Building a Simple CLI

Slides:
tinyurl.com
/5d6cafe9

Nathan Jones

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What could we talk about that would be worth 20 minutes of your time?

Agenda

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1. Why and what is it?
2. Plan of attack
3. Step 1: Read from UART
4. Step 2: Simple commands
5. Step 3: Commands + values
6. Going further

https://github.com/nathancharlesjones/simple-cli

Why and What is it?

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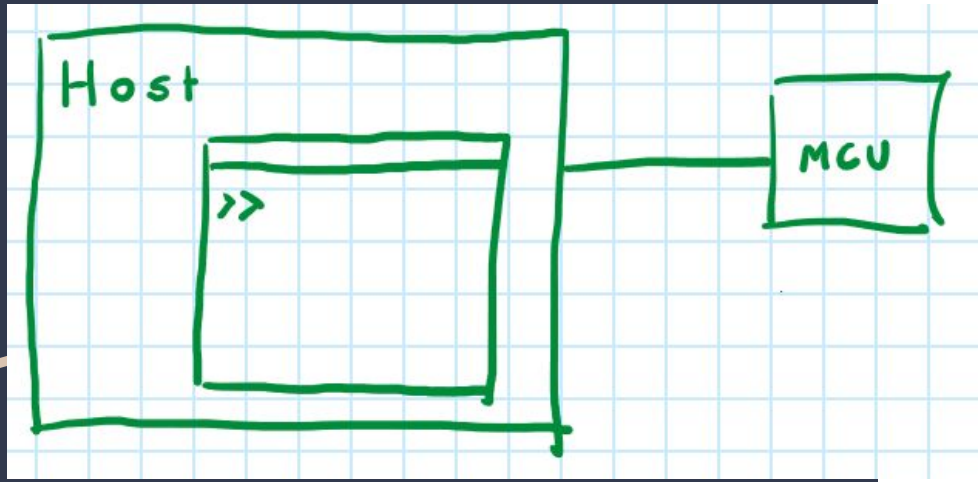
- Control tasks
- Query state
- REPL
- Load data/firmware
- On-chip debugging (Cortex-M)
- Monitor/small OS



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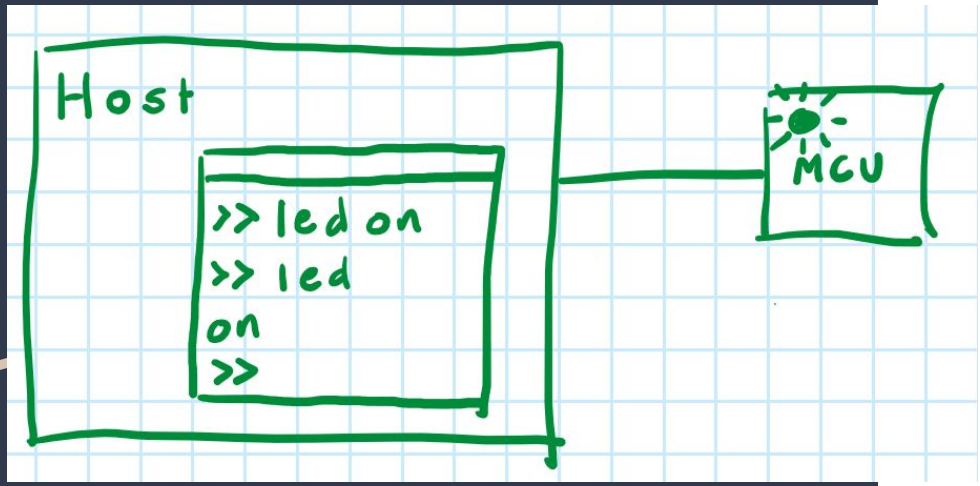

