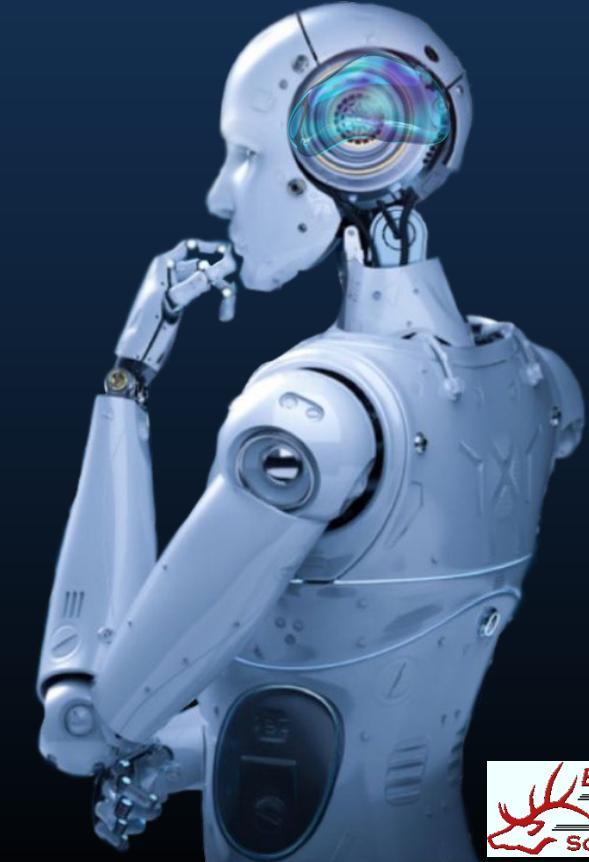




WHY DOES AI MATTER?

Scott Stephenson, CDC Instructor Trainer

Instructor Professional Development
June 2025

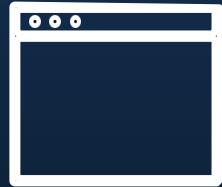


Are Our Jobs in Jeopardy?

The landscape of networks is shifting, and it's time for us to **adapt!** Our approach to learning and teaching must **evolve** to truly resonate with today's learners.

Innovation = Job Security

CLI-only Era



Automation



AI-Augmented Networking

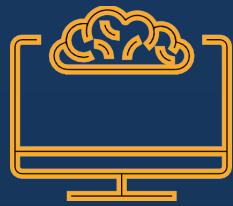


This approach relies solely on manual command-line interface (CLI) operations for network management, where all configurations and troubleshooting are performed by human engineers, leading to potential inefficiencies and errors.

This approach utilizes scripts and tools to automate repetitive tasks in network management, enhancing efficiency and consistency while reducing the need for manual intervention, but it remains limited to predefined rules and lacks adaptive intelligence.

This advanced approach integrates artificial intelligence and machine learning into network operations, enabling intelligent decision-making, predictive analytics, and autonomous management, which significantly enhances efficiency, security, and the ability to proactively address network issues.

What is AI in Networking?



Traditional Networking Tasks:

- Manually monitor device logs
- Write and apply CLI configs
- Respond to issues after they occur
- Interpret error messages through trial and error
- Manually tune performance and adjust routes

AI-Augmented Networking:

- Detect and predict failures using real-time data
- Generate config suggestions or full command sets
- Identify anomalies before users report issues
- Explain technical errors in plain language
- Dynamically optimize traffic and bandwidth

AI doesn't replace the engineer — it amplifies their expertise.

Understanding AI's Limits in Networking

- Accuracy Depends on Data Quality
 - AI relies heavily on accurate and complete data. Poor input data leads to unreliable outputs.
- AI Doesn't Replace Expertise
 - It amplifies but doesn't replace human judgment, especially for complex, nuanced decisions.
- Potential for Incorrect or Misleading Outputs
 - Generative AI may occasionally produce plausible but incorrect suggestions or configurations.
- Requires Human Oversight and Verification
 - Always verify AI-generated solutions before applying them in production networks.



AI and ML in the CCNA 1.1

6.4

Explain AI (generative and predictive) and machine learning in network operations

Generative AI

- Automated network configurations
- Security enhancement
- Data analysis for event prediction
- Network management automation

Predictive AI

- Network traffic prediction and analysis
- Proactive security detection and resolution
- Performance optimization
- Equipment failure prediction

Automation and Programmability make up 10% of the CCNA exam.

AI in Action: Generative vs. Predictive vs. Agentic

- **Generative AI:** Specializes in creating new content, such as visualizations, reports, or scripts, based on input data. It is particularly useful for generating training materials, configuration templates, or summaries.
- **Predictive AI:** Focuses on analyzing historical data to predict future outcomes or trends. It is primarily used for forecasting and identifying potential risks or issues before they occur.
- **Agentic AI:** Goes beyond generation and prediction by autonomously reasoning, planning, and executing tasks.

AI in Action: How They Contribute to the Respective Tasks

| Category | Generative AI | Predictive AI | Agentic AI |
|------------------------|---|--|---|
| Monitoring | <ul style="list-style-type: none">Generates visualizations or reports to summarize monitoring data. | <ul style="list-style-type: none">Analyzes historical data to predict potential issues or anomalies in real-time. | <ul style="list-style-type: none">Autonomously monitors systems, identifies patterns, and takes action to address anomalies. |
| Maintenance & Planning | <ul style="list-style-type: none">Creates detailed maintenance schedules or plans based on input data. | <ul style="list-style-type: none">Forecasts when maintenance is needed based on usage patterns and trends. | <ul style="list-style-type: none">Develops and executes multi-step maintenance plans autonomously, optimizing resources. |
| Troubleshooting | <ul style="list-style-type: none">Generates troubleshooting guides or scripts to address specific problems. | <ul style="list-style-type: none">Identifies likely causes of issues based on historical data and trends. | <ul style="list-style-type: none">Diagnoses issues and reasons through solutions and implements fixes without human intervention. |
| Configuration | <ul style="list-style-type: none">Generates configuration templates or scripts for devices or systems. | <ul style="list-style-type: none">Suggests optimal configurations based on predictive models and best practices. | <ul style="list-style-type: none">Configures systems autonomously, adapting to changing requirements and goals. |
| Training & Simulation | <ul style="list-style-type: none">Generates realistic training environments or datasets for simulations. | <ul style="list-style-type: none">Simulates future scenarios to predict outcomes and train users on potential risks. | <ul style="list-style-type: none">Creates and runs autonomous simulations, learns from outcomes, and adjusts strategies. |

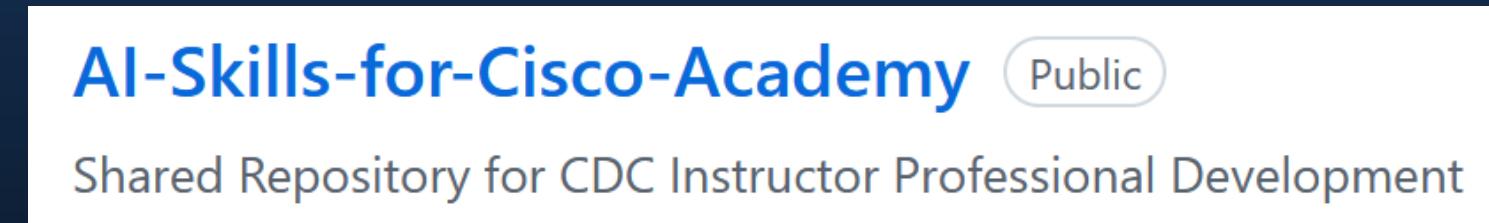
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GitHub Account

1. Go to: GitHub.com
2. Click on Sign in if you have an account or Sign up if you don't.
3. Use the same email address you registered with.
4. You will get an email asking you to join the repository.



Choose the Right AI Model for You

| Platform | Free Model | Strengths | Best For |
|--|-------------------|--|---|
| OpenAI https://chat.openai.com/auth/login | ChatGPT (GPT-3.5) | User-friendly, versatile, widely supported | Beginners learning text-based prompting |
| Anthropic https://poe.com/ | Claude 2 | Long-context handling, detailed reasoning | Long-context tasks and brainstorming |
| Google https://bard.google.com/ | Gemini 1 (Bard) | Multimodal, Google ecosystem integration | Creative and research tasks |
| Meta https://huggingface.co/meta-llama/Llama-2-7b-chat-hf | Llama 2 | Open-source, customizable | Developers and technical users |
| Perplexity https://www.perplexity.ai/ | Perplexity AI | Research-focused, concise answers | Research-based or factual prompts |
| You.com https://you.com/ | YouChat | Real-time web integration | Prompts requiring real-time information |

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AI SKILLS FOR THE CISCO ACADEMY

Key Highlights

- **Discover the C.O.A.S.T. Prompting Formula:** Learn a structured approach to crafting effective prompts that enhance learning outcomes.
- **Teach Students to Write Great Prompts:** Equip your students with the skills to create their own prompts, fostering independence and creativity.
- **Utilize Prompts in Your Studies:** Explore how prompts can streamline your study process and improve retention of complex concepts.
- **Incorporate Prompts in Teaching:** Gain insights on using prompts for lesson planning, lab creation, and interactive learning experiences.
- **Prepare for Certification with Prompts:** Leverage prompting techniques to enhance your certification preparation and boost your confidence.

