

IDT 540

Instructional Web Site Project: Cognitive Tutor

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Description

Developing a Web-based cognitive tutor requires advance planning to ensure its success; planning ahead also reduces the amount of debugging and editing required throughout the development of the project. In order to design, develop, and implement this project a multitude of computer software products and technologies will be employed including: Adobe Acrobat Pro, Dreamweaver, Photoshop, Captivate, Media Encoder, Soundbooth, Presenter, Illustrator, Flash Builder, Flash Professional, Flash Player, Flash Media Server, ActionScript; Camtasia Studio; Lector Inspire; JavaScript; Apple Quicktime; and Microsoft Media Player, Expression Studio, Visual Studio, C#, and ASP.NET. In order for a Web-based cognitive tutor to be successful and efficient it must follow proven pedagogically-based instructional design techniques and developed using empirically established principles established in cognitive load theory. The design and development of the Web-based cognitive tutor must also follow time-tested guidelines of interface design including the use of strategies such as: sign posting, intuitive navigation, breadcrumbs, the ability for the user to save and return to the point where they left off. In order for the Web-based cognitive tutoring system to be implemented through a learning management system like Moodle or Blackboard it must also be SCORM compliant to provide proper integration with the learning management system.

Part I - ANALYSIS

1. TOPIC:

This project involves creating a Web-based cognitive tutor which will be designed using the principles of cognitive load theory (CLT) and used in my *CSIS 202 Introduction to Networks and Data Communications* online course at Mt. San Jacinto College. It will consist of: an introductory module which will include pre-testing, instructional tutorials which incorporate multimedia content designed to enhance germane cognitive timely feedback, self-explanation prompting, and adaptive sequencing.

2. NEEDS ASSESSMENT:

The information technology (IT) industry is second only to the medical industry in job growth and wages paid to IT professionals is well above the state average for salaries (edd.ca.gov). Community colleges receive funds from the Perkins grant to develop courses that teach students skills for high paying jobs that are in demand. Parts of the assessment portion of the Perkins grant calls for retention and persistence by students to be increased in career and technical education programs by

colleges that receive funding. A cognitive tutor developed for teaching students networking will be an effective, efficient, and engaging way to meet the goals of Perkins and the needs of the community.

3. TARGET AUDIENCE:

The target audience for the cognitive tutor will be college students seeking entry level IT positions. The age range will vary from recent high school graduates transferring to the community college and older workers who are looking to change their career path.

4. GOALS:

This project aims to deliver effective, efficient and engaging instruction that will enhance a student's schema acquisition and construction abilities, rule automation, and transfer of learning which transfers to both near and far problem solving skills.

5. LEARNING OBJECTIVES:

Upon completion of the cognitive tutor the user will be able to:

- Convert decimal numbers into binary numbers accurately on each attempt
- Identify the class of an IP address correctly for each IP address presented
- Create a custom subnet mask which will function properly in a multi-segmented IP-based LAN

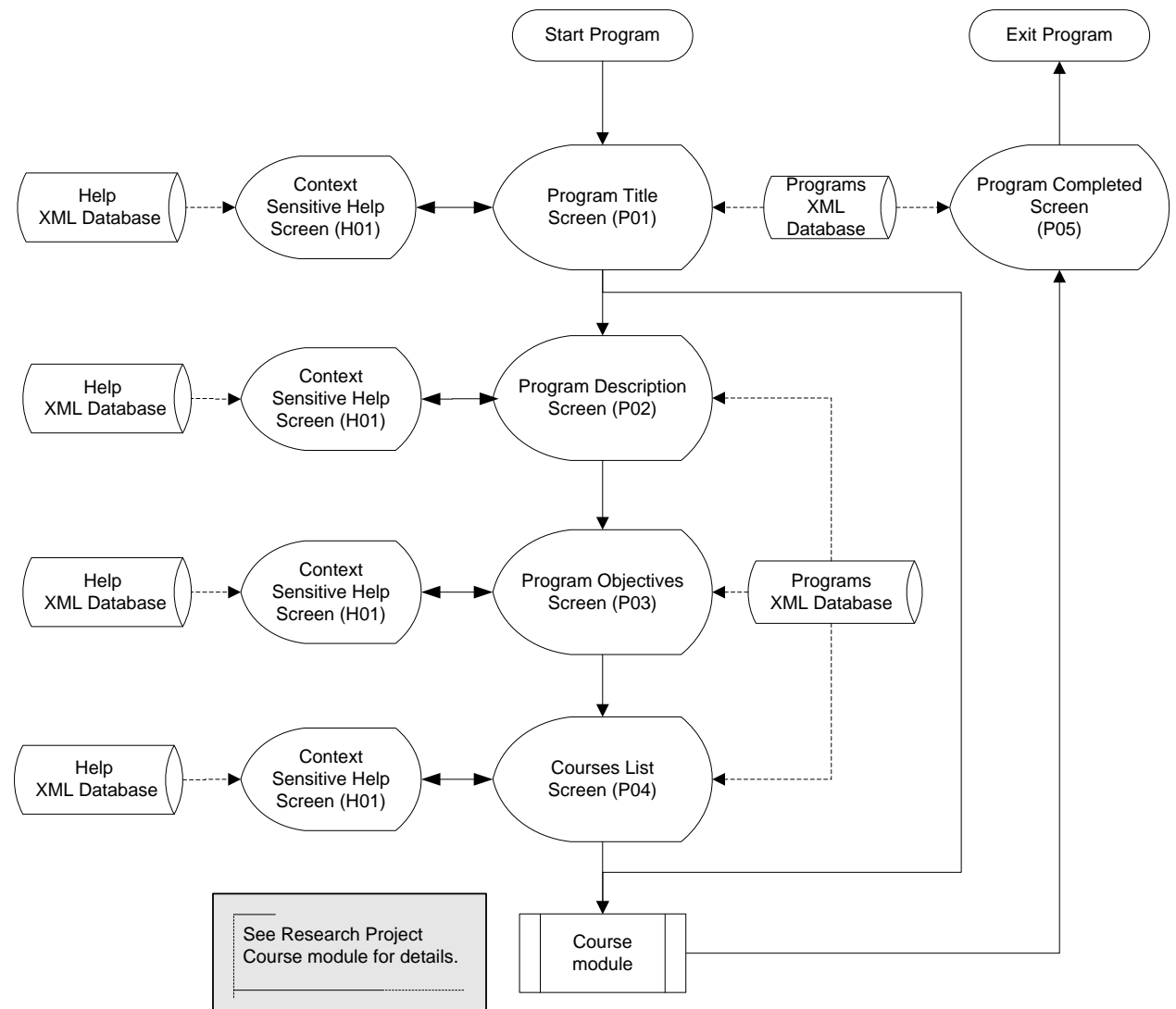
6. PREREQUISITES: What are the prerequisites for your program that the target audience must already have?

