

Progress Presentation-I

e-Yantra Summer Internship-2016

Testing Embedded C Code, Spark-V Module Development, and
Wireless Programming of AVR Microcontrollers

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Overview of Project

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Overview of Project

Overview of Tasks for SPARK V Tutorials

Overview of Tasks for Testing of AVR C Programs

Overview of Tasks for Wirelessly Programming AVR Controllers

Tasks Accomplished

Tasks Accomplished

Tasks Accomplished

Challenges Faced

Future Plans

Timeline

Give following details:

- **Project Name:**
Testing Embedded C Code, Spark-V Module Development, and Wireless Programming of AVR Microcontrollers
- **Objective:**
 1. Develop a Test Environment for Embedded C Programs
 2. Develop a Method to Wirelessly Program the SPARK V
 3. Develop a Video Tutorials for the SPARK V
- **Deliverables:**
 1. Automated Test Environment for AVR C Programs
 2. Wireless Programming Facility of SPARK V
 3. Generic wireless Programming of a 40 pin Controller
 4. Video tutorials for SPARK V

Overview of Tasks for SPARK V Tutorials

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Future Plans

Tasks	Description	Deadline
Task 1	Explore test suite for C viz. Unity, CMock, Ceedling	2 days
Task 2	Write different Test cases for Sample C Programs	1 day
Task 3	Unit Testing for Basic I/O Programs	2 days
Task 4	Unit Testing for PWM and Interrupt based Programs	2 days
Task 5	Develop Python Scripts to Evaluate the Programs	1 day
Task 6	Develop Test Cases for the TBT of FireBird V	4 days
Task 7	Developing Guidelines to Writing Testable Programs	1 day
Task 8	Develop a similar environment for Windows	1 day

Overview of Tasks for SPARK V Tutorials

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Future Plans

Tasks	Description	Deadline
Task 1	Complete Tutorial for I/O in SPARK V	5 days
Task 2	Developing Tutorials for PWM and Interrupts for SPARK V	3 days

Overview of Tasks for Wirelessly Programming AVR Controllers

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Future Plans

Task 1

Tasks	Description	Deadline
Task 1	Understanding ISP and Working of Bootloaders	2 days
Task 2	Writing a simple bootloader for Atmega 16 using Zigbee	4 days
Task 3	Writing a simple bootloader for Atmega 16 using Zigbee	4 days
Task 4	Wireless Programming of SPARK V	1 day
Task 5	Generic Programming circuit for a 40 pin controller	2 days
Task 6	Documentation	3 days

Tasks Accomplished

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Future Plans

- Explore test suite for C viz. Unity, CMock, Ceedling:
 1. The three test suites were researched and explored.
 2. Multiple programs were used to understand how each of the test suites function.
- Write different Test cases for sample C Programs:
 1. Unity and its built in functions were used to test various programs and functions.
 2. It was discovered that found to test the main function of any program, that it was required to rename it.
compiled properly.

Tasks Accomplished

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Future Plans

- Unit Testing for Basic I/O, ISR, PWM Programs:
 1. Editing the Avr-IO Header file to assign the registers to RAM so it can be written to and its content verified.
 2. Since the programs are not compiled using AVR-GCC the delay functions have to be mocked.
 3. To test the functionality of an interrupt its interrupt vector has to be called in a function in the main program.
 4. The method of testing of PWM based programs still needs to be explored.

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Challenges Faced

Future Plans

- Developing Python scripts for parsing and development of test cases for the 6 TBT of FireBird V:
 1. Wrote a Python script to parse the submitted document and render it testable.
 2. Integrated the script and a make file and with a final level of parsing to produce a automated test.
 3. Automated tests have been developed for Simple Motion Controll, Buzzer, and Timer Programs for the FireBird V
 4. The tests for the reminaing ADC, White line follower, and LCD programs are currently being developed.

Challenges Faced

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Challenges Faced

Future Plans

- Getting Unity to work with native builds.
- Compiling the AVR C code with normal GCC.
- Generating Mock functions and intergrating them with the submitted program.
- Modification of the Main C Program to render it testable via parsing.

Future Plans

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Challenges Faced

Future Plans

- Guidelines for Writing Unit Tests and Automated an Test Enviornment for Windows.
- Spark V Tutorials.
- Simple Bootloader for Wireless Programming of Spark V.

Thank You

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THANK YOU !!!