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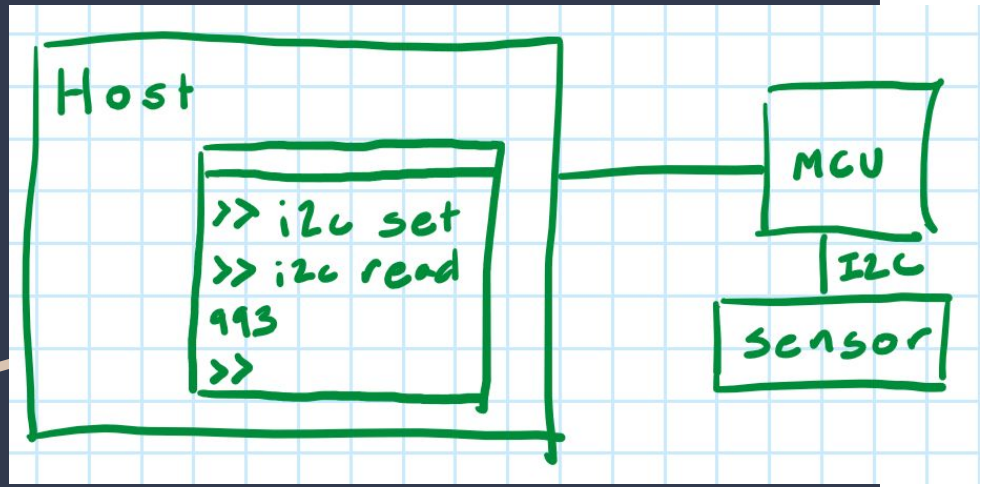

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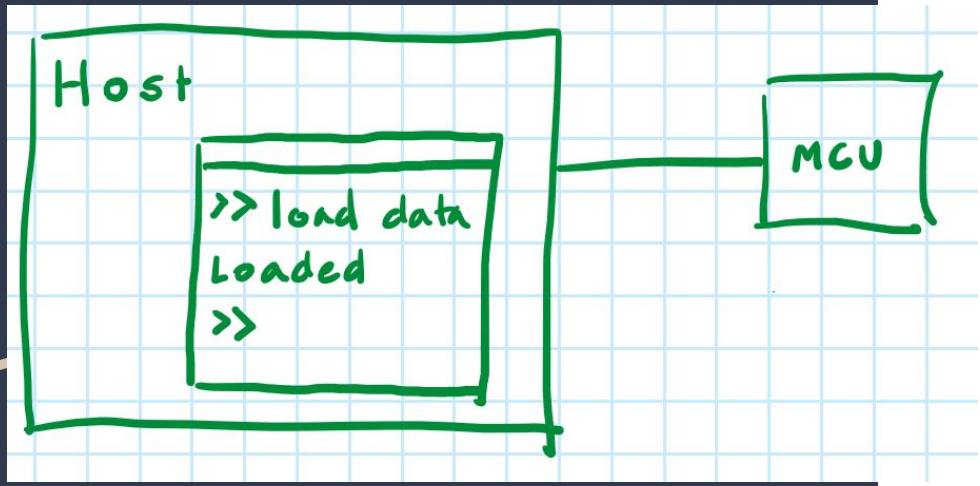

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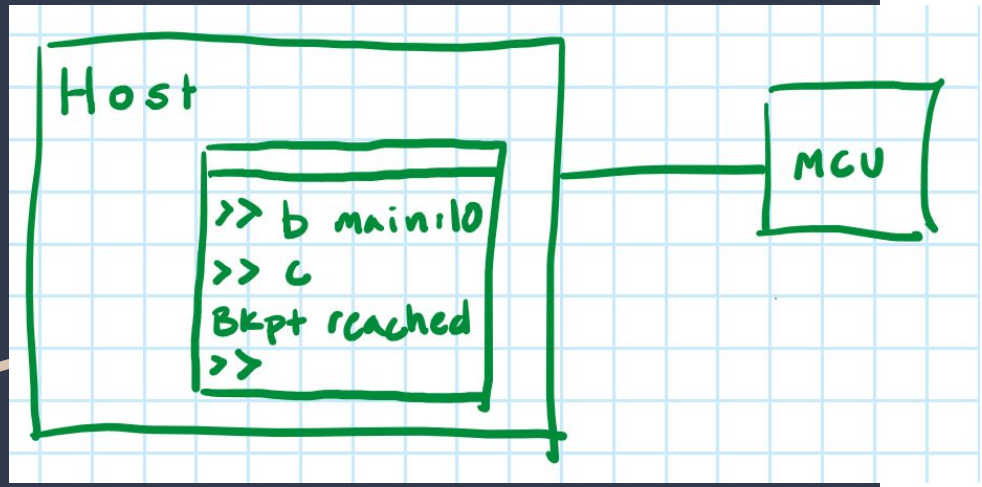