- Users of the cognitive tutor will need to have access to a computer
- Users of the cognitive tutor will need to have knowledge of how to activate a computer program from either a CD or the Internet (depending on implementation)
- For online access the user will need to have access to a computer which has Internet access

Part II - DESIGN

1. FLOWCHARTING:

MSIDT Research Project Program Module

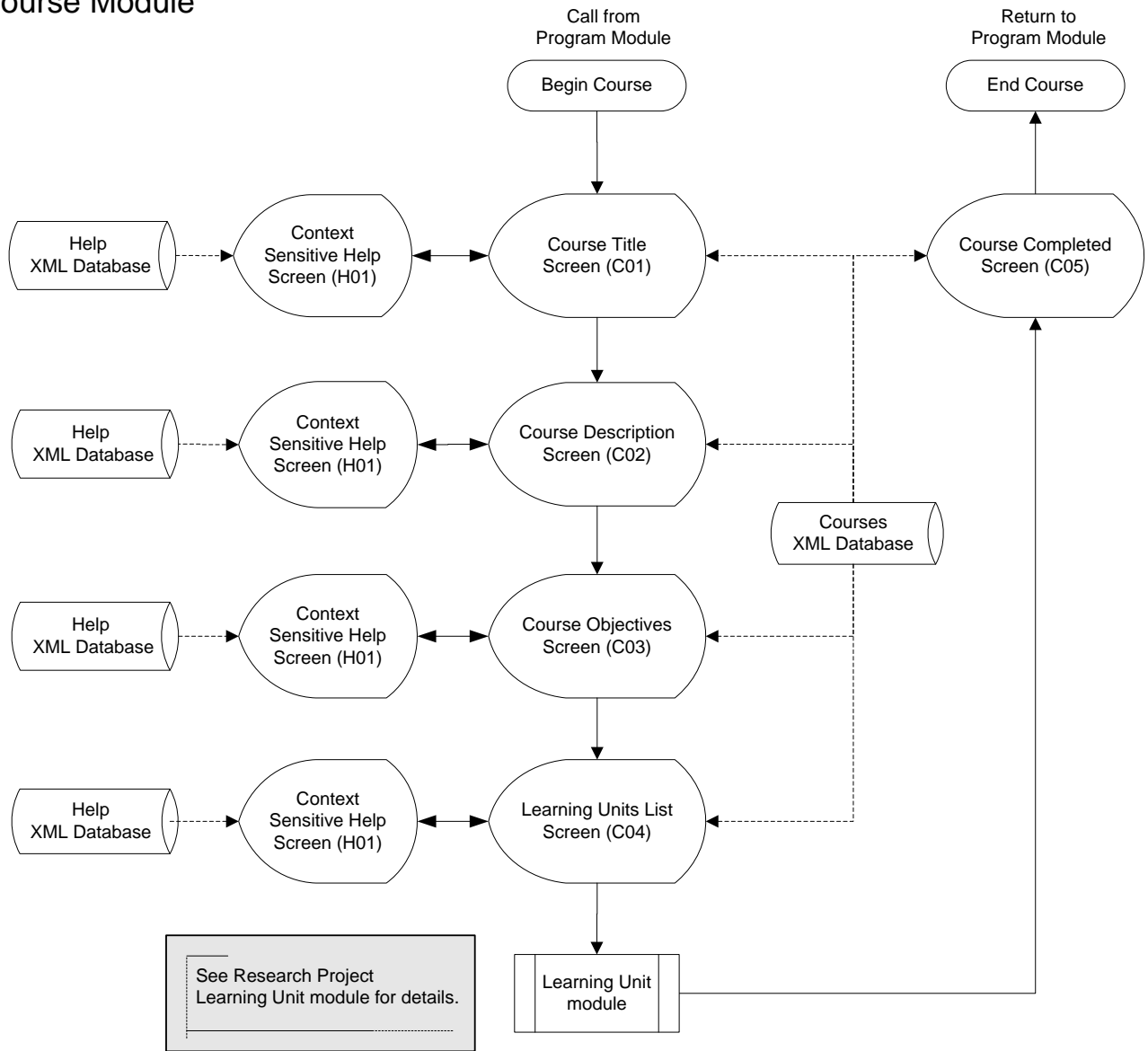


————— Navigational path

- - - - - Database binding

MSIDT Research Project

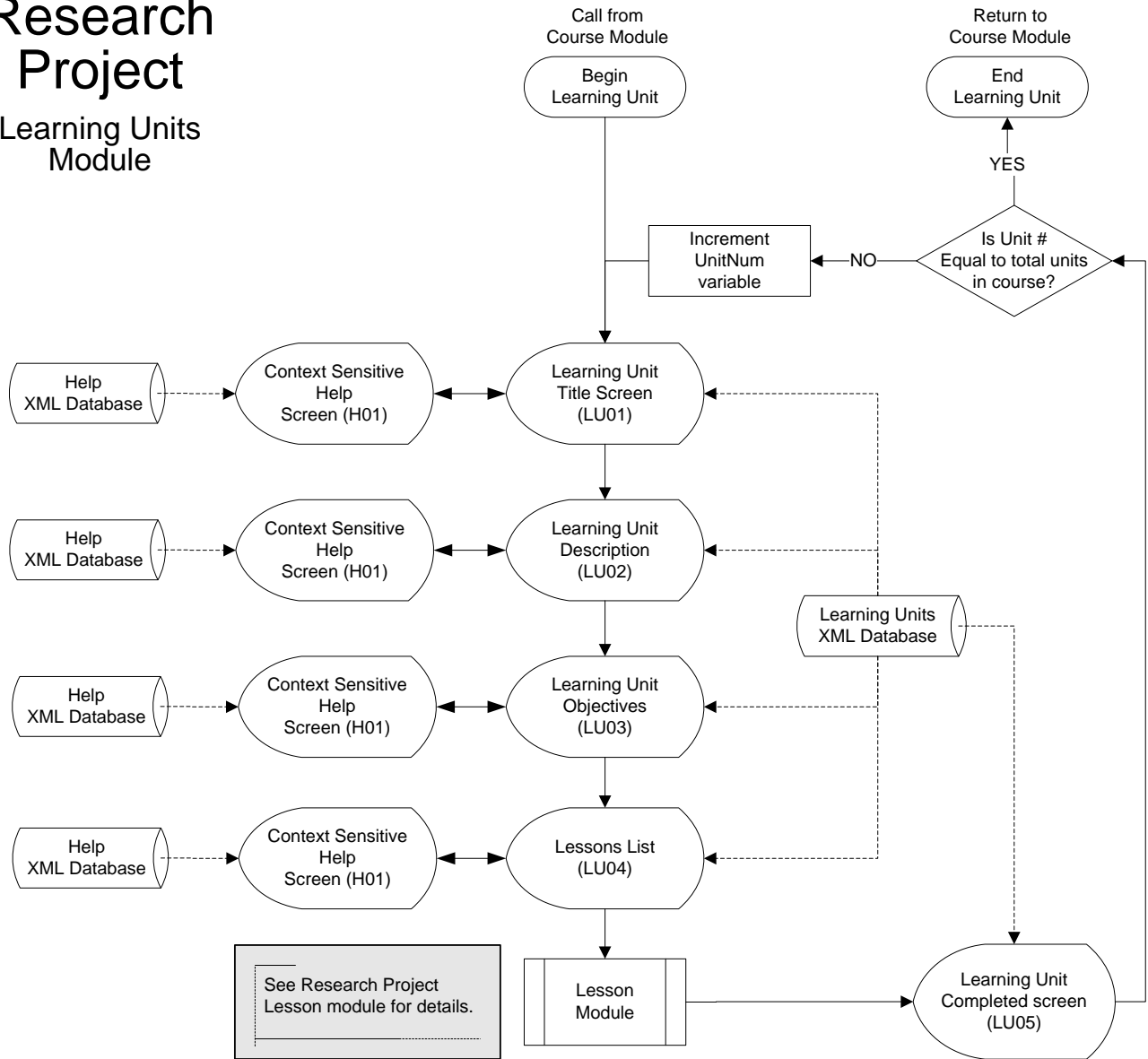
Course Module



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Learning Units Module

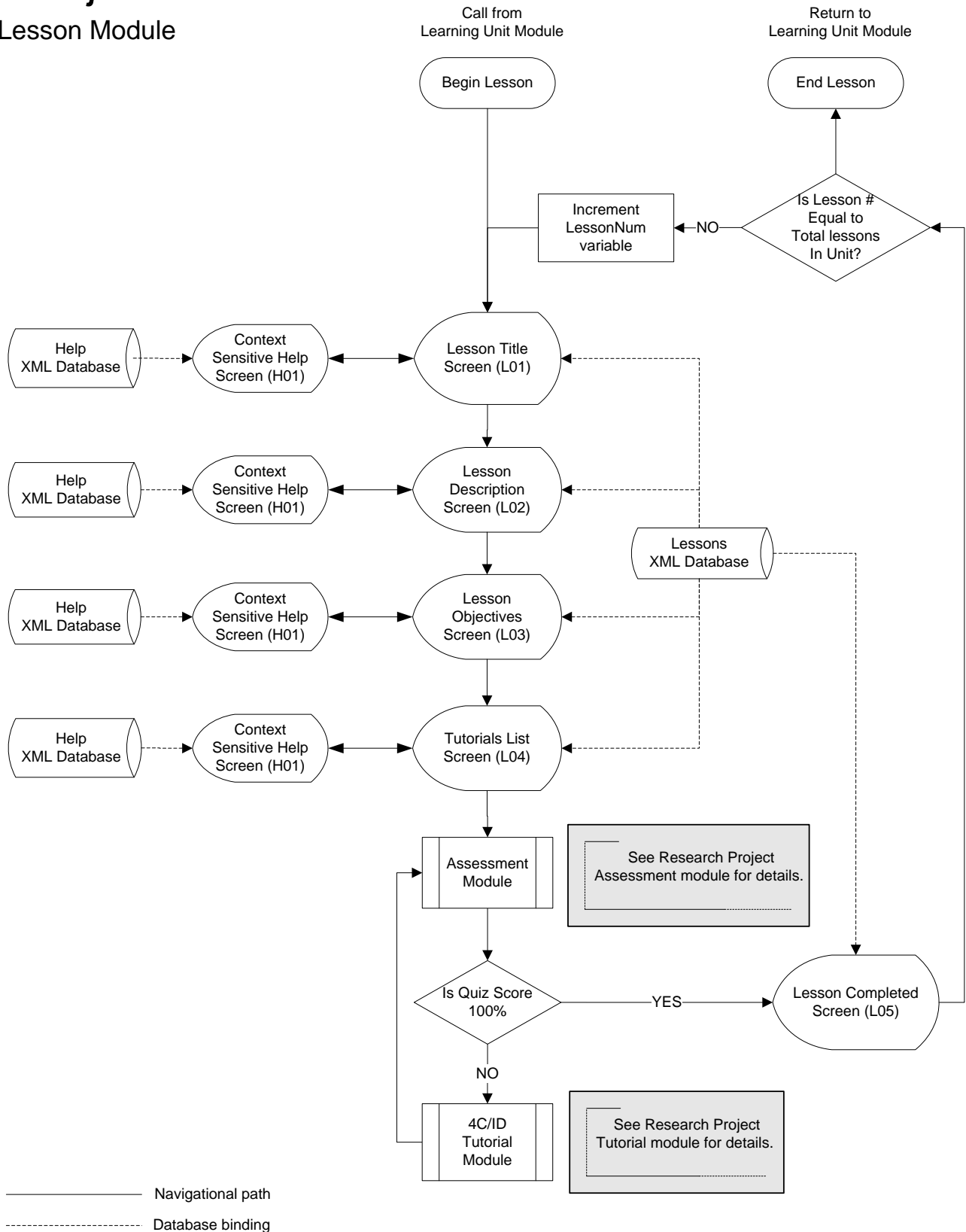


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See Research Project
Lesson module for details.

