Problem and Users

sdmay25-23:
James Joseph
Samuel Lickteig
Alix Noble
Andrew Sand
Owen Sauser

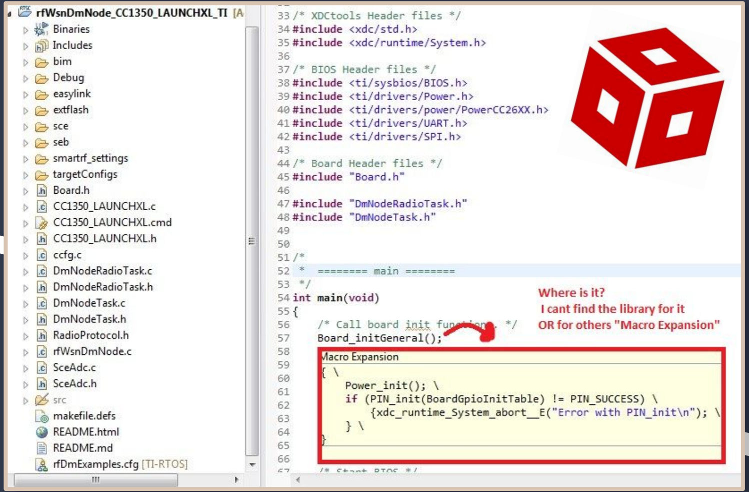
Code Critiquer System for the C Language and Embedded C

Project Overview

- Current state of project (continuation of sdmay24-34) is a web-based critiquer tool
    - Students upload C files to tool
    - Files are statically analyzed to search for antipatterns
    - Tool generates feedback
    - Students use feedback to improve skills
- Will modify current system and/or develop new prototypes
- Ideally tailored for CPR E 288

Problem Statement

- Static Code Analysis is a challenging problem
- Many off-the-shelf solutions
  - ○ Many leave a lot to be desired
  - ○ They are not bespoke for CPR E 288 usage
  - ○ No off-the-shelf “perfect combination” for what the project 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 Code Composer Studio



```
/* XDCtools Header files */
#include <xdc/std.h>
#include <xdc/runtime/System.h>

/* BIOS Header files */
#include <ti/sysbios/BIOS.h>
#include <ti/drivers/Power.h>
#include <ti/drivers/power/PowerCC26XX.h>
#include <ti/drivers/UART.h>
#include <ti/drivers/SPI.h>

/* Board Header files */
#include "Board.h"

#include "DmNodeRadioTask.h"
#include "DmNodeTask.h"


/*
 *  ======== main ========
 */
int main(void)
{
    /* Call board init functions. */
    Board_initGeneral();
```

Macro Expansion

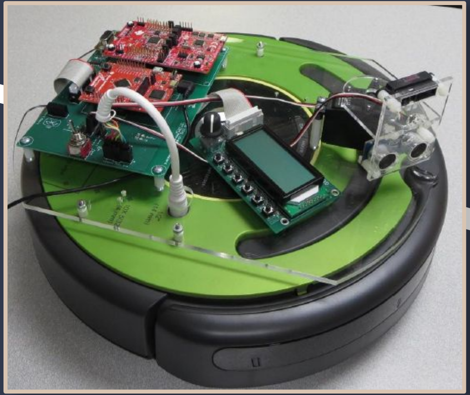
```
{ \
    Power_init(); \
    if (PIN_init(BoardGpioInitTable) != PIN_SUCCESS) \
        {xdc_runtime_System_abort__E("Error with PIN_init\n"); \
    } \
}
```

Where is it?
I cant find the library for it
OR for others "Macro Expansion"

Persona #1:

Jimmy Dean (Confident CprE 288 Student)

- Hears
    - “How did you do that?”
    - “Could you help me with ___?”
- Sees
    - Working Cybot
    - Understandable errors
    - Other students struggling/waiting for TA
- Says/does
    - Quickly resolves errors
- Thinks/feels
    - “This makes sense”
    - “If only the sensors were better”



Persona #2:

John Doe (Struggling CprE 288 Student)

- Hears
  - “What do the logs say?”
  - “Check the datasheet”
- Sees
  - Cybot not working
  - Other teams going faster
- Says/does
  - Why does this not work?
  - What register does that?
- Thinks/feels
  - Defeated
  - Lost

Persona #3:

John Smith (CprE 288 Professor)

IOWA STATE UNIVERSITY
Department of Electrical and Computer Engineering

- Hears
  - Student struggles
  - TAs complaining about answering the same/simple questions
- Sees
  - Students spending hours on an error
  - Students struggling to read the datasheet
- Says/Does
  - Clarifies common errors
  - Holds office hours
- Thinks/Feels
  - “I want students to succeed and learn”
  - The oddities of C are a pain point for beginners

User Needs

- Feedback
  - Quick answers
  - Confidence in the response
  - Comprehensive
  - Understandable at a basic level
- Security
  - Students can’t cheat results
  - System won’t fail when running
- UI/UX
  - Intuitive/out of the way
  - Quick to use and interpret

Conclusions from Empathy Mapping

- Users need a reliable and quick method to get feedback on C code
- Feedback must help students learn the about the issue and not simply give them the answer
- Solution needs to be readily available for the users to reduce confusion and repeated questions

Any Questions, Suggestions, or Comments?