# Design Review: DigiTool Inc.

NAU DigiTool

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Project: Digital Logic Self-Study Toolkit
Project Sponsor: Xi Zhou
Team Faculty Mentor: Fabio Santos

Client

- Assistant Professor of Practice Xi Zhou

- Specializes in Electrical Engineering

- Ph.D in Material Science & Engineering @ Norfolk State University

- Teaches Intro to Digital Logic course
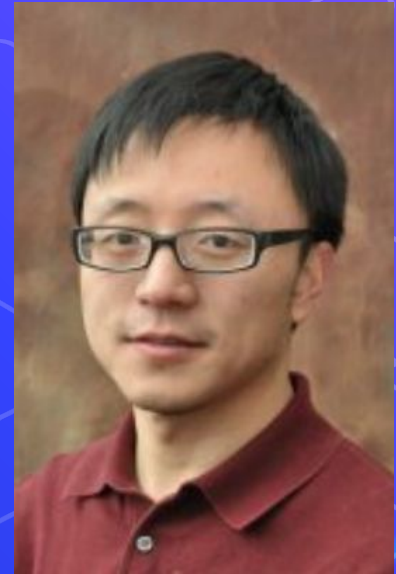
Big Picture

- Considered a foundational course for EE majors

- Any Engineering student can take the course

- Large number of students take the course every year
  - 75 students were enrolled just this semester alone

- Course introduces many complicated topics

Problem Statement

- General workflow of the course:
  - Introduce topic, assign homework, take tests on topic

- Client was using a Java applet previously for students to use

- Java applets are no longer supported by browsers

- Similar tools exist, but are ineffective

- Client wants to expand on previous applet

Solution Overview

Goals of our self - study toolkit:

- Increase student's understanding of concepts talked about in class

  - Through the interactive learning module, complete the exercises corresponding to the classroom content (these topics will be classified according to the difficulty and the chapters)

- Providing our customers with another way to help students solve problems, customers can check the student's usage and give feedback in a timely manner.
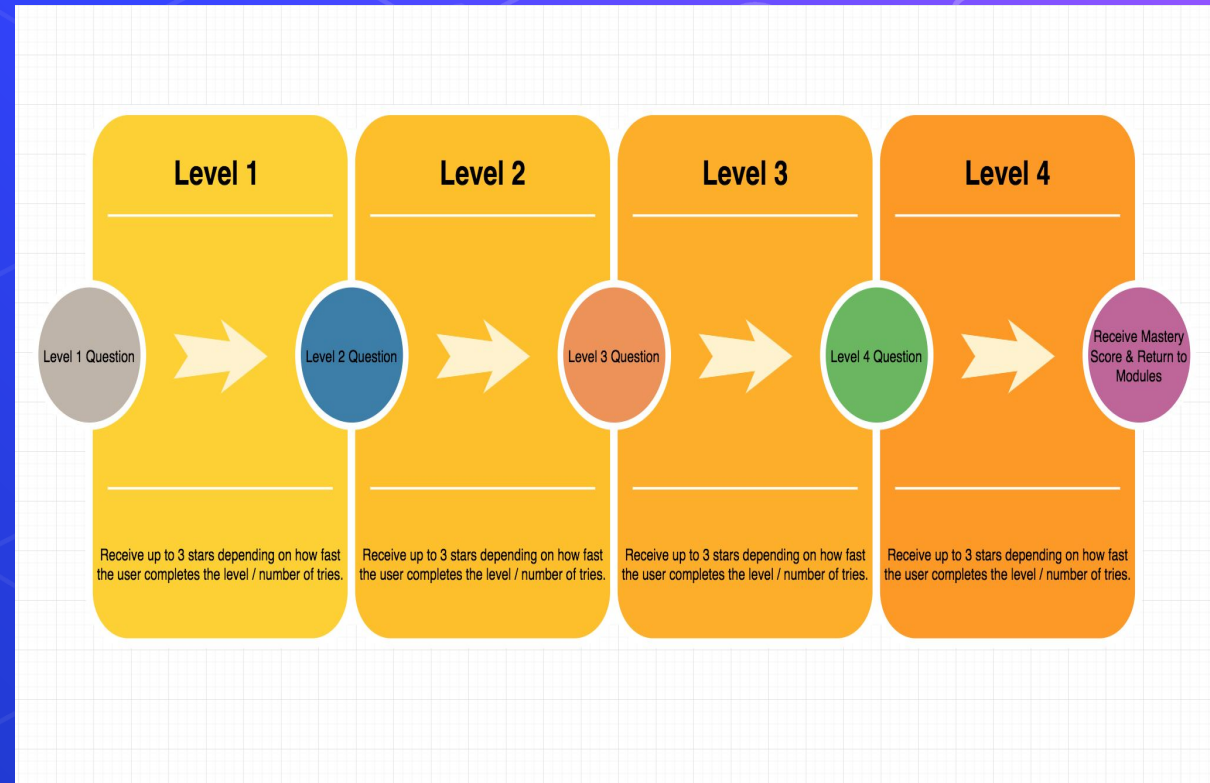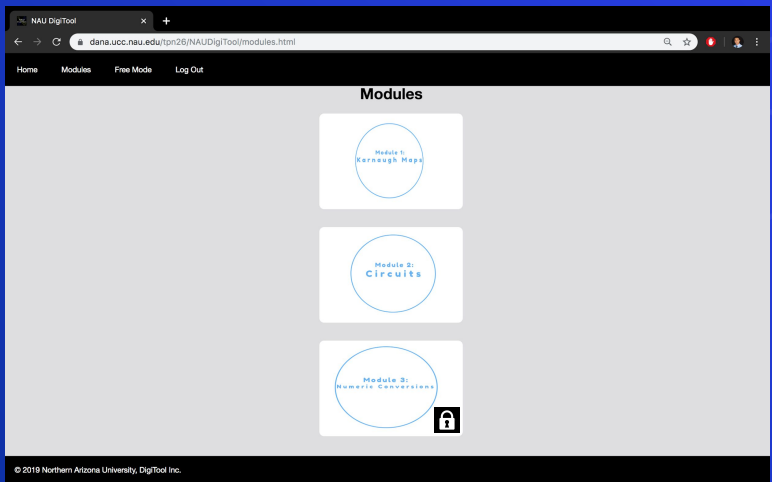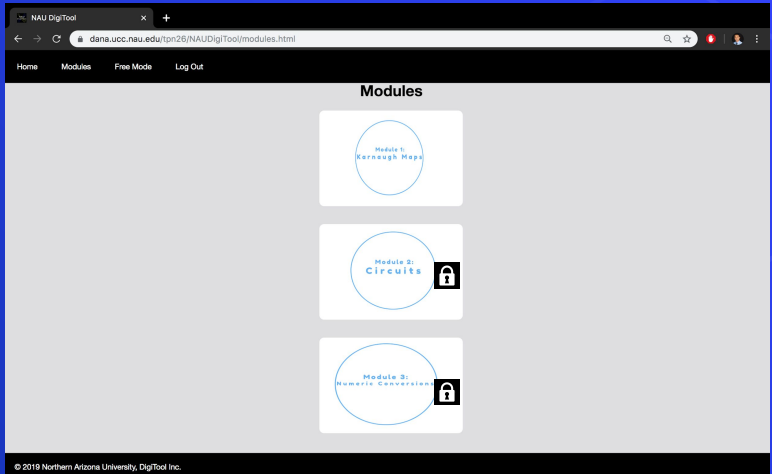
Acquisition of Requirements

