

# Progress Presentation-I

e-Yantra Summer Internship-2016

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

Vinay Manjunath  
Mentors: Parin, Avijit

IIT Bombay

June 7, 2017

# Overview of Project

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

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 FireBird V
  3. Develop a Video Tutorials for the SPARK V
- **Deliverables:**
  1. Automated Test Environment for AVR C Programs
  2. Wireless Programming Facility for FireBird V
  3. Video tutorials for SPARK V

# Overview of Tasks for SPARK V Tutorials

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

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 Write Testable Programs	1 day
Task 8	Develop a similar environment for Windows	1 day

# Overview of Tasks for SPARK V Tutorials

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

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

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

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	Wireless Programming of SPARK V	1 day
Task 4	Documentation	3 days

# Tasks Accomplished

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

- Explore Unit Testing Frameworks
  1. Explored Unity and understood how Unit Tests are developed and written.
  2. Explored CMock and understood the flexibility brought to testing by using Mocks.
- Writing different Test cases for sample C Programs:
  1. Generated different test cases for each of the programs.
  2. Understood how Mocks can be intergrated with a Unit Test.

# Tasks Accomplished

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

- Unit Testing for Basic I/O, ISR, PWM Programs:
  1. Figured out how to use Unity with Native Builds.
  2. Learnt how to Mock functions so that the test and program to be tested can be compiled with GCC.
  3. Understood the Procedure for writing Unit tests for the three types of programs.

# Tasks Accomplished

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

- Developing Python scripts for parsing and development of test cases for the 6 TBT of FireBird V:
  1. Separated the automated process into three parts.
  2. Automated tests were developed for Simple Motion Controll, Buzzer, Timer and ADC Programs for the FireBird V.



# Challenges Faced

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

- Getting Unity to work with Native builds.
- Generating Mock functions and intergrating them with the main program.
- Modification of the Main C Program to render it testable.

# Future Plans

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

- 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

## Progress Presentation-I

Vinay Manjunath  
Mentors: Parin,  
Avijit

## 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

THANK YOU !!!