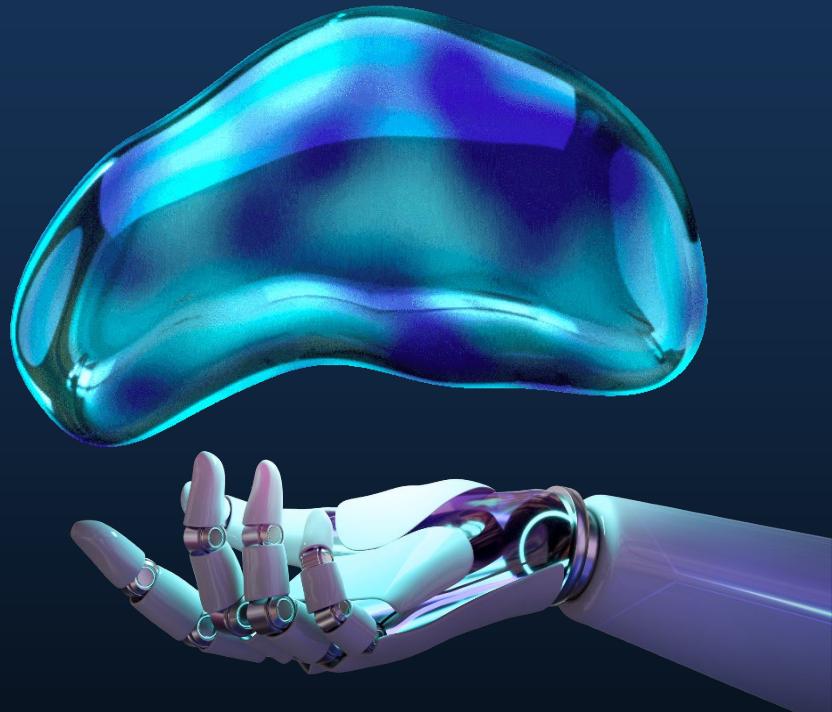
CISCO



AI SKILLS FOR THE CISCO ACADEMY

Scott Stephenson, CDC Instructor Trainer

Instructor Professional Development
June 2025



What You Will Learn Today



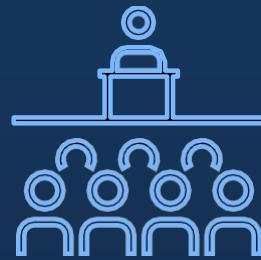
Understand

- Define what predictive AI and generative AI entail.
- Explore how these AI technologies are utilized within network operations.
- How these concepts align with CCNA objectives.



Apply

- Create documents, labs, network configurations, or troubleshoot issues by crafting precise and effective prompts.
- Analyze and understand AI-generated outputs to identify and resolve problems efficiently.
- Use large language models (LLMs) to simulate and test scenarios for planning, testing, or training purposes.



Teach

- Integrate AI tools into lab activities and classroom discussions to enhance learning experiences.
- Utilize relatable, real-world terminology to clarify complex concepts for students.
- Foster critical thinking skills by using AI as a collaborative tool to assist students in problem-solving and decision-making.

PROMPT ENGINEERING

What is Prompt Engineering?

- Prompt engineering is the practice of carefully designing and structuring instructions, or "prompts," to guide AI models like ChatGPT or Claude in generating accurate, relevant, and high-quality responses.
- At its core, prompt engineering bridges the gap between human intent and machine understanding, NLP, by translating complex objectives into concise, actionable directives that the AI can process.
- It involves crafting clear, specific, and goal-oriented inputs that provide the AI with the necessary context, constraints, and expectations to perform a given task effectively.
- As a dynamic and rapidly evolving field, prompt engineering is not only about technical precision but also creativity and experimentation, empowering users to unlock the full potential of AI by tailoring its outputs to their specific needs.

Writing a Great Prompt

- A **prompt formula** is a structured guideline used to create effective prompts for language models, ensuring that the generated responses meet specific requirements and contexts.
- The importance of prompt formulas lies in their ability to enhance the quality of interactions with AI by minimizing ambiguity and focusing the model's attention, ultimately leading to more accurate and contextually appropriate answers.
- By using prompt formulas, users can harness the full potential of language models, making them more efficient and effective in various applications.
- A well-defined prompt is a carefully constructed instruction ensuring AI systems generate precise, relevant, high-quality responses. It consists of critical components that guide the AI's focus, provide necessary context, and set clear expectations for the output.

Popular Prompting Formulas

- **C.O.A.S.T.** is an acronym that represents five essential components for creating effective prompts: **Context**, **Objective**, **Actions**, **Scenario**, and **Task**. Widely used by IT professionals to enhance the clarity and effectiveness of instructions given to AI systems.
- **C.R.E.A.T.E.** is an acronym representing key principles or steps for developing high-quality prompts: Clarity, Relevance, Explicitness, Auto Awareness, Task Orientation, and Evaluation.
- **RTF** (Request, Task, Format)
- **APE** (Audience, Purpose, Example)
- **STAR** (Situation, Task, Action, Result)
- **PAST** (Problem, Action, Solution, Takeaway)
- **FAB** (Features, Advantages, Benefits)
- **5W1H** (Who, What, When, Where, Why, How)

Why C.O.A.S.T. is Best for the IT Industry

- For the IT industry, the **COAST** formula is particularly effective. It allows for precise, context-rich prompts that lead to actionable and relevant AI-generated responses. This structured approach is particularly beneficial in a field where clarity and specificity are crucial for effective communication and problem-solving.
- Here's why it stands out for crafting prompts in the IT field:
 - **Context:** IT is a rapidly evolving field with various subdomains (e.g., cybersecurity, software development, network management). Providing context helps the AI understand the specific area of IT being addressed, leading to more relevant responses.
 - **Objective:** Clearly defining the objective allows users to specify what they want to achieve with the prompt, whether it's troubleshooting, learning about new technologies, or seeking best practices.
 - **Audience:** The IT audience can vary widely, from technical professionals to non-technical stakeholders. Tailoring the prompt to the audience ensures appropriate language and depth of information.
 - **Scenario:** Including a scenario helps ground the prompt in a real-world situation, making it easier for the AI to generate practical and applicable advice.
 - **Task:** Clearly stating the task guides the AI on what specific action or information is needed, enhancing the quality of the output.

9 Elements to Write Great Prompts

1. Define a Role



Assign a specific identity or role to the AI to shape its perspective, tone, and approach to the task.

- *"Act as a Cisco CCNA instructor."*
- *"Act as a Python programming expert."*
- *"Act as a cybersecurity professional."*
- *"Act as a CCIE Routing and Switching expert."*

2. Provide Context



Provide background information and a clear purpose to help the AI understand the scope and relevance of the request.

- *"I am a beginning CCNA student."*
- *"When configuring a new PC..."*
- *"Talk to me like I'm an inexperienced Linux user.?"*
- *"Describe as if I'm a beginning Python programmer."*

3. Give Instructions



Clearly define the task or goal, ensuring the AI knows exactly what is required. Break down what you want.

- *"First create VLANs, assign them to ports, and then explain why."*
- *"Create a detail step-by-step Lab."*
- *"Research SD-WAN."*
- *"Analyze the attached document."*

9 Elements to Write Great Prompts

4. Include Details



Include relevant information or data that the AI should consider to produce accurate outputs. Be specific: device model, interface IDs, IP addresses, protocols.

- *Use two Cisco 4331 routers, two Cisco 2960 switches, and two Windows 11 PCs.*
- *"I am using Windows 11 professional."*

5. Provide Examples



Provide sample responses to illustrate the desired format, style, or content. Show an example, then ask for a variation:

"Here's how I configured VLAN 10:

| Device | Interface | VLAN | Name |
|--------|-----------|------|------|
| SW1 | G0/0/0 | 10 | BOB |

Do VLAN 20 the same way?"

6. Use Delimiters



Use triple single quotes ('''') or clear labels like ***"Scenario:"***, ***"Question:"***, and ***"Answer:"*** to separate instructions, examples, or configs.

...

Question: What is 2 + 2?

Answer:

- A. 1
- B. 2
- C. 3
- D. 4

...

9 Elements to Write Great Prompts

7. Style and Format



Specify clarity, tone, structure, and engagement to align the response with user preferences and the intended audience.

- *"Write this in a prose style."*
- *"Research and create a thesis-style paper."*
- *"Describe with an outline and bullet points."*

8. Output Indicators



Specify the desired format or structure of the AI's response, such as a bullets, table, or paragraph, or in plain-text.

"Keep it under 5 lines"

"List only interface config commands."

"After the step-by-step instruction, write the complete configuration."

9. Provide Feedback



Enable iterative improvement by guiding the AI on how to refine responses based on prior interactions.

- *"Change the bullets to prose."*
- *"Rewrite with more details."*
- *"Make a one paragraph summary."*
- *"Perfect. Now do the same thing for this one."*

Prompt Tactic #1: Define a Role

Sample Prompt:

You are a Cisco TAC engineer. Explain this error:

...

%OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Gig0/1 from FULL to DOWN, Neighbor Down: Dead timer expired

...

