Low-Impact Linux Distributions for Arduino and RasberryPi

Ian Harrison

Samford University  
800 Lakeshore Dr  
Birmingham, AL 35229  
+1 678-485-8021

iharriso@samford.edu

Brian Toone

Samford University  
800 Lakeshore Dr  
Birmingham, AL 35229  
+1 205 726 2960

btoon@samford.edu

**ABSTRACT**

The purpose of our project is to refine a Linux-based OS into a lightweight, mobile-device ready boot. It should be able to perform basic Linux commands while ideally running on a light device such as an Arduino or RasberryPi. From there, we would like to attempt to overclock the device, and benchmark the results.

**Keywords**

Linux, Live, Arduino, RasberryPi, Operating Systems

# INTRODUCTION

With the rise of Microcomputers such as Arduino and RasberryPi, the importance of Operating Systems able to run on even the lowest levels of computational power is growing. Our goal is to create a simple, lightweight Linux Distribution that can handle basic computing tasks on these simple devices.

# BACKGROUND

Currently, both boards have several options for Operating Systems, but both of them are more focused on packing as many features as possible rather than efficiency.

# METHODOLOGY

We will use the open-source Linux kernel from Github, and build a bare-bones Linux distro using “Linux from Scratch”. From there we will optimize it any way we see fit, by removing processes until it is efficient enough to perform useful tasks without slowing down.

## Data Collection

We shall collect data by comparing boot time, efficiency performing certain tasks, and by using pre-made benchmarking software if available. We should be able to extract the data by timing the boot using external sources, and able to pull screenshots or take photos of benchmarking information.

## Separation of Duties

To properly separate and equally distribute the work, Bennett shall prioritize the coding process and development, while I shall prioritize the research and testing. While we will likely assist each other for most of the process, we understand the importance of separating duties.

## Displaying the results

We will display the results through graphs, and by showing any differences in real-time to the viewing audience. We should be able to consistently get similar results, and run them on the desired hardware.

# EXPECTED OUTCOME

A successful project results in us creating an operating system capable of running on a low-power build, capable of performing basic tasks necessary for a device. We may decide to optimize it in any particular field (coding, browsing, gaming, etc.).

# SUMMARY

During our senior project, we would like to explore Operating Systems, Kernels, and deep optimization of advanced software. We believe that creating a lightweight system to run on simple hardware could be extremely interesting, and we would be able to apply those skills in almost any software related field in the future.

# REFERENCES

1. **"Linux Distributions Compared"**  
   Linux Journal Staff. Linux Journal, Issue 22, October 1995, pp. 32-43.
2. **"Using Linux in Embedded and Real-Time Systems"**  
   Rick Lehrbaum. Linux Journal, Issue 38, June 1997, pp. 24-29.
3. **"Linux Distribution Chart"**  
   Linux Journal Staff. Linux Journal, Issue 107, March 2003, pp. 58-63.