Why and What is it?

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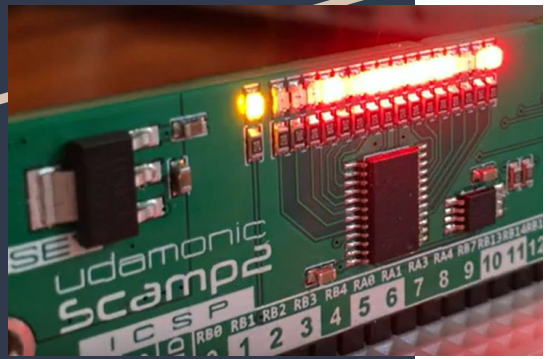
```
: blinken
  begin
     random leds
     blink
  key? until
  0 leds
;

ok

blinken
```

FlashForth



microshell

```
uShell 0.1.0
[host /]$ ls
d---- .
d---- bin/
d---- dev/
d---- etc/
-r--- readme.txt
[host /]$ cat readme.txt
Welcome to MicroShell DEMO implementation!
You will see how most common features work.
Enjoy!
[host /]$
```

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"The first thing I do in a new project is blink an LED. The next thing is to bring up a command-line shell. It's a great way to get stuff running quickly."

- andyturk (on the EEVBlog forum)

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Command-Line Blinky

Message Dictionary	
on	Turns the LED on (at the last stored duty cycle & frequency)
off	Turns the LED off
dc <val>	Sets the duty cycle. Val is an integer percent value. Returns the current duty cycle if <val> is omitted.
freq <val>	Sets the blink frequency. Val is a float value in Hertz. Returns the current frequency if <val> is omitted.

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Live Display of ADC Values with PyQT

Message Dictionary		
To	r	Requests an ADC value
From	<val>	4-digit ADC value in ASCII

Plan of Attack

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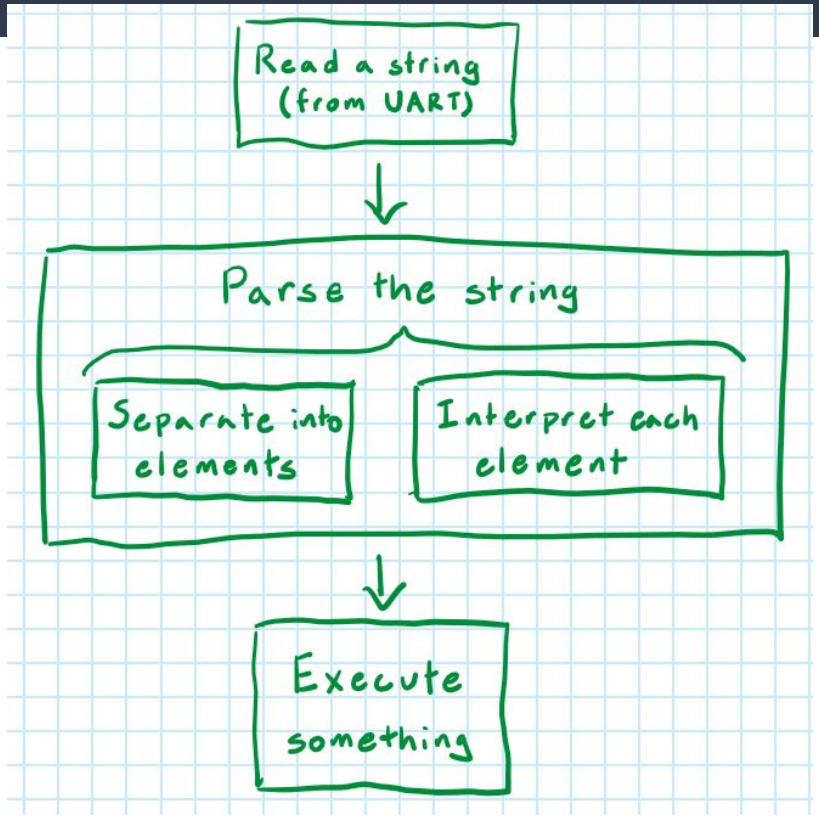