Sample Response:

This error indicates that the OSPF adjacency between the local router and the neighbor with Router ID 2.2.2.2 on interface GigabitEthernet0/1 has transitioned from the FULL state (fully established adjacency) to the DOWN state. The reason is that the Dead Timer expired, meaning the router did not receive OSPF Hello packets from the neighbor within the configured Dead Timer interval.

Common Causes:

1. Hello/Dead Timer Mismatch
2. Connectivity Issues
3. MTU Mismatch
4. High Network Congestion
5. QoS Misconfiguration
6. Authentication Mismatch

Prompt Tactic #2: Provide Context

Sample Prompt:

Act as an experienced Python instructor. I am an inexperienced student just learning to program. Help me to understand the difference between a variable and a constant.

Sample Response:

A **variable** is a named storage location in memory that can hold a value. The value stored in a variable can change (or vary) during the execution of a program. This means you can assign a new value to the variable at any time.

A **constant**, on the other hand, is a value that cannot be changed once it has been assigned. In Python, there is no built-in constant type like in some other programming languages, but we typically use naming conventions to indicate that a value should be treated as a constant.

Prompt Tactic #3: Give Instructions

Sample Prompt:

You are a Cisco CCNA instructor. I am new to writing ACLs. Create an extended ACL that permits HTTPS traffic from 192.168.1.0/24 and blocks everything else. Follow these steps:

1. Identify the correct ACL type
2. Define the source and destination
3. Choose the correct protocol and port
4. Apply the ACL in the correct direction
5. Then provide the CLI configuration on Gi0/0

Sample Response:

1. Use an extended ACL because it allows filtering based on source/destination IP, protocol, and port.
2. The source is 192.168.1.0/24, and the destination is any (all destinations).
3. Use tcp and specify port 443 for HTTPS.
4. Apply the ACL inbound on the interface where traffic from 192.168.1.0/24 enters the switch/router.

```
R1(config)# access-list 100 permit tcp 192.168.1.0 0.0.0.255 any eq 443  
R1(config)# access-list 100 deny ip any any
```

```
R1(config)# interface GigabitEthernet0/0  
R1(config-if)# ip access-group 100 in
```

Prompt Tactic #4: Include Details

Sample Prompt:

You are a Cisco network engineer.
Configure a Cisco 2960 24-port switch with VLANs: 10 (Administrators), 20 (Teachers), and 30 (Students). Assign VLAN 10 to interface range Fa0/1-5, VLAN 20 to Fa0/6-14, and VLAN 30 to Fa0/15-24. Set all ports to access mode. Shut down any unused ports. Show me the complete configuration.

Sample Response:

```
Switch> enable
Switch# configure terminal
Switch(config)# vlan 10
Switch(config-vlan)# name Administrators
Switch(config-vlan)# exit
Switch(config)# vlan 20
Switch(config-vlan)# name Teachers
Switch(config-vlan)# exit
Switch(config)# vlan 30
Switch(config-vlan)# name Students
Switch(config-vlan)# exit
Switch(config)# interface range fa0/1-5
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 10
Switch(config-if-range)# no shutdown
Switch(config-if-range)# exit
Switch(config)# interface range fa0/6-14
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 20
Switch(config-if-range)# no shutdown
Switch(config-if-range)# exit
Switch(config)# interface range fa0/15-24
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 30
Switch(config-if-range)# no shutdown
Switch(config-if-range)# exit
Switch(config)# interface range Gi0/1-2
Switch(config-if-range)# shutdown
Switch(config-if-range)# exit
Switch# copy running-config startup-config
```

Prompt Tactic #4: Include Details

"Act as a Cisco CCNA instructor. As a networking student, why is an OSPF neighbor not appearing even though the interface is up?"

Sample Prompt:

```
...
R1# show ip ospf interface gi0/0
GigabitEthernet0/0 is up, line protocol is up
  Internet Address 10.10.20.48/24, Interface ID 5, Area 0
  Attached via Network Statement
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Topology-MTID      Cost      Disabled      Shutdown      Topology Name
    0            1        no        no          Base
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 10.10.20.48
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:02
  Supports Link-local Signaling (LLS)
  Cisco NSF helper support enabled
  IETF NSF helper support enabled
  Index 1/1/1, flood queue length 0
  Next 0x0(0)/ 0x0(0)/0x0(0)
  Last flood scan length is 0, maximum is 0
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
...
```

Sample Response:

If an OSPF neighbor is not appearing even though the interface is up, there could be several reasons for this issue. Based on the provided output, here are potential causes and how to troubleshoot them:

1. Mismatched OSPF Hello and Dead Intervals
2. Mismatched Network Types
3. Missing or Incorrect OSPF Network Statements
4. Router IDs Conflict
5. OSPF Priority and DR/BDR Election
6. Layer 2 Issues
7. Passive Interface Configuration
8. Access List or Firewall Blocking OSPF

Prompt Tactic #5: Provide Examples

Sample Prompt:

You are a CCNA tutor. Answer questions using a short summary followed by a CLI example.

...

Question: How do I configure a default route?

Answer: A default route uses 0.0.0.0/0 to forward packets when no other route matches.

ip route 0.0.0.0 0.0.0.0 192.168.1.1

...

Question: How do I configure a static route?

Sample Response:

Answer: A static route is manually configured to direct packets to a specific destination network through a specified next-hop IP address or exit interface. This is useful for defining paths in a network where dynamic routing is not used.

ip route 192.168.1.0 255.255.255.0 10.1.1.1

Prompt Tactic #6: Use Delimiters

Sample Prompt:

I am a Cisco CCNA student. Here is part of my switch configuration:

'''

```
interface GigabitEthernet1/0/10  
switchport mode access  
no shutdown
```

'''

What's missing if I want to assign VLAN 20?

Sample Response:

To assign VLAN 20 to this interface, you also need to include:

```
switchport access vlan 20
```

Without this line, the interface is active but not assigned to any VLAN.

As a result, it will not forward traffic for VLAN 20.

Prompt Tactic #7: Style and Format

Sample Prompt:

Act as a CCNA Instructor. Create a detailed step-by-step lab for a beginning-level student on setting up OSPF between two 1941 routers. Show a configuration example for each step. You can pick an appropriate IP address scheme. At the beginning of the lab, write an objective statement, the topology overview, and an IP addressing table for this scenario, showing device name, interface, IP address, subnet mask, and description. Show the complete raw configuration for each router at the end of the lab.

Sample Response:

- Researching 100 sources read 
- ✓ Research current CCNA OSPF lab requirements and best practices for teaching beginners 
 - ✓ Investigate Cisco 1941 router specifications and OSPF configuration syntax 
 - ✓ Find recommended IP addressing schemes and network designs for OSPF labs 
 - ✓ Gather information about OSPF verification commands and troubleshooting procedures 
 - ✓ Research standard lab documentation formats and examples from Cisco certification materials 

[Completed Lab](#)

Prompt Tactic #8: Output Indicators

Sample Prompt:

Act as a CCNA instructor. Summarize the function of a DHCP relay **in 2 bullet points.**

I use lots of descriptive words: detailed, comprehensive, complete, thorough, and extensive.

Sample Response:

- **Forwarding DHCP Messages:** A DHCP relay agent listens for broadcast DHCP messages from client devices on a local subnet and forwards these messages to a DHCP server located on a different subnet, encapsulating them in unicast packets to ensure proper delivery.
- **Facilitating IP Address Assignment:** By enabling communication between DHCP clients and servers across different subnets, the DHCP relay allows clients to receive IP addresses and configuration information, ensuring seamless network connectivity even when the DHCP server is not directly reachable.

Prompt Tactic #9: Provide Feedback

Sample Prompt:

Original prompt: Act as a CCNA instructor. Create a Class C subnetting question appropriate for a beginner.

Feedback:

Perfect. Now create 10 more questions about class B subnetting.

Sample Response:

Question 1: You are given the Class B network 172.16.0.0/16. You need to create 4 subnets.
What subnet mask will you use?
What are the network addresses for each subnet?
How many usable hosts will each subnet have?

Question 2: You are given the Class B network 172.20.0.0/16. You need to create subnets that can each support 500 hosts.
What subnet mask will you use?
How many subnets can you create?
What is the first subnet's network address, broadcast address, and usable host range?

Key Elements of the C.O.A.S.T. Prompting Formula

The formula consists of five distinct components, each serving a specific purpose in prompt engineering:

- **C - Context:** Sets the background and environment for the task. It provides necessary background information and establishes the situation or conditions. It helps AI understand the broader environment.
- **O - Objective:** Defines the desired outcome. Clarifies the goal or purpose and guides the AI towards specific results. It ensures alignment with user expectations.
- **A - Actions:** Outlines the process steps. It details the necessary steps or procedures and provides a clear roadmap. It guides the AI through the execution.
- **S - Scenario:** Illustrates with specific examples. It provides real-world context and helps visualize the application. It makes the task more concrete.
- **T - Task:** Specifies the core assignment. It details the exact requirements and defines what needs to be accomplished. It forms the central focus of the prompt.

Deconstruct a Prompt Using the C.O.A.S.T. Formula

This example demonstrates how each component of the C.O.A.S.T. formula contributes to creating a clear, actionable prompt to guide the AI in generating relevant and helpful responses.

