Ethics and Professional Responsibility

Code Critiquer System for the C Language and Embedded C

sdmay25-23:

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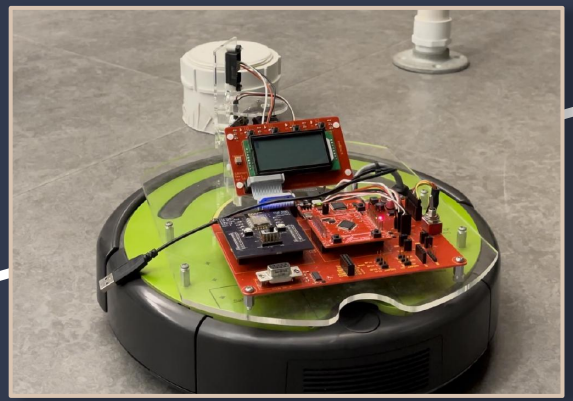


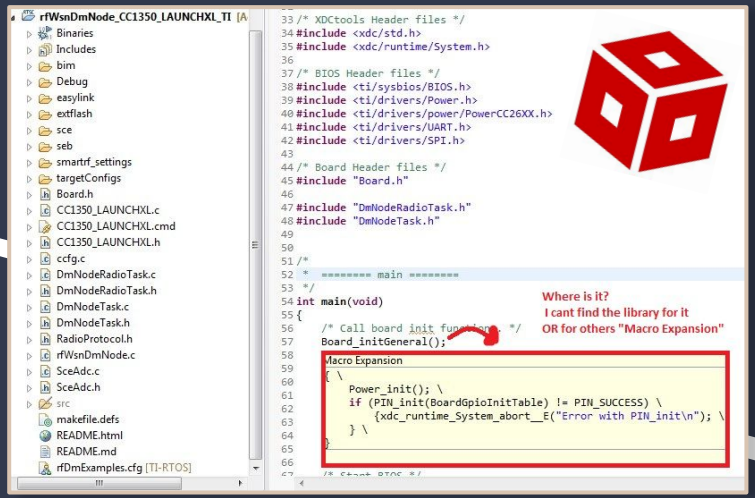
A CPR E 2880 CyBot

Project Overview

- Project is a web-based critiquer tool
  - Continuation of sdmay24-34
  - Students upload C files to tool
  - Files are statically analyzed to search for antipatterns
  - Tool generates student feedback
- Will modify current system developing new features
- Tailored for CPR E 2880
- Targeting a Spring Semester Prototype

Problem Statement

- Static Code Analysis is a challenging problem
- There are many off-the-shelf solutions, none meet all client needs
- Client needs a code critiquer that can...
  - Be accessed by students and instructors
  - Provide beginner-oriented feedback
  - Ability to give embedded and datasheet-focused feedback
  - Potentially integrate with Virtualized CyBots



Excelling Responsibility:

Property Ownership

- Relevance
  - Uses lab/exam "answers"
  - Uses specific CyBot information
  - Multiple parties involved must be satisfied
- Approach
  - Keep materials within the project
  - Pass feedback by the instructors
  - Only access the information when needed
    - Principle of least privilege/access
  - Secure permissions and limit signup

Underperforming Responsibility:

Social Responsibility

- Relevance
  - To help all novice C programmers
  - CPR E 2880 is a required course for several Iowa State majors
- Approach
  - Focused on embedded C for now
  - Limited analysis
  - Uses only one approach to C programming
- Discussed with advisor about handling this

	Beneficence	Nonmaleficence	Respect for Autonomy	Justice
Public health, safety, and welfare	Helps improve stress levels of students and TAs	Aim to reduce student reliance on critiquer	Allow students to use as much as needed	Provides a resource for busy students
Global, cultural, and social	Addresses the needs of instructors and TAs	Available for all students	Respects cultural practices	All user types benefit from implementation
Environmental	Design uses existing hardware and will receive energy from ISU	Design doesn't require more manufacturing	Will provide user choice between just static analysis or both static and dynamic (uses boards)	Allow students off campus to access cybot without producing more
Economic	Design is free for students	Design would not be disruptive	Will allow users to use only static analysis if they do not have access to a server with boards	Free resource for people who can't attend office hours

Cultural Context

- Original proof of concept was a MATLAB code critiquer created at Michigan Tech
- Previous senior design team used these ideas to create critiquer for C
- Working with the original authors
- Adding niche functionality for application in CprE 2880

Michigan Technological University - Daniel Masker, Joseph R. Teahen, Leo C. Ureel, Laura Brown, Michelle Jarvie-Eggart, Jon Sticklen
Iowa State University - Diane Rover, Fana Teffera, Juno Robertson

Ethical Concerns

- Keeping user information private
- Preventing cheating
- Ensure student learning is not compromised
- Creating a net positive impact
- Being accessible

Any Questions, Suggestions, or Comments?