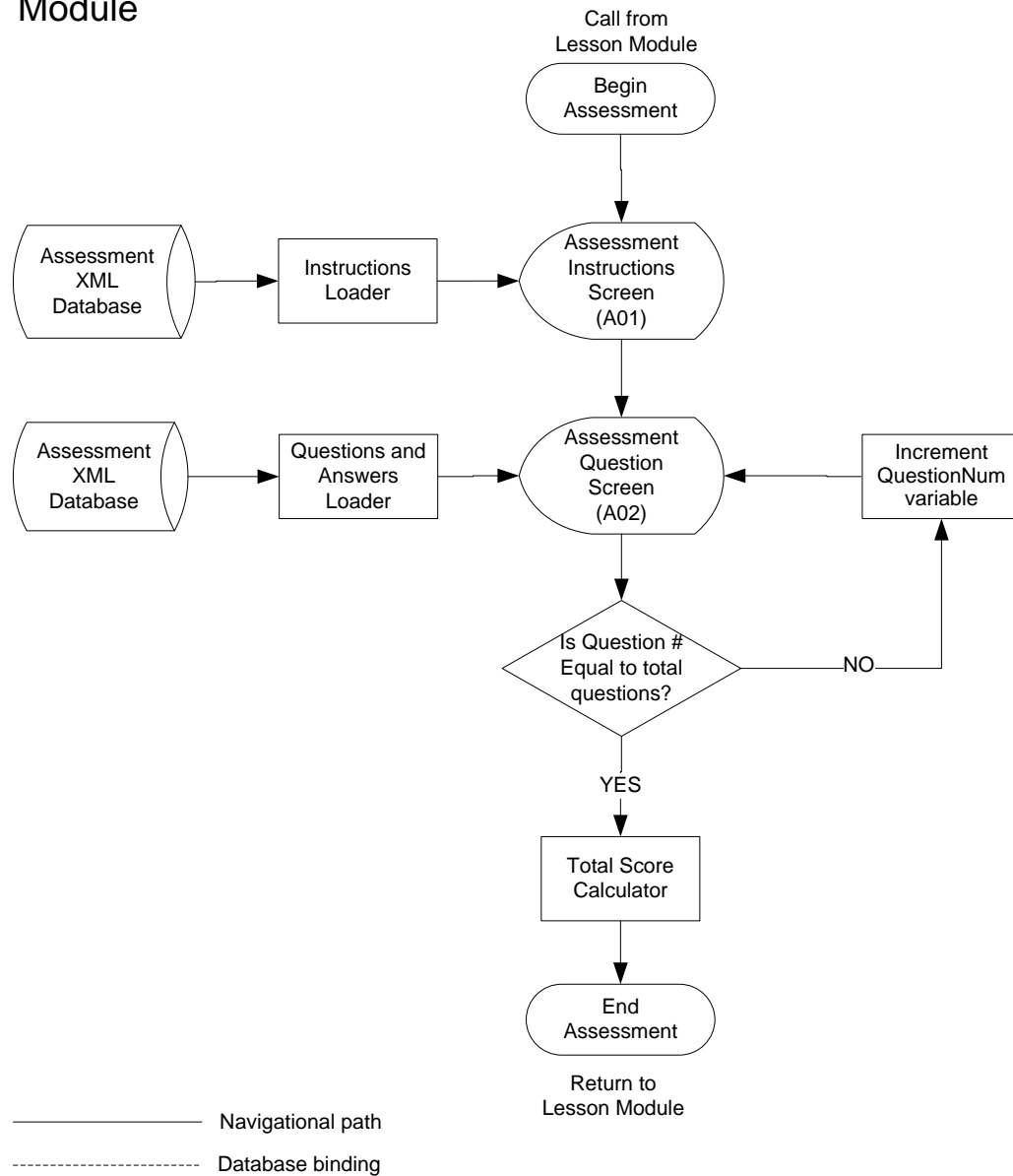
MSIDT Research Project

Lesson Module



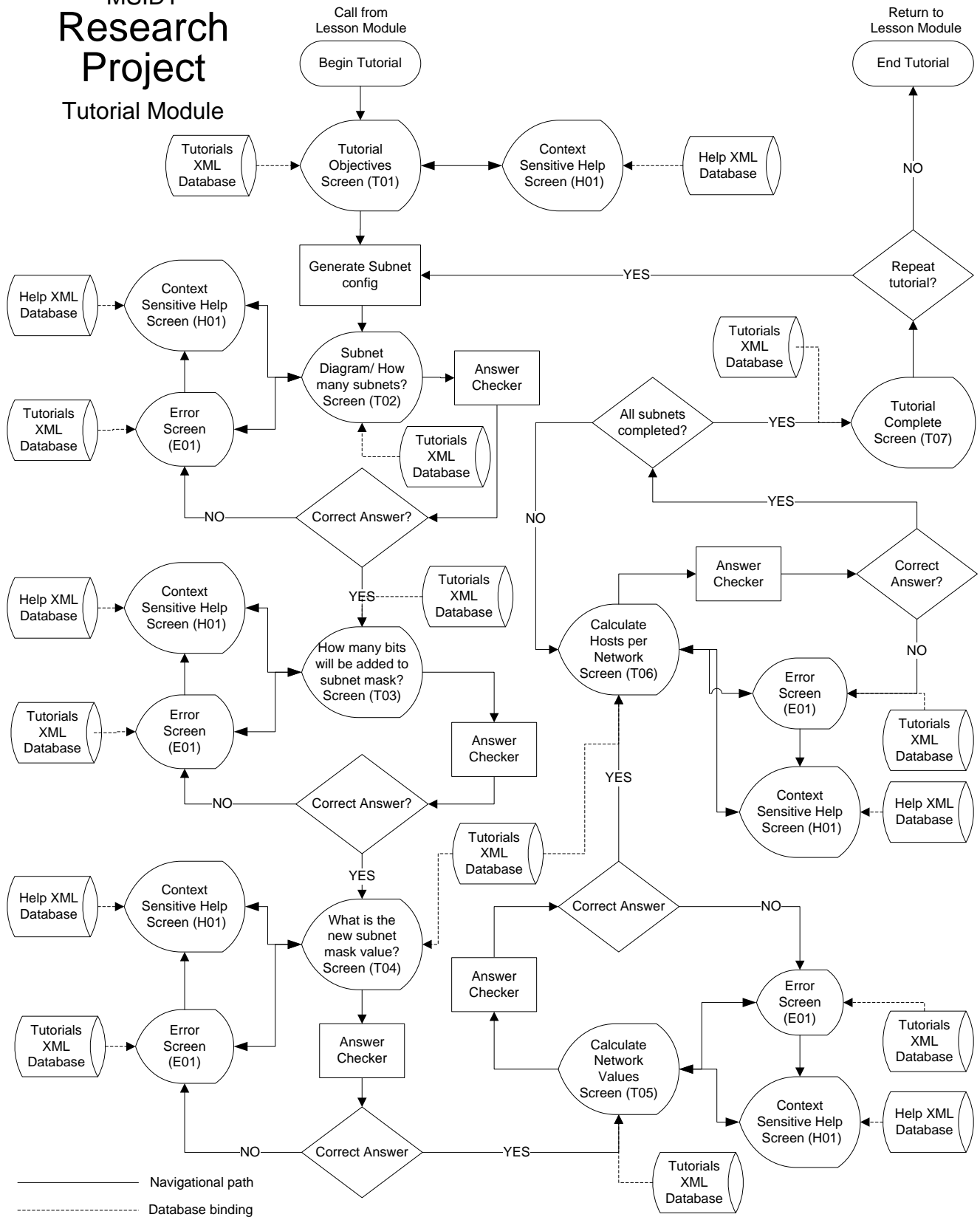
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Assessment Module



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Tutorial Module



2. SCREEN DESIGN PROTOTYPE:



Figure 1: P01



Figure 2: P02



Networking

Program Objectives

After successfully completing the CIS Networking Program students will be able to do the following:

- Explain the functions of the OSI layers
- Configure a star topology
- Build a CAT 5 patch cable
- Subnet an IP LAN
- Configure a network interface
- Describe SSL security
- View and install a digital certificate
- Explain the main functions of network management
- Describe the advantages of Ethernet
- Identify networking components like switches and routers

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[Courses ▶](#)

Figure 3: P03



Networking

Program Courses

In order to earn an CIS Networking certificate, students must complete the following courses with a grade of "C" or better.