Prompt: “*You are a marketing strategist working for a tech startup launching a new smartphone app. Research other marketing campaigns and analyze target market demographics, identify key marketing channels, create a messaging framework, design a promotional campaign, and set up tracking metrics.*

Find similar apps in the market that have succeeded through social media marketing and influencer partnerships. Create a detailed marketing plan geared toward online and printed consumers. Include budget allocation, timeline, and success metrics for the app launch.”

- **Context:** You are a marketing strategist working for a tech startup launching a new smartphone app.
- **Objective:** Research other marketing campaigns:
 - Analyze target market demographics
 - Identify key marketing channels
 - Create a messaging framework
 - Design a promotional campaign
 - Set up tracking metrics
- **Audience:** Consumers of online and print media
- **Scenario:** Find similar market apps that have succeeded through social media marketing and influencer partnerships.
- **Task:** Create a detailed marketing plan including budget allocation, timeline, and success metrics for the app launch.

C.O.A.S.T. Practice 1 of 8 – Preventive Maintenance

Original Prompt: *"What are the key steps to perform routine preventive maintenance on a Windows 11 computer to keep it running efficiently?"*

- **Context:** A personal computer running Windows 11.
- **Objective:** Identify key steps to improve system efficiency and longevity.
- **Audience:** General computer users with basic technical skills.
- **Scenario:** A user wants to perform routine preventive maintenance to prevent performance issues.
- **Task:** Provide a detailed checklist of preventive maintenance activities.

Final version: *"Act as an experienced computer repairman. I am a general computer user with basic technical skills. I have a personal computer running Windows 11 and I want to perform routine preventive maintenance to prevent performance issues. Identify steps to improve system efficiency and longevity. Then provide a detailed checklist of preventive maintenance activities I can use and how often I should use them."*

C.O.A.S.T. Practice 2 of 8 - Hardware Maintenance

Original Prompt: *"What are the best practices for cleaning a laptop keyboard and screen without causing damage?"*

- **Context:** A laptop that is used daily and has accumulated dirt and smudges.
- **Objective:** Learn how to clean the keyboard and screen safely.
- **Audience:** A general user with basic technical knowledge.
- **Scenario:** A user wants to clean their device without damaging its components.
- **Task:** Provide detailed step-by-step instructions for cleaning the keyboard and screen.

Final Version: *"Act as an experienced A+ technician. My laptop is used daily and it shows signs of dirt and smudges. I want to ensure it remains in good condition. I need detailed, step-by-step instructions to safely clean the keyboard and screen without causing any damage. Please tailor these instructions for a general user with basic technical knowledge."*

C.O.A.S.T. Practice 3 of 8 - Software Maintenance

Original Prompt: *"How can I optimize the startup programs on my computer to improve startup times in Windows?"*

- **Context:** A personal computer running Windows 11 with slow startup times.
- **Objective:** Optimize the startup process to improve boot performance.
- **Audience:** Non-technical users seeking simple solutions.
- **Scenario:** The computer takes too long to boot due to unnecessary startup programs.
- **Task:** List easy-to-follow steps to manage and optimize startup programs.

Final Version: *"You are an experienced A+ technician. I am a non-technical user with a personal computer running Windows 11 that is experiencing slow startup times. I want to optimize the startup programs to improve boot performance. Please provide a list of easy-to-follow steps I can use to effectively manage and optimize to reduce the startup delay."*

C.O.A.S.T. Practice 4 of 8 - Troubleshooting Common Issues

Original Prompt: *"What should I do if my computer frequently freezes or crashes without showing error messages?"*

- **Context:** A Windows 11 Home desktop computer.
- **Objective:** Troubleshoot, identify, and resolve the root cause of the issue.
- **Audience:** Someone with limited experience.
- **Scenario:** The computer freezes and crashes without showing error messages or warnings.
- **Task:** Provide a comprehensive troubleshooting guide to identify and fix common causes.

Final Version: *"Act as an experienced A+ technician. My Windows 11 Home desktop computer frequently freezes or crashes without showing any error messages. I want to troubleshoot, identify, and fix the root cause of this issue. Please provide a clear troubleshooting guide with detailed step-by-step instructions tailored for someone with limited technical knowledge."*

C.O.A.S.T. Practice 5 of 8 - Data Backup and Recovery

Original Prompt: *"What are the best practices for setting up an automatic backup system for personal files on a laptop?"*

- **Context:** A laptop containing important personal files.
- **Objective:** Set up an automated backup system to protect data.
- **Audience:** A new laptop owner with basic technical skills.
- **Scenario:** A user wants to ensure their files are safe in case of hardware failure or accidental deletion.
- **Task:** Provide complete step-by-step instructions for configuring an automated backup system.

Final Version: *"Act as a Cisco IT Essentials instructor. My laptop contains important personal files, and I want to ensure my data is protected in case of hardware failure or file loss. I am looking for a simple and reliable way to set up an automated backup system. Please provide detailed step-by-step instructions on what to do for a new laptop owner with basic technical knowledge."*

C.O.A.S.T. Practice 6 of 8 - Virus and Malware Protection

Original Prompt: *"How can I identify and remove malware from my computer using free tools?"*

- **Context:** A Windows 11 computer is suspected of being infected with malware.
- **Objective:** Identify and remove malware using free, reliable tools.
- **Audience:** General computer user with no access to premium antivirus software.
- **Scenario:** A user notices unusual computer behavior and suspects a malware infection.
- **Task:** Recommend free tools and explain how to use them to detect and remove malware.

Final Version: *"You are a cybersecurity expert. A Windows 11 computer is showing unusual behavior that makes me suspect a malware infection. I do not have access to premium antivirus software, so I need recommendations for free tools that can help identify and remove malware. Please explain how to use these tools with clear, detailed step-by-step instructions for a general computer user with basic technical knowledge."*

C.O.A.S.T. Practice 7 of 8 - Performance Optimization

Original Prompt: *"What are the best tools for defragmenting a Mac hard drive, and when should I perform this task?"*

- **Context:** A Mac desktop computer with a traditional hard drive (HDD) is experiencing slower file access speeds.
- **Objective:** Optimize hard drive performance through defragmentation.
- **Audience:** A Mac user with minimal technical expertise.
- **Scenario:** The hard drive has become fragmented, leading to slower performance.
- **Task:** Recommend the best defragmentation tools to improve performance and explain when to use them.

Final Version: *"You work at the Apple Store's Genius Bar. My desktop computer, which has a traditional hard drive (HDD), is experiencing slower file access speeds. I want to optimize its performance through defragmentation. Please recommend the best tools for defragmentation (built-in or third-party). Additionally, explain when and how often this task should be performed, ensuring the instructions are simple and easy to follow for someone with minimal technical expertise."*

C.O.A.S.T. Practice 8 of 8 - Maintenance Scheduling

Original Prompt: *"What weekly and monthly tasks should I include in a maintenance checklist for my computer?"*

- **Context:** A Windows 11 Pro computer used regularly for work and entertainment.
- **Objective:** Develop a comprehensive maintenance schedule for routine upkeep.
- **Audience:** Experienced user.
- **Scenario:** A user wants to ensure their computer remains functional and efficient over time.
- **Task:** Provide a detailed weekly and monthly maintenance checklist.

Final Version: *"Act as an A+ computer technician. I am a experienced user who regularly uses a Windows 11 Pro computer for work and entertainment. I want to ensure my device remains functional and efficient over the long term. I am looking for a detailed weekly and monthly maintenance checklist that is simple to follow and helps me proactively care for my computer. Please provide clear, detailed step-by-step instructions."*

FROM GOOD TO GREAT

LEVERAGING PROMPTING TECHNIQUES IN YOUR OWN EDUCATION AND TEACHING WORKFLOW¹¹

How to Make AI Teach You Any Skill

"Act as an expert tutor who will help me master any topic through an interactive, interview-style Q&A. The process must be recursive and personalized. Here's what I want you to do:

1. *Ask me for a topic I want to learn.*
 2. *Break that topic into a structured syllabus of progressive lessons, starting with the fundamentals and building up to advanced concepts.*
 3. *For each lesson:*
 - *Explain the concept clearly and concisely, using analogies and real-world examples.*
 - *Ask me socratic-style questions to assess and deepen my understanding.*
 - *Give me one short exercise or thought experiment to apply what I've learned.*
 - *Ask if I'm ready to move on or if I need clarification.*
 - *If I say yes, move to the next concept.*
 - *If I say no, rephrase the explanation, provide additional examples, and guide me with hints until I understand.*
 4. *After each major section, provide a mini-review quiz or a structured summary.*
 5. *Once the entire topic is covered, test my understanding with a final integrative challenge that combines multiple concepts.*
 6. *Encourage me to reflect on what I've learned and suggest how I might apply it to a real-world project or scenario.*
- Let's begin: Ask me what I want to learn."*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

As a Cisco Networking Academy Instructor, you can integrate **prompting techniques** into your learning and teaching workflow to enhance your understanding of topics like Routing and Switching, Programming, DevNet, IoT, and IT in general. Here are some ideas to help you effectively use prompting in your personal educational journey.

Create one prompt for each of the next 8 areas:

1. You pick the subject/objective
2. Write the perfect question
3. Write your completed prompt and questions into a document (.docx, .txt, .pdf)
4. Save to share at the end of class.