Step 1: Read from UART

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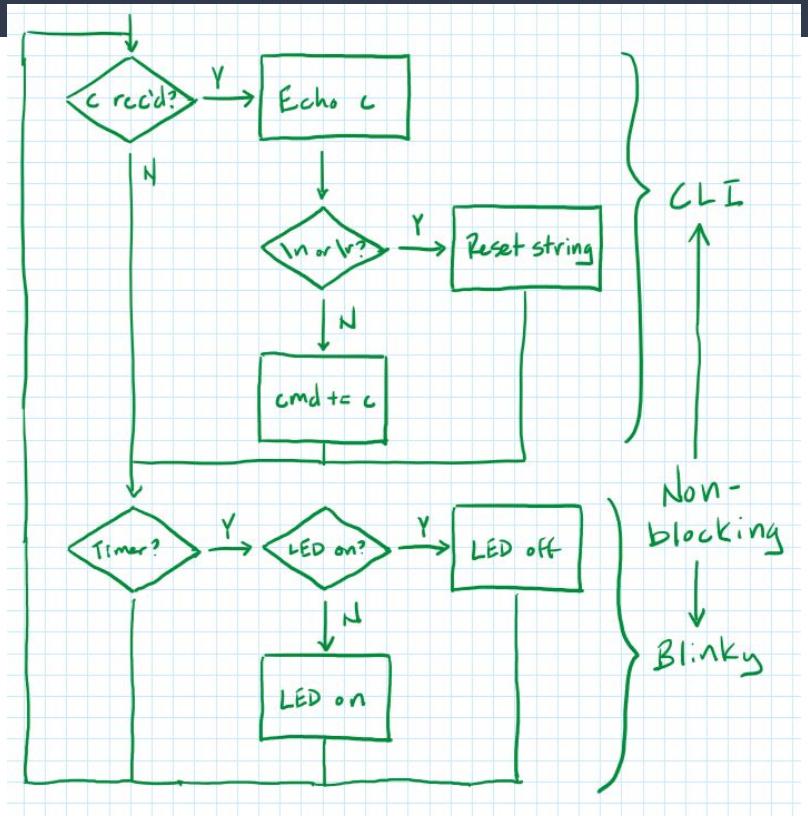