Core Courses:

- CSIS 101: Introduction to the Computers - 3 units
- CSIS 201: Systems Analysis - 3 units
- CSIS 202: Networking & Data Communications - 3 units

Microsoft Certified Systems Administrator:

- NET 120: Configuring a Microsoft Client - 3 units
- NET 121: Configuring a Microsoft Server - 3 units
- NET 122: Configuring a Network Infrastructure - 3 units

Click on a course above to begin instruction

Figure 4: P04



Figure 5: P05

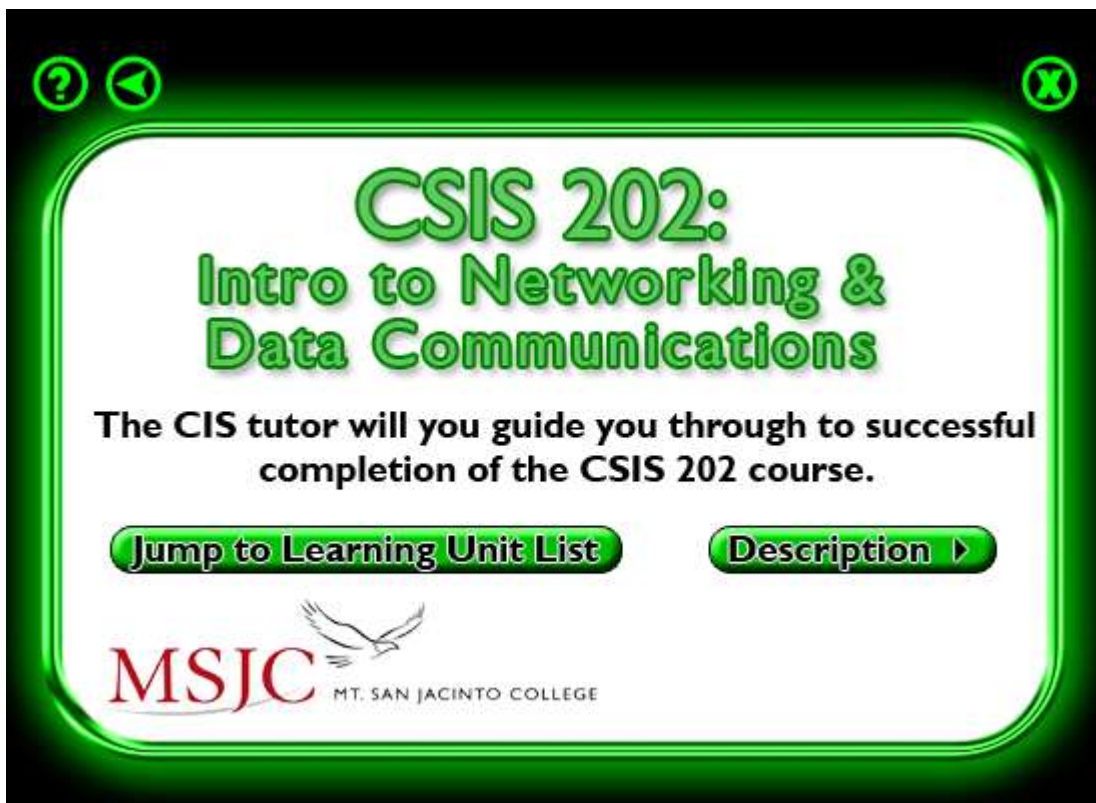


Figure 6: C01

CSIS 202: Intro to Networking & Data Communications

Course Description

This course introduces students to fundamental data communication concepts including voice and data communications, networking, hardware, the OSI model, and network design. Network management and security issues are also covered. This course is designed for the student who is interested in learning about data communications and networking as well as the career options that are available in this field.