Save as: "*Your Initials – Prompting Ideas*"

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

1 of 8 - Prompting for Routing and Switching

- **Scenario-Based Prompts:** Create real-world network scenarios and challenge yourself or your students to design, configure, and troubleshoot them. For example:
 - *"How would you configure a redundant network using HSRP for a small business?"*
 - *"What steps would you take to troubleshoot a VLAN mismatch issue on a Cisco 2960 switch?"*
- **Lab Prompts:** Use tools like **Packet Tracer** or **GNS3** to simulate network environments. Prompt yourself with tasks such as:
 - *"Configure a detailed step-by-step lab ..."*
 - *over OSPF on a multi-area network and verify connectivity."*
 - *to set up inter-VLAN routing using a Layer 3 switch."*
 - *to configure this topology with the provided interfaces and IP addresses."*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

2 of 8 - Prompting for Programming

- **Code Challenges:** Use Python or other programming languages to automate network tasks. Prompt yourself with challenges like:
 - *"Write a Python script to retrieve the running configuration of a Cisco router using Netmiko."*
 - *"How can you use Python to monitor network device uptime and send alerts for downtime?"*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

3 of 8 - Prompting for DevNet (CCNA Automation)

- **API Exploration:** Prompt yourself to explore Cisco APIs and their use cases:
 - "What are the key differences between RESTCONF and NETCONF for network automation?"
 - "Use REST APIs to configure a Cisco device. What are the steps to authenticate and send a POST request?"
 - "How can you use Cisco DNA Center APIs to gather network insights?"
- **Workflow Automation:** Challenge yourself to automate workflows:
 - "Create a workflow to provision a new network device using Python and Cisco APIs."
 - "How can you integrate DevOps tools like Jenkins with Cisco DevNet for CI/CD pipelines?"
 - "How can you use Ansible to automate VLAN creation on multiple switches?"

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

4 of 8 - Prompting for IoT

- **IoT Use Cases:** Prompt yourself to think about IoT applications in networking:
 - *"How would you design a network to support IoT devices in a smart city?"*
 - *"What security measures would you implement to protect IoT devices on a network?"*
- **IoT Labs:** Use Cisco Packet Tracer IoT features to simulate IoT environments:
 - *"Using Cisco Packet Tracer, configure an IoT-enabled network with sensors and actuators. How would you ensure reliable communication between devices?"*
 - *"How can you use MQTT to enable communication between IoT devices and a central server?"*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

5 of 8 - Prompting for Teaching and Learning

- **Student-Centered Prompts:** Use prompts to engage students in active learning:
 - *"What are the key differences between static and dynamic routing? Provide examples."*
 - *"How would you explain subnetting to someone new to networking?"*
- **Self-Reflection Prompts:** Reflect on your teaching methods and learning progress:
 - *"What new teaching strategies can I use to explain complex topics like BGP or OSPF?"*
 - *"Create a step-by-step lab detailing how to configure MPLS. Show the completed configuration at the end of the lab."*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

6 of 8 - Prompting for Certification Preparation

- **Exam-Focused Prompts:** Use prompts to prepare for certifications like CCNA, CCNP, or DevNet Associate:
 - *"As a Cisco CCNA instructor, what are the key differences between EIGRP and OSPF, and when would you use each?"*
- **"Practice Labs:** Use pre-built labs or create your own:
 - *You are a Cisco CCNA instructor. Create a detailed step-by-step CCNA-level lab scenario with VLANs, trunking, VTP, no DTP, and inter-VLAN routing. Use a Cisco 4331 router and three Cisco 2960 switches. The router is connected to SW1 while all three switches are interconnected through the gigabit Ethernet ports."*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

7 of 8 - Prompting for Collaboration and Community Engagement

- **Discussion Prompts:** Engage with the Cisco Networking Academy community or forums like Reddit or Cisco Learning Network:
 - *"As a Cisco CCNA instructor, what are the best practices for teaching subnetting to beginners?"*
 - *"How do I, as a Cisco CCNA instructor, incorporate DevNet concepts into a traditional networking curriculum?"*
 - *Brainstorm ideas to help me recruit new students into my Cisco program."*
- **Peer Challenges:** Collaborate with other instructors to create and solve challenges:
 - *"You are a Cisco Networking Academy instructor. Design a challenging network topology for a medium-sized business with redundancy and scalability in mind."*

Use Prompting in Your Workflow as a Cisco Networking Academy Instructor

8 of 8 - Prompting for Continuous Learning

- Daily Learning Prompts: Set daily goals to explore new topics:
 - *"What is the latest feature in Cisco IOS-XE, and how can it improve network performance?"*
 - *"How does SD-WAN differ from traditional WAN technologies?"*
- Skill-Building Prompts: Focus on building specific skills:
 - *"Learn how to configure and troubleshoot IPv6 on a Cisco router."*
 - *"Explore how to use Python to parse JSON data from a Cisco API."*
 - *Act as a Cisco CCIE routing and switching expert. Research Cisco's implementation of MPLS and write a prose-format paper detailing everything a Cisco Networking Academy instructor should know about it. Incorporate configuration and verification commands."*

Your Leadership Toolkit (So Far)



- AI as a tool for navigating networking tasks just by asking
- Prompt strategies that build clarity, accuracy, and control
- Real-world examples across config, troubleshooting, and explanation
- Techniques for turning prompts into classroom activities
- A mindset shift—from AI use to AI-powered teaching leadership

QUESTION PROMPTING



Use AI to Create STP Practice Questions

Sample Prompt:

You are a CCNA instructor. Write a multiple-choice question about Spanning Tree root bridge selection. Include switch priorities and MAC addresses. Provide the correct answer and a one-line explanation.

Sample Response:

Question:

Four switches have the following priorities and MAC addresses:

Switch A: priority 32768, MAC 00:11:22:33:44:01

Switch B: priority 32768, MAC 00:11:22:33:44:02

Switch C: priority 4096, MAC 00:11:22:33:44:03

Switch D: priority 32768, MAC 00:11:22:33:44:04

Which switch will become the root bridge?

Correct Answer: Switch C

Explanation: STP selects the switch with the lowest bridge ID (priority + MAC); Switch C has the lowest priority (4096).

Use AI to Generate NAT Concept Questions

Sample Prompt:

You are a CCNA instructor. Write a multiple-choice question about NAT behavior. Include inside and outside IPs and provide the correct answer with an explanation.

Sample Response:

Question:

Which address is considered the inside global address in a NAT configuration?

- A. 192.168.10.5
- B. 203.0.113.5
- C. 172.16.0.10
- D. 10.0.0.1

Correct Answer: B

Explanation: Inside global is the public IP assigned to an internal device for communication over the Internet.

Challenge Student Reasoning with ACL Logic

Sample Prompt:

You are a CCNA instructor. Write a multiple-choice question where students must decide which packet is denied by the ACL. Include port-based conditions.

Sample Response:

ACL:

```
access-list 120 permit tcp any host 10.10.10.10 eq 22
access-list 120 permit udp any any eq 53
access-list 120 deny ip any any
```

Question:

Which of the following packets would be denied by this ACL?

- A. TCP from 192.168.1.5 to 10.10.10.10 on port 22
- B. UDP from 172.16.0.2 to 8.8.8.8 on port 53
- C. TCP from 192.168.0.1 to 10.10.10.10 on port 80
- D. UDP from 10.1.1.1 to 192.168.2.2 on port 53

Correct Answer: C

Explanation: Only SSH (TCP port 22) to host 10.10.10.10 and UDP DNS (port 53) are permitted; TCP port 80 traffic is denied.

Test Config Understanding with DHCP Questions

Sample Prompt:

You are a CCNA instructor. Write a multiple-choice question to test DHCP relay configuration. Include a brief scenario and the correct answer.

Sample Response:

Question:

A router interface is configured as follows:

```
interface G0/1
ip address 192.168.100.1 255.255.255.0
ip helper-address 10.10.10.10
```

What is the purpose of the ip helper-address command?

- A. It assigns a default gateway to the client
- B. It specifies the DHCP server to forward client requests to
- C. It assigns an IP to the router interface
- D. It configures the router to act as a DHCP server

Correct Answer: B

Explanation: The ip helper-address command forwards DHCP requests to a remote DHCP server.

Isomorphic Deterministic Questioning

Sample Prompt:

Using isomorphic deterministic questioning techniques, create 10 variations of this question, changing the IP address and/or subnet mask.

...

What class is this IP address?

10.10.10.1 255.0.0.0

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class E

...

Show the correct answer after each question and a one-sentence explanation.

Sample Response:

What class is this IP address?

169.254.0.1 255.255.0.0

- Class A
- Class B
- Class C
- Class D
- Class E

Answer: Class B

Explanation: The IP address 169.254.0.1 falls within the Class B range (128.0.0.0 to 191.255.0.0), but it is specifically reserved for Automatic Private IP Addressing (APIPA).

Isomorphic Deterministic Questioning

Sample Prompt:

Using isomorphic questioning techniques, create 5 variations of this question, changing the name, job title, the scenario, and the routing protocol (RIP, EIGRP, OSPF) while keeping the main objective the same. Give 4 answer choices.

'''

Jim is a network administrator. He has been tasked with configuring EIGRP in a network consisting of 3 routers and 5 different subnets. What command can he use to see if the network is configured correctly?

'''

Show the correct answer after each question and a one-sentence explanation.