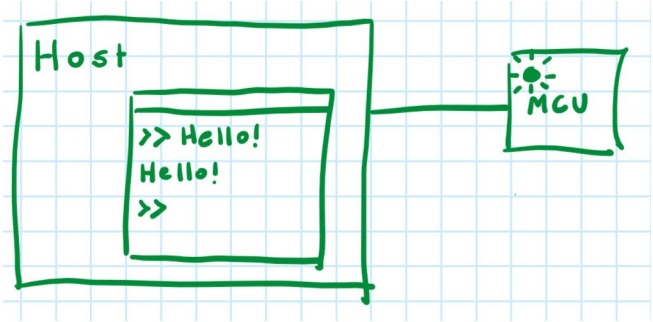

Step 1: Read from UART

~~Serial.available()~~

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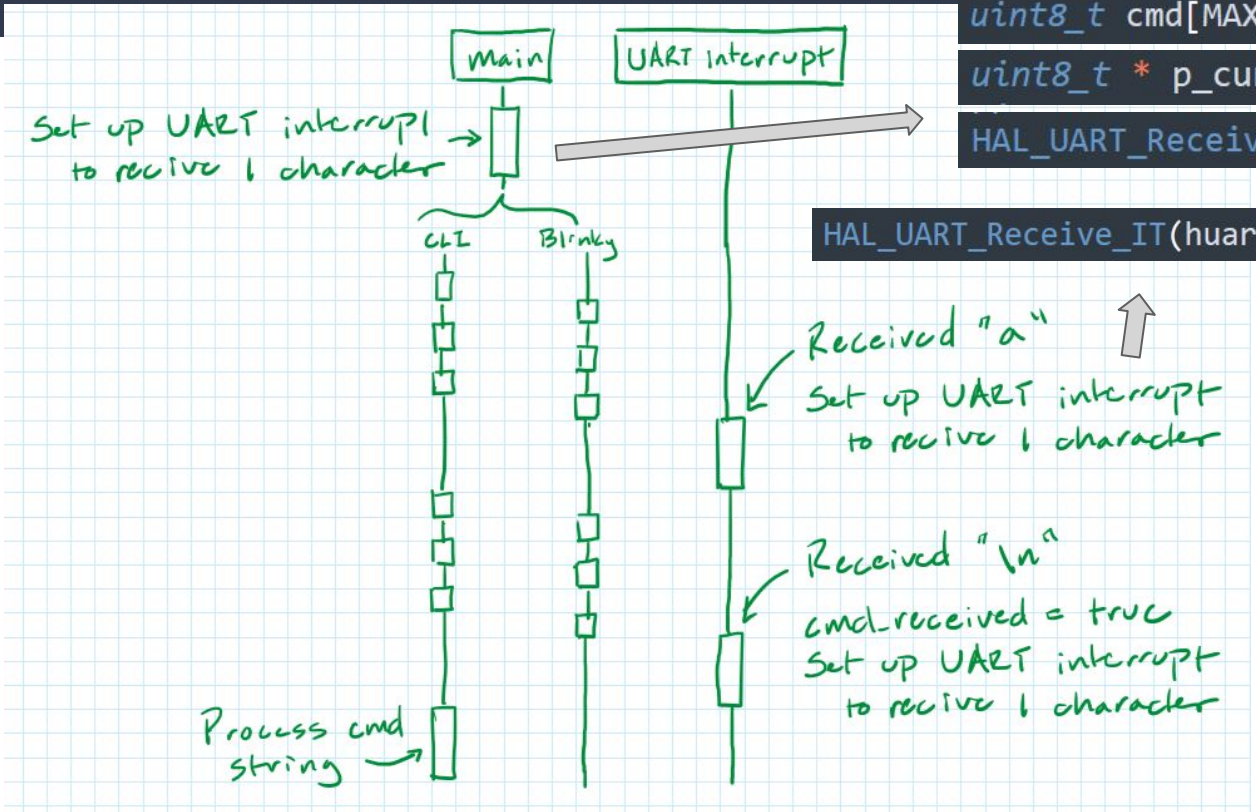


```
uint8_t cmd[MAX_CMD_LEN] = {0};
uint8_t * p_current_char = cmd;
HAL_UART_Receive_IT(&huart2, cmd, (size_t)1);
```

```
HAL_UART_Receive_IT(huart, ++p_current_char, (size_t)1);
```