- Meetings with our client

- Source code from the previous Capstone project

Key Requirements

- **Tracking system**
  - User's overall progress in all modules
  - Resume where they left off

- **Mastery system within each module**
  - Allow students to move onto the next module

Mastery System: Deeper Look

Functional Requirements

- The user will be able to create an account.

- The user will be able to access various modules depending on previous module completion.

- The user will be able to access a practice mode which allows them to practice content from a given module.

- The user will be able to receive a hint in case they're stuck on a problem.

- The user will have multiple attempts for every question given.

Non-Functional Requirements

- Web application must support 150 users at the same time.

- Response time must be between 0.1 - 2.5 seconds.

  - Network connection

- Web application must be operational from August - December & January - July.

  - NAU school year

Environmental Constraints

- Modern browser with HTML5 support

  - Internet Explorer 6 & above

  - FireFox 3.5 & above

  - Opera 11 & above

  - Safari 5 & above

  - Google Chrome 8 & above

- Only operational / functional on a computer

Risks

- Communicating with passwords and tracking usage statistics

- Learning centric design

- Database server uptime

- Compatibilities

	Severity	Management	Total
Protecting information			
UX			
Database server			
Compatibility			

Feasibility

- Protecting Information
    - Mitigation: Using existing technologies like encryption

- UX
    - Mitigation: Staying engaged with client and end users

- Database uptime
    - Accept the Risk: Only needs to be working during the semester

- Compatibility
    - Mitigation: Creating an uncomplicated architecture
    - Plan B: Switching out a framework or library

Schedule

- Finish module one by reading week

- Implement placeholders for all other modules

- Present demo of working module to Xi Zhou by finals week

Conclusion

- Introduction to digital logic can be a complicated course.
- Current tool is outdated and no longer works/ similar tools are ineffective.
- Our envisioned solution will be an updated web based application with expanded functionality.
- Important overall requirements
  - Tracking system
  - Mastery system
  - User accounts
  - Sustained up-time during fall and spring semesters
- Our new tool will fix previous issues, expand current functionality, and assist countless students succeed in the digital logic class