[Objectives](#)

Figure 7: C02

CSIS 202: Intro to Networking & Data Communications

Course Objectives

After successfully completing the CSIS 202: Networking and Data Communications course students will be able to do the following:

- Explain the functions of the OSI layers
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- Identify networking components like switches and routers



[Learning Units](#)

Figure 8: C03

CSIS 202: Intro to Networking & Data Communications

Learning Units

In order to complete this course students must complete the following learning units.

- Learning Unit 1: Introduction, OSI Layers 1 & 2**
- Learning Unit 2: OSI Layers 3 and 4**
- Learning Unit 3: OSI Layers 5, 6, and 7**
- Learning Unit 4: Systems Management & Security**
- Learning Unit 5: LAN Management & Security**

Click on a learning unit above to access its corresponding lessons

Figure 9: C04

Congratulations

Student's name

You have completed
CSIS 202:
Introduction to
Networking &
Data Communications

Return to Course Listings ▶

Figure 10: C05

CSIS 202: Intro to Networking & Data Communications

Learning Unit 1: OSI Layers 3 and 4

The CIS tutor will guide you through to successful completion of this learning unit.

[Jump to Lessons List](#) [Description](#)

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Figure 11: LU01

CSIS 202: Intro to Networking & Data Communications

Learning Unit Description

In this learning unit you will be introduced to OSI layer 3 the Network layer and OSI layer 4 the Transport layer. The Department of Defense layered model will also be introduced. The networking layer will focus on the TCP/IP and IPX/SPX transport protocols and the transport layer will focus on application port numbers and sockets.

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[Objectives](#)



Figure 12: LU02

CSIS 202: Intro to Networking & Data Communications

Learning Unit 2 Objectives

After successfully completing the CSIS 202: Networking and Data Communications course students will be able to do the following:

- Explain the primary functions of the OSI layers 3 and 4
- Identify IP address components
- Compare and contrast TCP/IP to IPX/SPX
- Configure custom subnet masks
- Subnet a TCP/IP network
- Identify Application layer protocols by their corresponding port number

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[Lessons List ▶](#)

Figure 13: LU03

CSIS 202: Intro to Networking & Data Communications

Lessons

In order to complete this learning unit students must complete the following lessons.

- Lesson 4: Network Layer Protocols**
- Lesson 5: Advanced TCP/IP**
- Lesson 6: OSI Layer 4 the Transport Layer**

**Click on a lesson above
to access its tutorials and assessments**

Figure 14: LU04

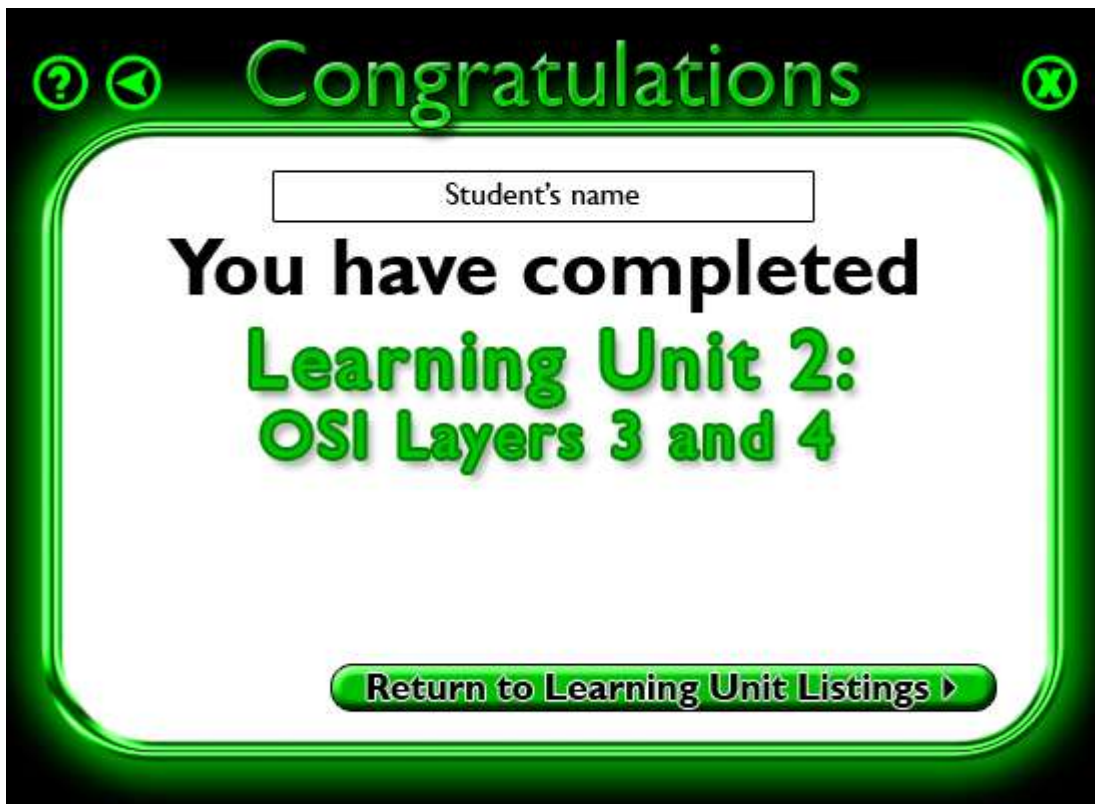


Figure 15: LU05



Figure 16: L01

CSIS 202: Intro to Networking & Data Communications

Lesson 4 Description

In this you will learn how to properly segment a TCP/IP network into subnetworks, including how to define a custom subnet mask, how to assign the proper network IDs to each subnetwork, and how to define the useable IP address range to be used by host devices on each sub-network.

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[Objectives](#)

Figure 17: L02

CSIS 202: Intro to Networking & Data Communications

Lesson 4 Objectives

After successfully completing this lesson students will be able to do the following:

- Convert decimal values to binary sequences
- Create a custom subnet mask
- Define network IDs for subnetwork segments
- Identify the useable address range on a given subnetwork segment
- Calculate total number of host address available on a subnetwork segment

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[Tutorial List](#)