Sample Response:

1. Jim is a network administrator. He has been tasked with configuring EIGRP in a network consisting of 3 routers and 5 different subnets. What command can he use to see if the network is configured correctly?
- A) show ip eigrp topology
B) show ip rip database
C) show ip protocols
D) show ip eigrp neighbors
E) traceroute 25.0.0.2
F) show interfaces

Answer: B) show ip rip database
Explanation: This command displays the RIP database.
Answer: A) show ip eigrp topology
Explanation: This command displays the EIGRP topology.
Answer: C) show ip protocols
Explanation: This command lists all active routing protocols.
Answer: D) show ip eigrp neighbors
Explanation: This command shows EIGRP neighbors and their interface information.
Answer: E) traceroute 25.0.0.2
Explanation: This command shows the path to a destination host.
Answer: F) show interfaces
Explanation: This command shows interface statistics and configuration.

Isomorphic Deterministic Questioning

Create three prompts:

1. You pick the subject/objective
2. Write the perfect questions
3. Create 10 isomorphic Questions from the main question
4. Adjust your prompt until you get the questions you're looking for
5. Copy the completed prompt and questions into a document (.docx, .txt, .pdf)
6. Save to share at the end of class.

Save as: "*Your Initials – Prompting Ideas*"

Time Remaining:

Start

FROM LEARNING TO LEADING

**HOW YOU CAN HELP STUDENTS APPLY
AI SKILLS WITH CONFIDENCE.**

Teaching Prompting in the Classroom



Prompt Rewrites

- Give students vague prompts and ask them to improve clarity and structure.



Compare & Explain

- Show two outputs from different prompts. Have students identify which is better and why.



Prompt-Based Lab Tasks

- Replace a config task with a prompt challenge:
 - *“Write a prompt that generates the correct VLAN setup for this topology.”*



Use AI as a Lab Assistant

- Have students check their configs by asking the AI:
 - *“What’s missing from this?” or “Is this interface configured correctly?”*

Use AI to Simulate “show” Command Output

Sample Prompt:

You are a Cisco IOS router. Simulate the output of show ip route on a device with:
FastEthernet0/0 in 192.168.1.0/24
FastEthernet0/1 in 10.0.0.0/8
OSPF-learned route to 172.16.0.0/16 via 10.1.1.1
Include route codes, administrative distance/metric, interfaces, and proper
formatting.

Sample Response:

```
Router# show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, O - OSPF, IA - OSPF inter area
* - candidate default, U - per-user static route

Gateway of last resort is not set

C      192.168.1.0/24 is directly connected, FastEthernet0/0
C      10.0.0.0/8 is directly connected, FastEthernet0/1
O      172.16.0.0/16 [110/20] via 10.1.1.1, 00:00:12, FastEthernet0/1
```

Using Simulated Output for Teaching & Review



In-Class Use Ideas:

- Use simulated show output for concept review
 - *“What does this routing table tell you about the topology?”*
- Challenge students to spot missing or unusual entries
 - *“What’s one thing that’s not quite right in this output?”*



Turn it into a peer teaching activity

- One student writes a prompt, and another interprets the result



Teaching Tips:

- Use AI to simulate progressions. Start with a basic table, then add learned routes or static entries
- Have students prompt AI to generate output for their own topology diagrams

Use AI to Translate Configs into Plain Language

Sample Prompt:

You are a Cisco instructor. Explain this ACL configuration to a student new to networking:

```
...
access-list 110 permit tcp 192.168.10.0 0.0.0.255 any eq 443
access-list 110 deny tcp 192.168.10.0 0.0.0.255 any eq 23
access-list 110 permit ip any any
...
```

Sample Response:

This ACL allows devices in the 192.168.10.0/24 network to send TCP traffic to any destination if the destination port is 443, which is typically HTTPS.

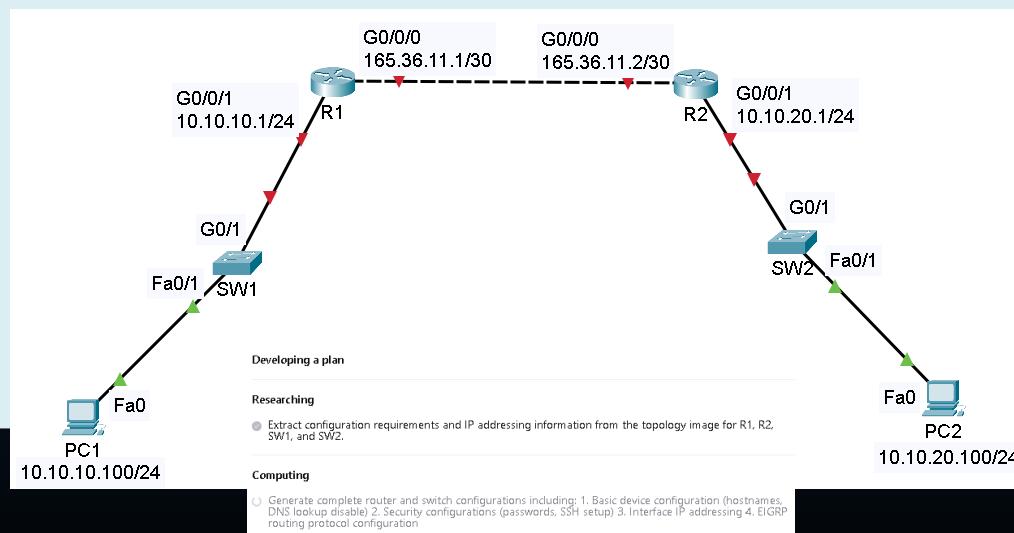
It then explicitly denies Telnet traffic (port 23) from that same source network to any destination. This is often done for security, since Telnet is unencrypted.

Finally, it permits all other IP traffic. This ensures that other non-blocked traffic is allowed through. In short, it allows secure web traffic, blocks Telnet, and permits everything else.

Use AI to Write a Configuration from a Graphic

Sample Prompt:

Act as a CCNA student. Create a complete raw configuration, with no comments or explanations, to configure hostnames, no lookups, secure all passwords, use SSH for local login to the console and vty ports, interface addressing, and use the EIGRP routing protocol to exchange all information.



Sample Response:

```
enable
configure terminal
hostname R1
no ip domain-lookup
ip domain-name ccna-lab.com
service password-encryption
enable secret Cisco123
username admin privilege 15 secret Admin123
crypto key generate rsa modulus 2048
ip ssh version 2
line console 0
  login local
  logging synchronous
  transport input ssh
line vty 0 4
  login local
  logging synchronous
  transport input ssh
  exit
interface GigabitEthernet0/0/0
  description Link to R2
  ip address 165.36.11.1 255.255.255.252
  no shutdown
interface GigabitEthernet0/0/1
  description LAN Network
  ip address 10.10.10.1 255.255.255.0
  no shutdown
  exit
router eigrp 1
  network 10.10.10.0 0.0.0.255
  network 165.36.11.0 0.0.0.3
  no auto-summary
end
copy running-config startup-config
```

Use AI to Generate IP Addressing Tables

Sample Prompt:

Act as a Cisco CCNA instructor.
Generate three different IP addressing scenarios based on the provided IP addressing table. You can change the IP addressing scheme, ports, and number of routers as you see fit.

IP Addressing Table

| Device | Interface | IP Address | Subnet Mask | Description |
|--------|-----------|---------------|-----------------|-------------------|
| R1 | G0/0/0 | 25.0.0.1 | 255.255.255.252 | Link to R2 |
| R1 | G0/0/1 | 192.168.1.64 | 255.255.255.224 | Link to Local LAN |
| R1 | Lo0 | 1.1.1.1 | 255.255.255.255 | Link for Testing |
| R2 | G0/0/0 | 25.0.0.2 | 255.255.255.252 | Link to R1 |
| R2 | G0/0/1 | 30.0.0.1 | 255.255.255.252 | Link to R3 |
| R2 | Lo0 | 2.2.2.2 | 255.255.255.255 | Link for Testing |
| R3 | G0/0/0 | 30.0.0.2 | 255.255.255.252 | Link to R2 |
| R3 | G0/0/1 | 192.168.1.128 | 255.255.255.224 | Link to Local LAN |
| R3 | Lo0 | 3.3.3.3 | 255.255.255.255 | Link for Testing |

Sample Response:

Scenario 2: End-User Configuration IP address assignment for a hub-and-spoke topology connecting multiple subnets and LANs.

| Device | Interface | IP Address | Subnet Mask | Description |
|--------|-----------|-------------|-----------------|----------------------|
| R1 | G0/0/0 | 192.168.0.1 | 255.255.255.252 | Link to R2 |
| R1 | G0/0/1 | 10.0.0.1 | 255.255.255.0 | Link to Local LAN |
| R1 | Lo0 | 1.1.1.1 | 255.255.255.255 | Loopback for Testing |
| R2 | G0/0/0 | 192.168.0.2 | 255.255.255.252 | Link to R1 |
| R2 | G0/0/1 | 192.168.1.1 | 255.255.255.252 | Link to R3 |
| R2 | Lo0 | 2.2.2.2 | 255.255.255.255 | Loopback for Testing |
| R3 | G0/0/0 | 192.168.1.2 | 255.255.255.252 | Link to R2 |
| R3 | G0/0/1 | 192.168.2.1 | 255.255.255.252 | Link to R4 |
| R3 | Lo0 | 3.3.3.3 | 255.255.255.255 | Loopback for Testing |
| R4 | G0/0/0 | 192.168.2.2 | 255.255.255.252 | Link to R3 |
| R4 | G0/0/1 | 10.0.1.1 | 255.255.255.0 | Link to Local LAN |
| R4 | Lo0 | 4.4.4.4 | 255.255.255.255 | Loopback for Testing |