Step 2: Simple Commands

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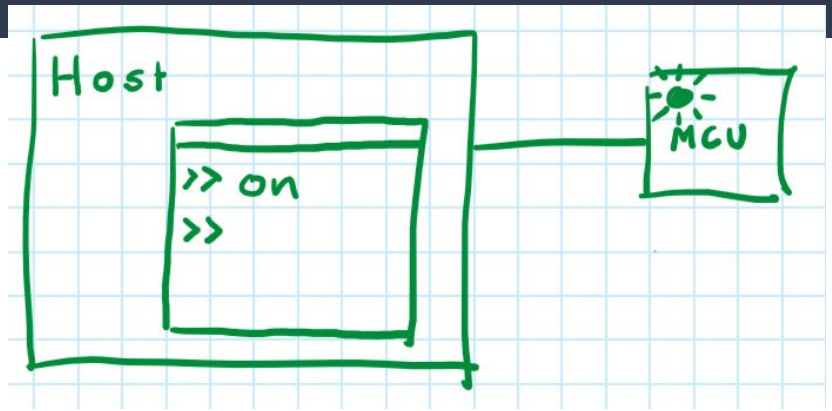

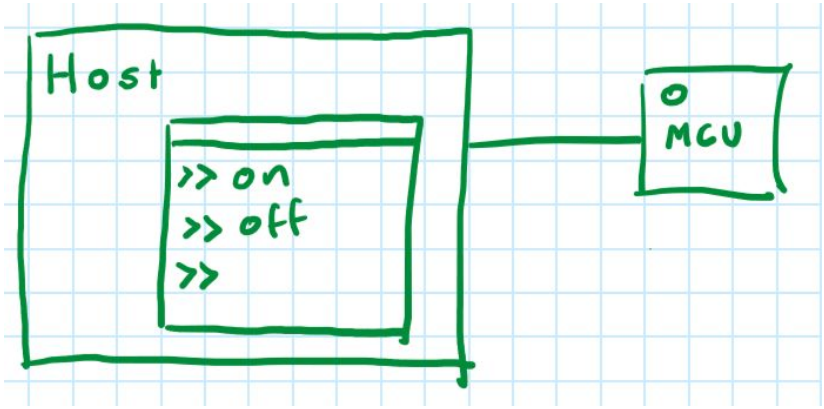

Message Dictionary	
on	Turns on the on-board LED
off	Turns off the on-board LED

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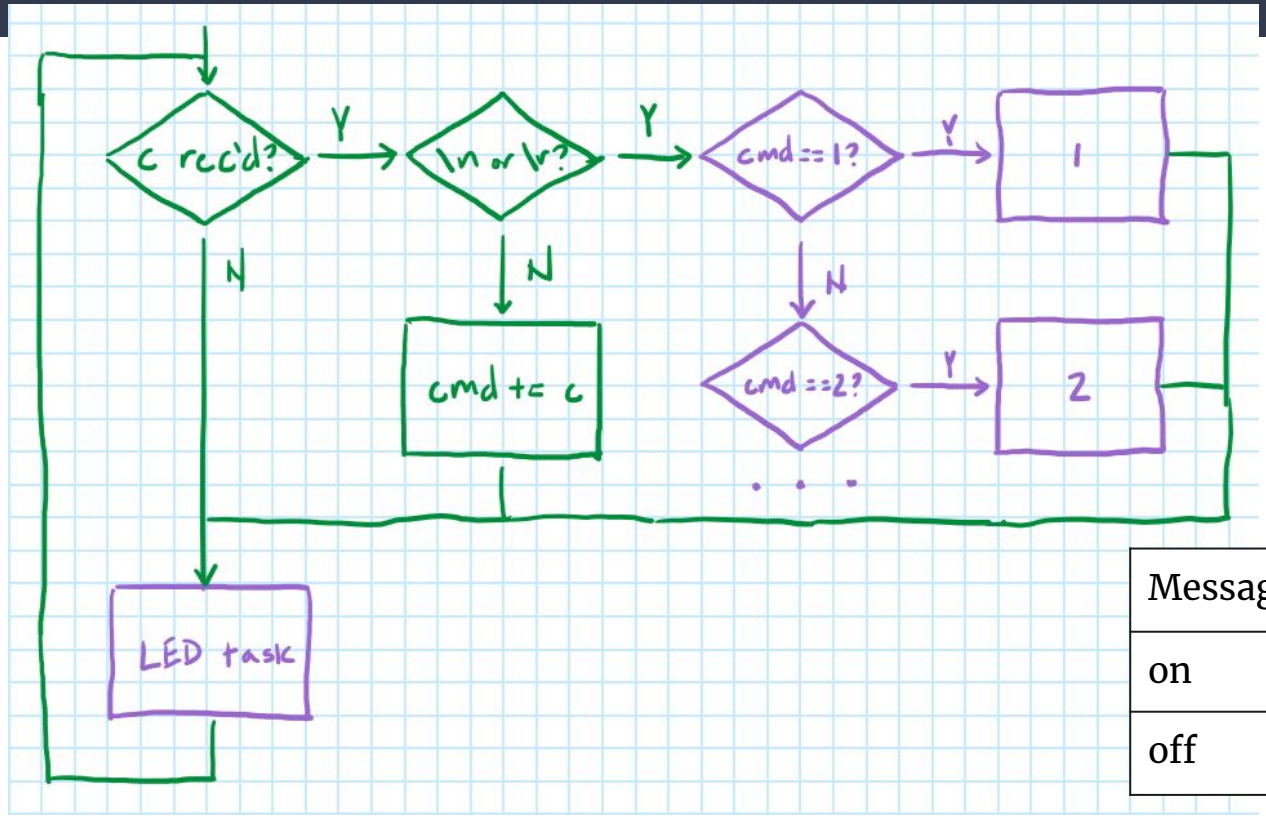

