink.

```
! Router-on-a-stick example
interface g0/0.10
  encapsulation dot1Q 10
  ip address 192.168.10.1 255.255.255.0
interface g0/0.20
  encapsulation dot1Q 20
  ip address 192.168.20.1 255.255.255.0
```

Verify & save

On routers/switches:

```
 show ip interface brief
show interfaces status
show ip route
show cdp neighbors detail
```

On PCs: `Command Prompt` → `ping` gateway, then other subnets.

Save: `copy running-config startup-config` (or `write`).

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Common pitfalls that break the grader

- **Wrong cable type** (e.g., straight-through used where crossover is expected between switches).
- **Wrong ports** (diagram expects `Fa0/6` but you used `Fa0/7`).
- **Interfaces left administratively down** (forgot `no shutdown`).
- **Serial DCE clock rate missing** on the DCE side.
- **Host default gateway** not set or wrong subnet masks.
- **Trunk not configured** when VLANs need to cross switches.
- **Using Auto-Connect** when the PKA expects manual cable selection.