Teaching with Explanation Prompts



In-Class Use Ideas:

- Give students a config and ask them to write:
 - *“Explain this as if you were teaching a new student.”*
 - Then compare their output to the AI’s
- Flip it: give them the AI’s plain-language response and ask:
 - *“What config generated this?”*
- Use explanations to check for concept misunderstandings
 - *“What assumptions is the AI making? Are they valid?”*



Teaching Tips:

- Focus on building networking fluency, not just correctness
- Ask students to edit or improve the AI's explanation
- Use this format for peer reviews



Teaching with AI-Generated Scenarios



In-Class Use Ideas:

- Use scenarios as review warm-ups or quiz questions
 - “*What’s the correct answer—and how do you know?*”
- Remove the explanation and have students justify their answer
 - Builds critical thinking and CCNA exam prep skills
- Have students write their own prompt to generate practice questions
 - Swap with peers to solve and discuss



Teaching Tips:

- Focus on reasoning, not just recall
- Let students compare AI’s logic to their own
- Use AI to remix scenarios by changing addresses, ports, or protocols



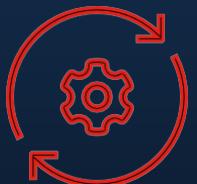
What Can You Do? Lead the Way!

Try Prompting in Your Own Workflow

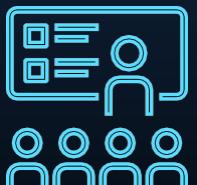


- Ask AI to explain a config, simulate output, or review CLI
- Reflect on how the prompt impacts the response

Bring Prompting into a Lab or Lesson



- Turn a config task into a prompt challenge
- Ask students to write the prompt that generates a solution, then explain it



REAL-WORLD EXAMPLES YOU CAN TEACH TO STUDENTS

Prompts for Creativity and Critical Thinking Skills

"Act as a Cisco CCNA student preparing for the CCNA certification exam..."

1. **Real-World Networking Scenarios:** Ask students to create prompts that describe a real-world networking problem they might encounter, such as network congestion or security breaches.
 - *"Generate a list of troubleshooting steps for resolving network congestion in a corporate environment."*
2. **Networking Concepts Exploration:** Encourage students to write prompts that explore specific networking concepts.
 - *"Explain the differences between TCP and UDP in a way that a beginner can understand, including examples of when to use each."*
3. **Design a Network:** Have students create prompts that ask for network design suggestions based on specific requirements.
 - *"Design a small office network for a team of 10 people, including recommendations for hardware, IP addressing, and security measures."*

Prompts for Creativity and Critical Thinking Skills

4. **Security Best Practices:** Students can write prompts focused on cybersecurity.
 - *"List the top 10 best practices for securing a small business network against cyber threats."*
5. **Future of Networking:** Encourage students to think creatively about the future of networking.
 - *"Imagine a future where quantum computing is mainstream. Describe how this technology could change networking protocols and security measures."*
6. **Case Studies:** Students can create prompts based on hypothetical case studies.
 - *"Given a scenario where a company has experienced a data breach, outline a response plan that includes immediate actions and long-term strategies."*
7. **Networking Tools and Technologies:** Ask students to write prompts that explore various networking tools.
 - *"Compare and contrast three different network monitoring tools, highlighting their features, advantages, and disadvantages."*

Prompts for Creativity and Critical Thinking Skills

8. **Troubleshooting Scenarios:** Encourage students to write prompts that simulate troubleshooting scenarios.
 - *"You receive a call from a user who cannot connect to the Wi-Fi. Outline the steps you would take to diagnose and resolve the issue."*
9. **Networking Protocols:** Students can create prompts that delve into specific networking protocols.
 - *"Explain how the DHCP protocol works, including its role in IP address assignment and the process of lease renewal."*
10. **Networking Innovations:** Encourage students to think about innovations in networking.
 - *"Discuss the impact of Software-Defined Networking (SDN) on traditional networking practices and its potential benefits for businesses."*

Prompts for Creating Labs

"Act as a Cisco CCNA student preparing for the CCNA certification exam..."

1. **Scenario-Based Prompts:** Encourage students to write prompts based on specific networking scenarios.
 - *"Create a lab that simulates a network outage due to a misconfigured router. Include detailed steps for troubleshooting and restoring connectivity."*
2. **Concept Exploration:** Have students write prompts that explore specific networking concepts or technologies. Students can research various networking concepts and create prompts that lead to lab designs that illustrate those concepts.
 - *"Design a lab that demonstrates the differences between static and dynamic routing protocols."*
3. **Real-World Applications:** Students can discuss current networking trends and write prompts that reflect real-world applications, encouraging practical learning.
 - *"Generate a lab that shows how to implement VLANs in a corporate environment to improve network segmentation."*

Prompts for Creating Labs

4. **Troubleshooting Labs:** Students can identify common issues they've encountered and write prompts that guide the AI to create troubleshooting labs.
 - *"Create a lab that simulates a network performance issue and outlines the steps to diagnose and resolve it."*
5. **Security Focus:** Students can explore various security measures and write prompts that lead to labs focused on implementing those measures.
 - *"Design a lab that demonstrates how to configure firewall rules to protect a network from unauthorized access."*
6. **Collaborative Projects:** Students can work in teams to brainstorm and refine prompts, fostering collaboration and teamwork.
 - *"Develop a multi-site network lab that includes VPN configuration for secure remote access."*
7. **Simulation Tools:** Students can experiment with different simulation tools and write prompts that guide the AI to create labs tailored to those tools.
 - *"Generate a lab using Cisco Packet Tracer to simulate a basic network with multiple devices and configurations."*

Prompts for Creating Labs

8. **Performance Metrics:** Students can research performance metrics and write prompts that lead to labs designed to analyze those metrics.
 - *"Create a lab that measures the impact of different routing protocols on network latency and throughput."*
9. **Future Technologies:** Students can investigate future trends and write prompts that guide the AI to create labs that incorporate these technologies.
 - *"Design a lab that explores the implementation of Software-Defined Networking (SDN) in a virtualized environment."*
10. **Reflection and Feedback:** Students can create prompts that help them articulate their learning outcomes and provide feedback on the lab experience.
 - *"Generate a lab report template that includes sections for objectives, findings, and lessons learned from the lab."*

Prompts for Certification Study

"Act as a Cisco CCNA student preparing for the CCNA certification exam..."

1. **Create a Personalized Study Plan:** Ask students to write a prompt that generates a personalized study plan for the CCNA exam.
 - *"Create a 4-week study plan for the CCNA certification exam. Include daily topics, practical lab exercises, and review sessions. Focus on Network Fundamentals, IP Connectivity, and Security Fundamentals."*
2. **Generate Mock Exam Questions:** Have students write prompts to create mock exam questions for specific CCNA topics.
 - *"Generate 10 multiple-choice questions on VLAN configuration and troubleshooting. Include correct answers and explanations for each question."*

Prompts for Certification Study

3. **Simplify Complex Networking Concepts:** Encourage students to write prompts that simplify difficult CCNA topics.
 - *"Explain the concept of Spanning Tree Protocol (STP) as if you were teaching it to a beginner. Use simple analogies and avoid technical jargon."*
4. **Design Lab Scenarios:** Ask students to write prompts that create hands-on lab scenarios for CCNA topics.
 - *"Create a lab exercise to configure and verify OSPF on three routers in a small network. Include step-by-step instructions and expected outputs."*
5. **Troubleshooting Practice:** Have students write prompts to simulate troubleshooting scenarios.
 - *"Generate a troubleshooting scenario where a user cannot access the internet. Include possible causes related to IP addressing, DNS, and routing, and provide step-by-step solutions."*

Prompts for Certification Study

6. **Flashcard Creation:** Get students to write prompts that create flashcards for CCNA topics.
 - *"Create 20 flashcards for CCNA Network Fundamentals. Each card should have a question on one side and a detailed answer on the other."*
7. **Compare Networking Protocols:** Ask students to write prompts that compare different networking protocols.
 - *"Compare and contrast RIP, OSPF, and EIGRP routing protocols. Include their advantages, disadvantages, and use cases."*
8. **Subnetting:** Have students write prompts to generate subnetting quizzes.
 - *"Create a VLSM subnetting quiz with 5 questions. Include scenarios where I need to calculate subnet masks, usable ranges, network IDs, and broadcast addresses."*
9. **Explain Real-World Applications:** Encourage students to write prompts that connect CCNA topics to real-world scenarios.
 - *"Explain how VLANs are used in a corporate network to improve security and reduce broadcast traffic. Provide practical examples."*

AI Implementation

Implementation in Class:

- **Group Activities:** Have students work in groups to brainstorm and write prompts, then share them with the class for discussion.
- **Peer Review:** Have students share their prompts with peers for review and suggestions, fostering a collaborative learning environment.
- **Prompt Challenges:** Organize a challenge where students submit their best prompts, and the class votes on the most effective ones.
- **AI Interaction:** Use AI tools in class to generate responses to the prompts students create, allowing them to see the practical application of their writing.
- **Encourage Iteration:** Have students refine their prompts based on the quality of the AI-generated responses.