Figure 18: L03

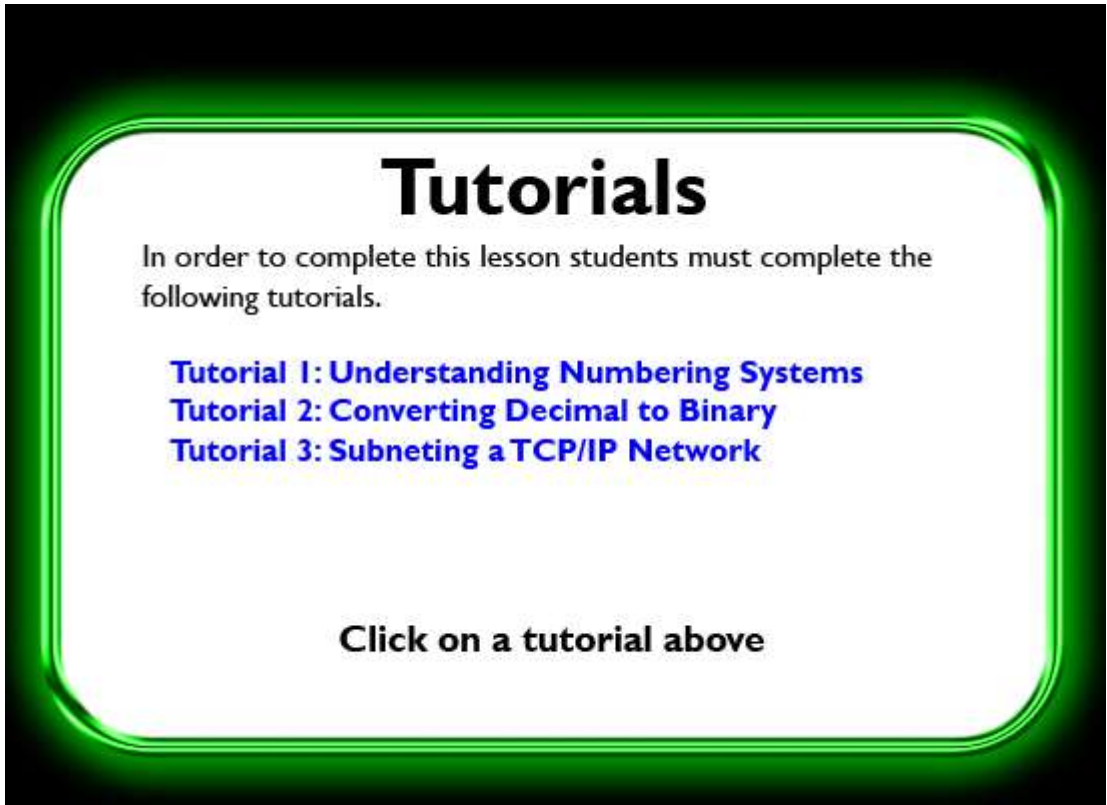


Figure 19: L04

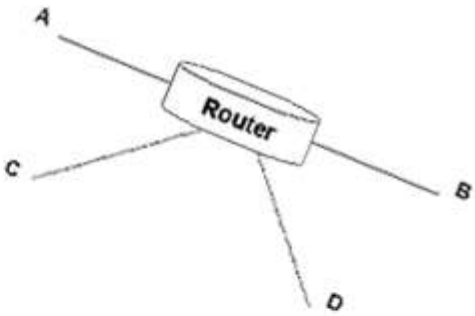


Figure 20: L05

Subnetting Tutorial

Are You Networkworthy?

Your objective is to evaluate a given network configuration and subnet it into the appropriate segments including calculating the correct IP addresses for each segment.

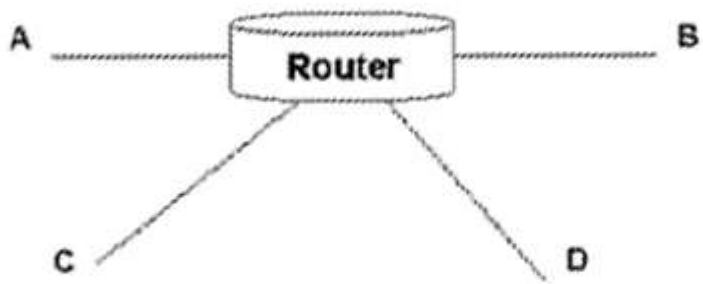


Instructions **START**

Figure 21: T01

Subnetting Tutorial

Network: 192.168.0.0/16



How many subnets are shown?