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Step 3: Commands + Values

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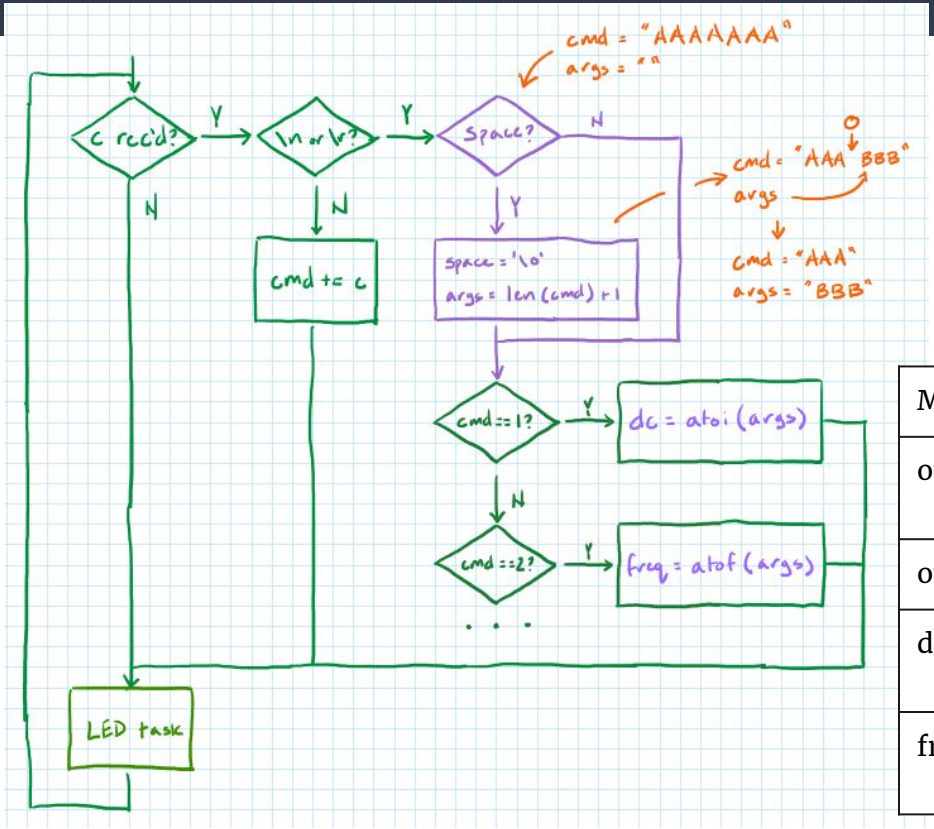