Classroom Ideas

Come up with five ways to incorporate AI into your classroom:

1. You pick the subject/objective
2. You pick the scenario.
3. Make at least one sample prompt for each scenario.
4. Copy the completed scenario and prompt into a document (.docx, .txt, .pdf)
5. Save to share at the end of class.

Save as: "*Your Initials – Prompting Ideas*"

Time Remaining:

Start

Creating Materials and Labs

Come up with a concept and/or lab you want to know about:

1. You pick the subject/objective
2. You pick the scenario.
3. Make a sample prompt and refine as needed.
4. Copy the completed prompt and scenario into a document (.docx, .txt, .pdf)
5. Save to share at the end of class.

Save as: "*Your Initials – Prompting Ideas*"

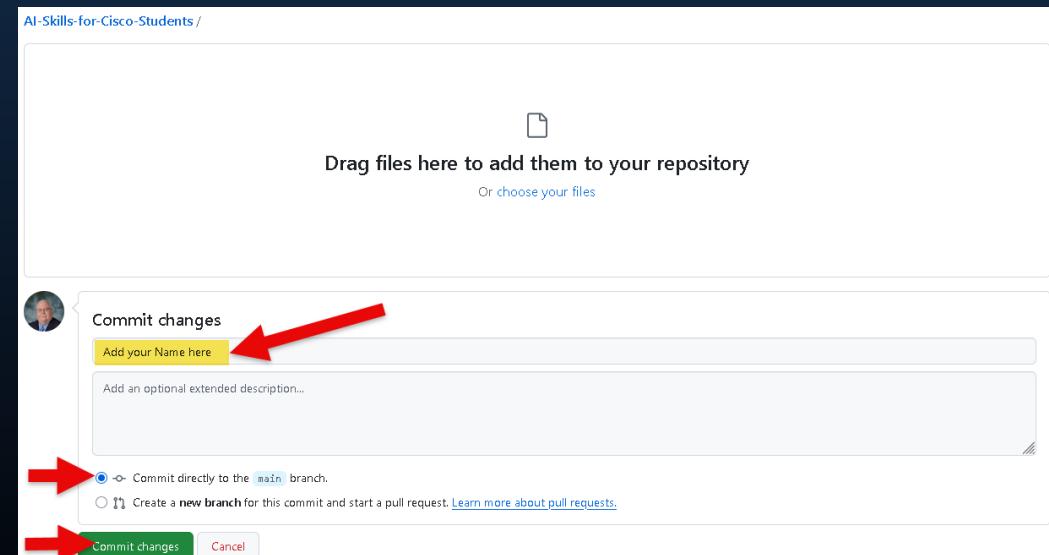
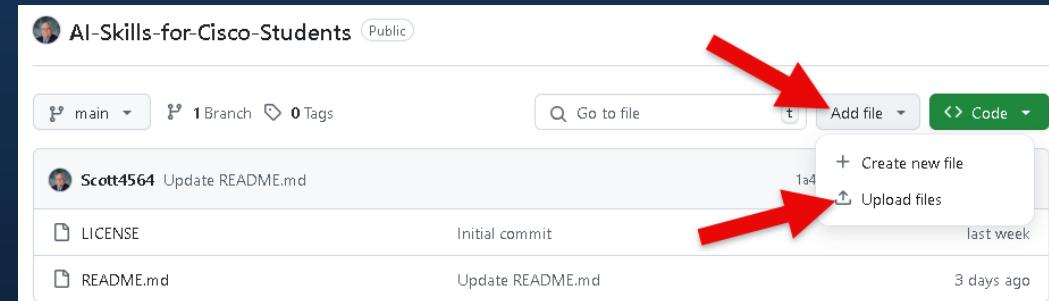
Time Remaining:

Start

Upload your Documents to GitHub

1. Open and log into GitHub
2. Navigate to the **AI-Skills-for-Cisco-Students** folder
3. Click on **Add file -> Upload files**
4. Drag files to browser
5. Add **Your Name** to Commit changes
6. Be sure Commit directly to the main branch is checked
7. Click **Commit changes**

Note: You must have already added to the repository before you will have upload rights.





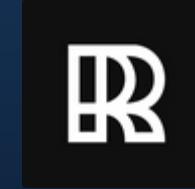
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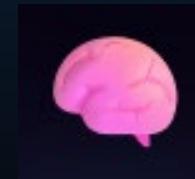
The Rundown AI - <https://www.therundown.ai/>



Smarter with AI - <https://www.smarterwithai.news/>



TLDR AI - <https://tldr.tech/ai>





WANT TO LEARN MORE?

NEXT STEPS

CDC's DoL Prompt Engineering Internships

Overview

- Students will gain a comprehensive understanding of how prompt engineering intersects with Cisco networking and automation, preparing them for current industry challenges and trends.
- To encourage active participation and collaboration to foster a rich learning environment, students will be expected to complete:
 - 4 to 6 hours per week for reading and labs
 - Plus 120-minute bi-weekly online Webex sync session
 - 36 weeks of study before starting an internship
 - 140 hours total

CDC's DoL Prompt Engineering Internships

AI for Network Engineers

7 Modules include:

1. Foundations of AI (4 weeks)

- What is intelligence?
- Eras in Computing
- A Brief History of Artificial Intelligence
- What is Artificial Intelligence?
- Key Concepts in AI
- The Three Stages of AI Development
- Data Types of AI
- What is Machine Learning?
- What is Deep Learning?
- What is Natural Language Processing?
- What is computer vision?
- What is Generative AI?
- What are Large Language Models?
- Responsible AI
- Structured Approach to Problem Solving
- Current Trends in AI

CDC's DoL Prompt Engineering Internships

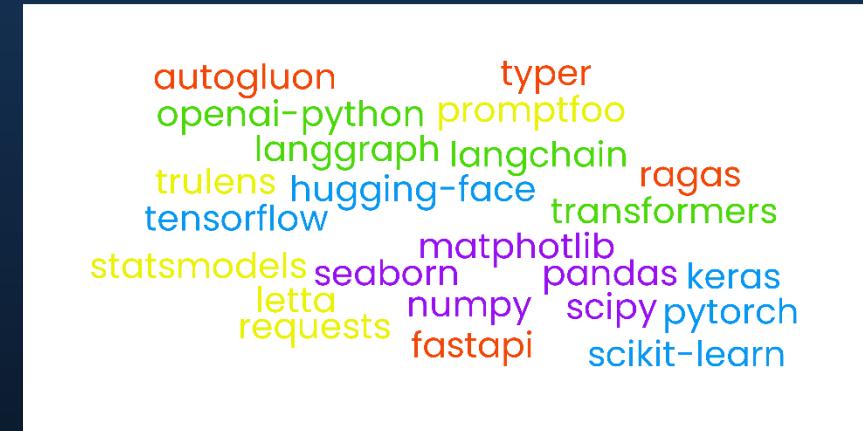
2. Linux, Cloud, Containers, and Version Control (2 weeks)

- What is Linux?
- What are Cloud Services?
- What is Docker?
- What is Version Control Using Git?
- What is an API?

CDC's DoL Prompt Engineering Internships

3. Python (6 weeks)

- Data Types, Variables, Operators, Formatting, and Basic I/O in Python
- Operations
- Making Decisions in Python
 - Conditional Statements
 - Looping Constructs
- Data Structures in Python
 - Implementing Lists
 - Implementing Tuples
 - Implementing Sets
 - Implementing Dictionaries
- Functions in Python
- Scopes in Python
- Handling Text Files in Python
- Exceptions in Python
- Python Modules for AI



CDC's DoL Prompt Engineering Internships

4. Getting Started with Prompt Engineering (6 weeks)

- Introduction to Prompt Engineering
- Understanding Different Prompt Engineering Techniques
- Set up your machine for Prompt Engineering
- Prompt Engineering Formulas
- Prompt Engineering Techniques

CDC's DoL Prompt Engineering Internships

5. Prompt Engineering for Network Engineers (6 weeks)

- AI in Networking and Cybersecurity
- Automation with Python
- Automation with Ansible
- Automation with Terraform
- Automation with Nornir
- Basics of REST APIs
- Automating tasks using API calls
- Testing Configurations
- Automation Prompting

CDC's DoL Prompt Engineering Internships

6. AI Agents and Agentic AI (6 weeks)

- Introduction to AI Agents?
- AI Frameworks
 - LangChain
 - LangGraph
 - HuggingFace
 - N8N
 - LlamalIndex
 - Evaluation Metrics
- Introduction to RAG systems
- Introduction to MCP and A2A
- Introduction to Agentic AI
- Building AI Agents
- Building Agentic AI

CDC's DoL Prompt Engineering Internships

7. Capstone Project (6 weeks)

- Create a capstone project that requires students to develop real-world applications to showcase their skills.
 - Develop an Agentic AI application that will automate configurations, monitor user interactions, troubleshoot, automatically fix issues, monitor and mitigate the network for security threats, and more.
 - Project Evaluation

Planned start date: January 2026

Thank you for leading the next generation of
network engineers.



Understand. Apply. Teach.

