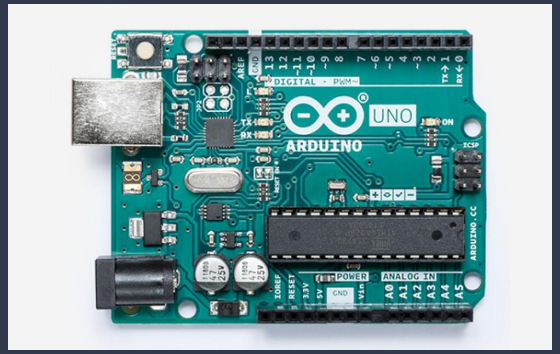
Extending the Arduino Real Time Kernel(ARTK)

Andrew Johnson, Jimmy Boland, Eric Zakrzewski



https://store.arduino.cc/usa/arduino-uno-rev3

ARTK

- ARTK is a real-time priority-driven multitasking kernel for the Arduino released under GPL
- Written by Paul Schimpf in 2012
- Un-maintained since 2014
- Memory footprint is under 8kbytes

Implementing FIFO, SJF, SRT

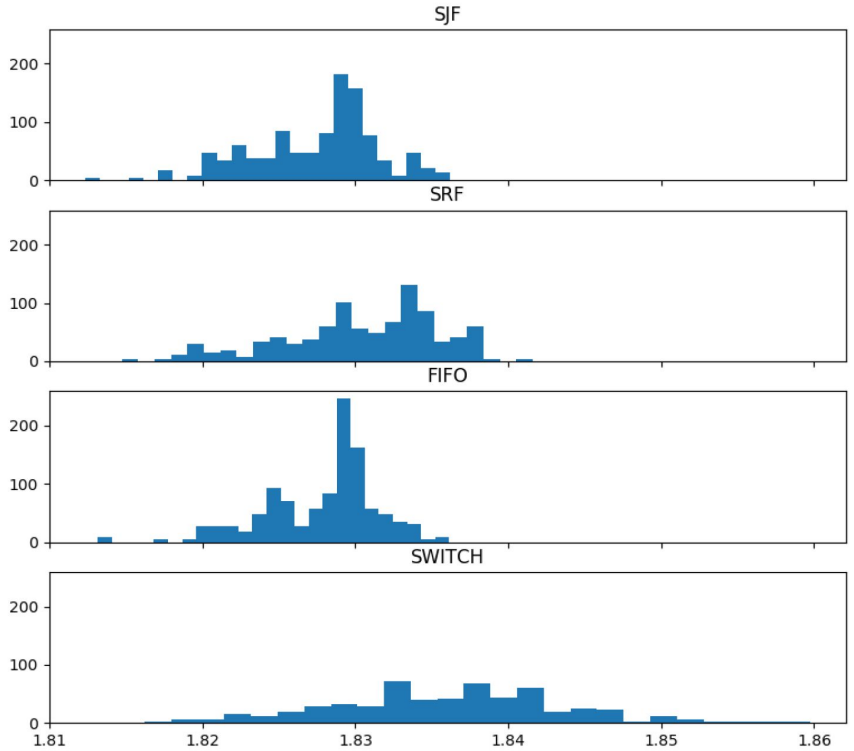
- Adding features to an existing kernel made more sense than building one from scratch
- Manipulating priority was most efficient way of creating the algorithms
- Arduino Uno thread and memory limitations

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13
Length	68.6 mm
Width	53.4 mm
Weight	25 g

https://store.arduino.cc/usa/arduino-uno-rev3

Results

- Set random seed
- Measured real time as well as ticks
- Overhead was the main limiting factor



DEMO

References

Our Repo:
https://github.com/Alatec/ARTK_Extentions

ARTK:
https://github.com/wcraigtrader/artk
https://sites.google.com/site/pschimpf99/home/software/artk

Arduino UNO:
https://store.arduino.cc/usa/arduino-uno-rev3