Check Answer

Figure 22: T02

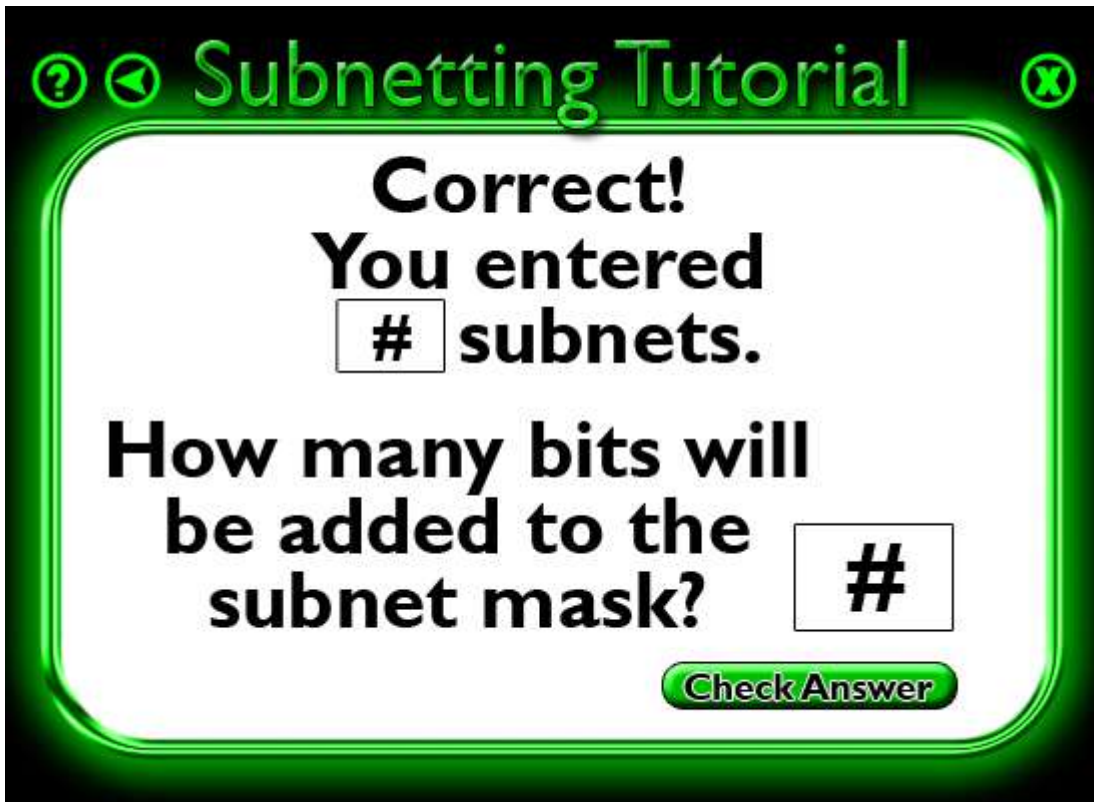


Figure 23: T03

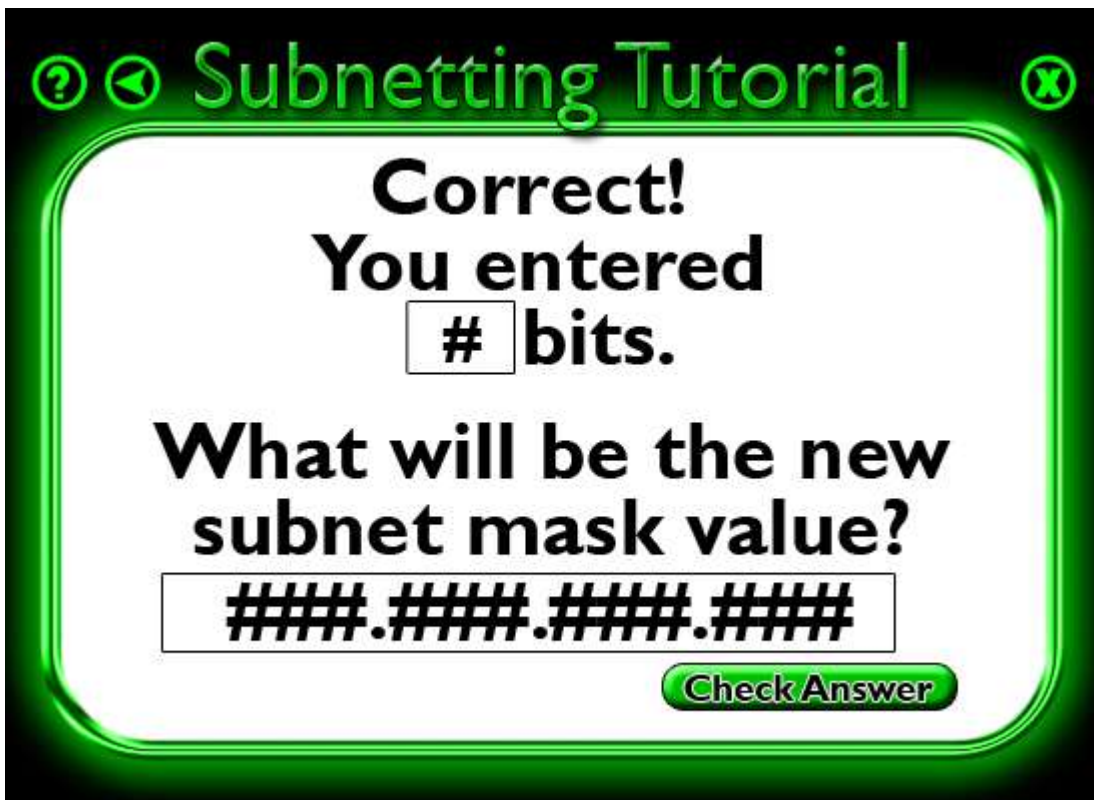


Figure 24: T04

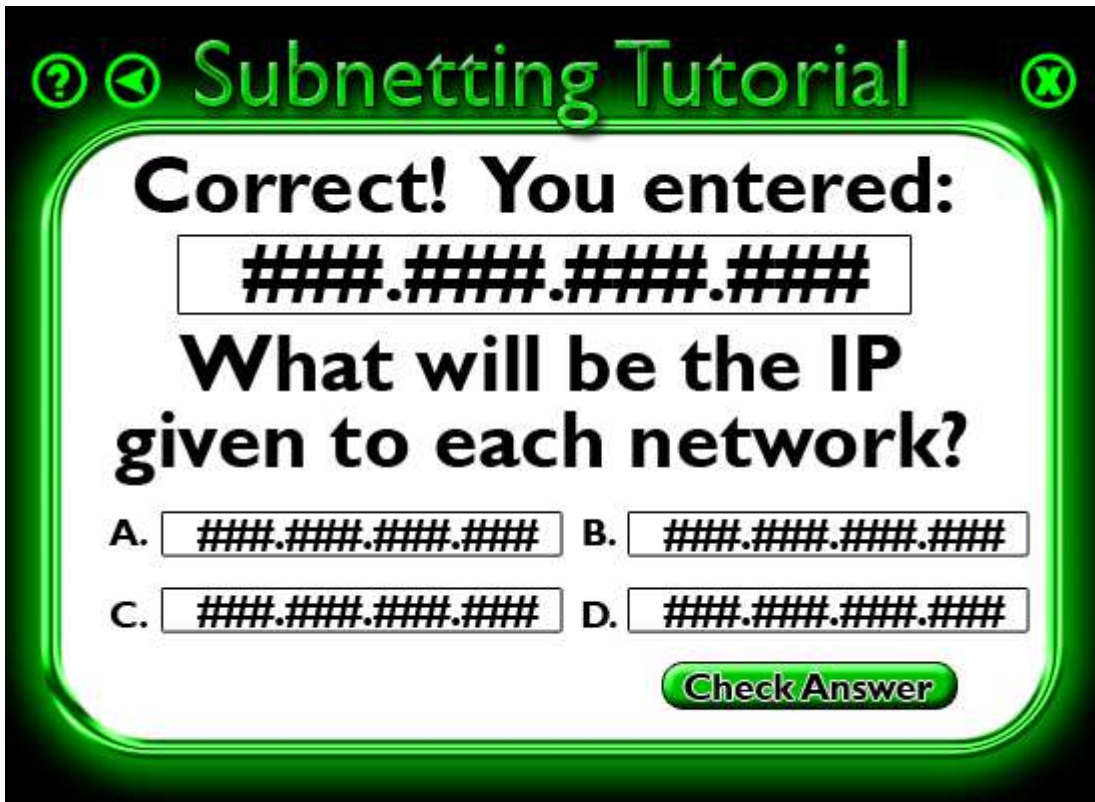


Figure 25: T05

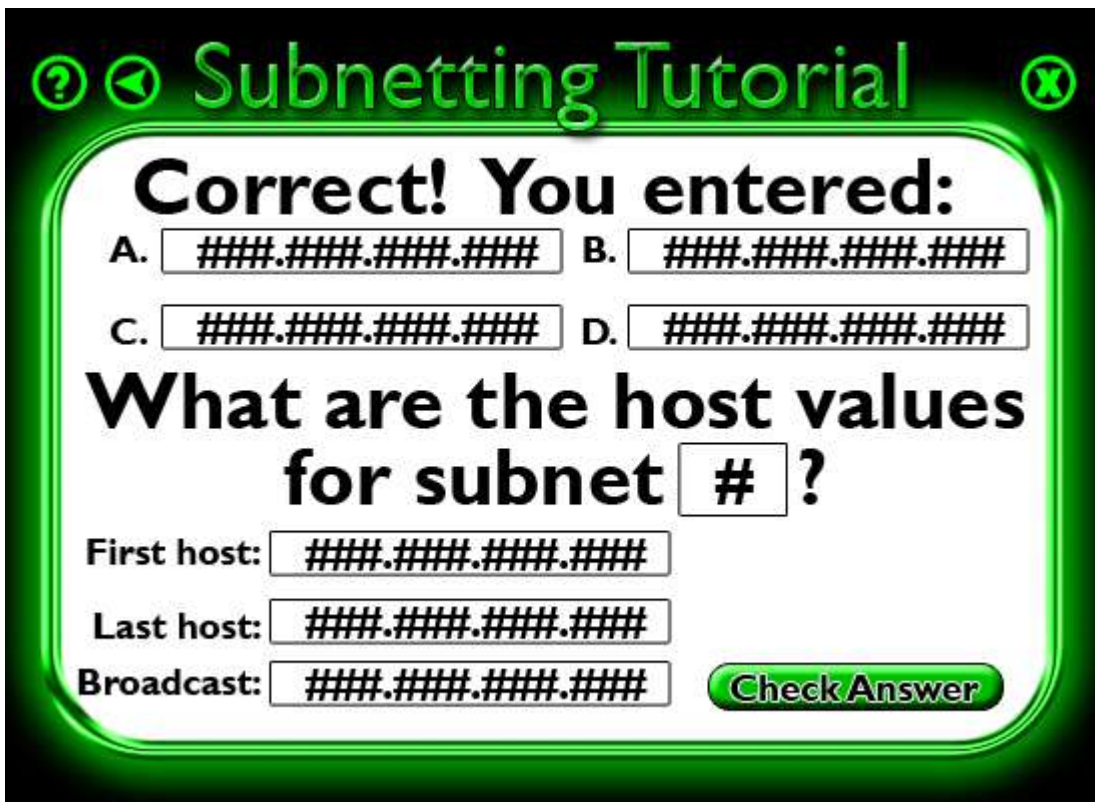


Figure 26: T06

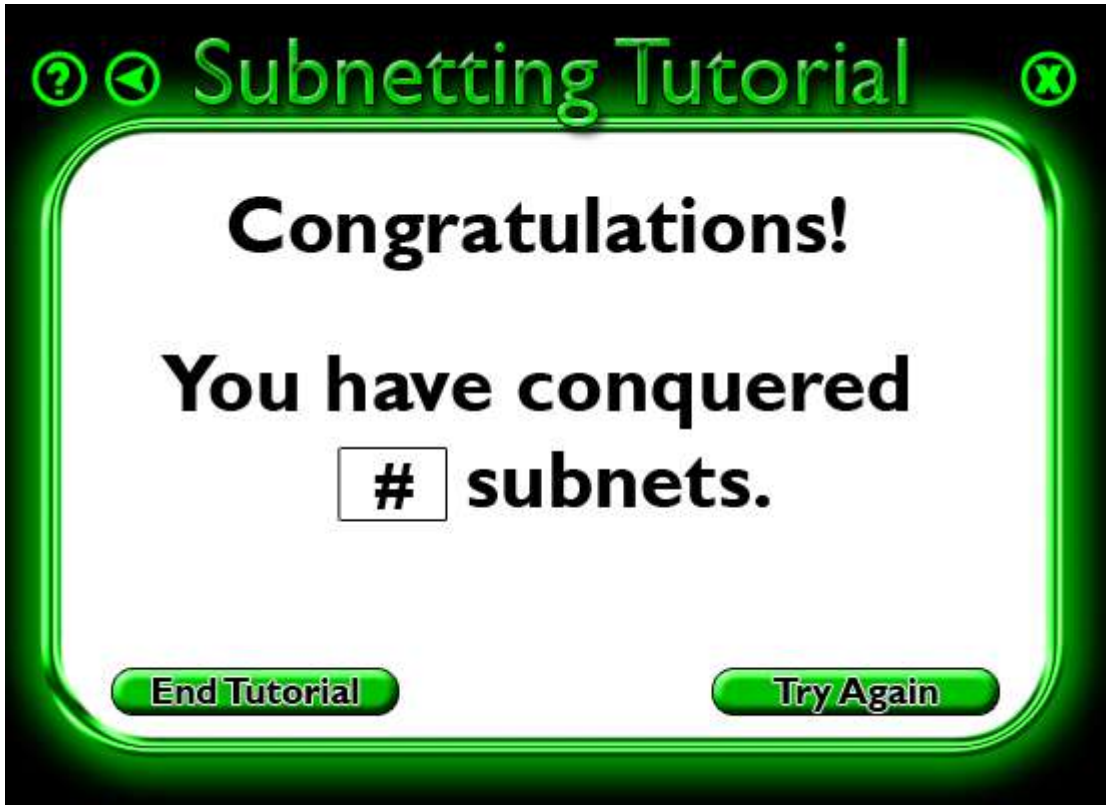


Figure 27: T07



Figure 28: E01



Figure 29: H01

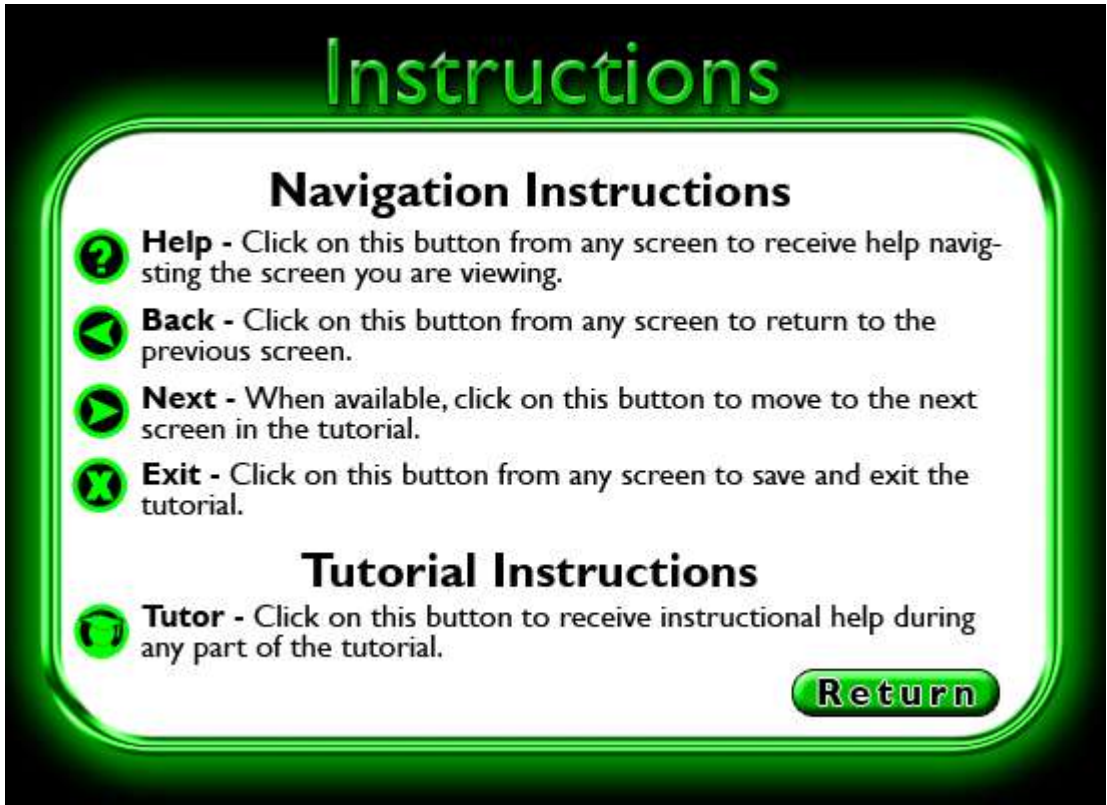


Figure 30: I01

3. LEARNING & INTERACTIVE STRATEGIES:

The cognitive tutor will consist of several types of instructional media including real world tasks, interactive tutorials, instructional videos, learning objectives to focus learners on intended outcomes, part-task practice, just-in-time feedback, random practice, partially worked examples, faded-worked examples, cognitive and skills-based assessments.

4. NAVIGATIONAL CONTROLS:

The cognitive tutor will use standard forward and backward navigation using next and back arrows in a global navigation bar when acceptable. Most of the cognitive tutor screens guide the user through the program step-by-step with buttons clearly marked as to their purpose. A context-sensitive Help button will be readily available from the global navigation bar at the top of each screen. Users who are operating the cognitive tutor within a learning management system will have the ability to bookmark their progress in the program for a quick and easy return to where they left off.

5. INTERACTIVE CONTROLS:

The cognitive tutor will use several types of assessment to evaluate the user learning progress which are all internally generated and, when installed in a learning management system, automatically recorded as the user progresses through the program. The assessment methods will include but are not limited to: partially-worked examples, faded examples, task completion assessment, concept attainment, reflection prompts, random practice, cognitive and skills-based.

Part III - IMPLEMENTATION

1. FIELD-TESTING:

I will be enlisting several colleagues whom I consider to be very informed and skilled at online instruction to evaluate the cognitive tutor and provide me with their feedback concerning its ability to perform the intended goal, as well as its navigational coherence, and aesthetic and motivational appeal.

2. RESULTS OF FIELD TESTING:

TBD

3. MODIFICATIONS:

TBD