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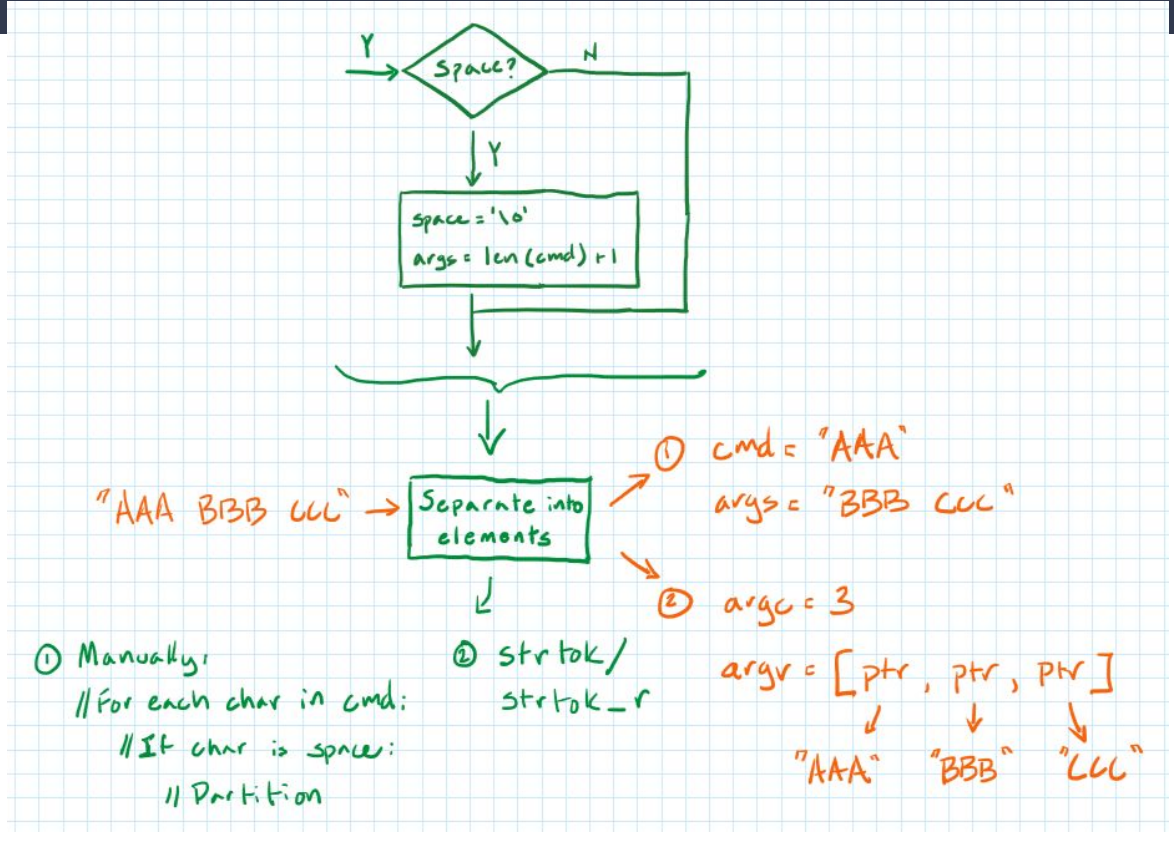

Going Further

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CLI Libraries

- Anchor
- Memfault
- Args
- getopt / Gengetopt
- Docopt
- Tree-based CLI from "The Power of a LUT"

Architectural Improvements

- Wireless communication
- Modules/Message passing
- RTOS
- Double-buffering
- Security
- Framing
- Error checking

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Wireless CLI

Message Dictionary	
on	Turns the LED on (at the last stored duty cycle & frequency)
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Going Further

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Better line reading

- getline
- linenoise

Interpreters/Monitors/OSes

- FlashForth
- uBASIC
- microshell
- RIDE Shell and C.impl interpreter (ELLO computer)

On-chip Debugging (Cortex-M)

Summary

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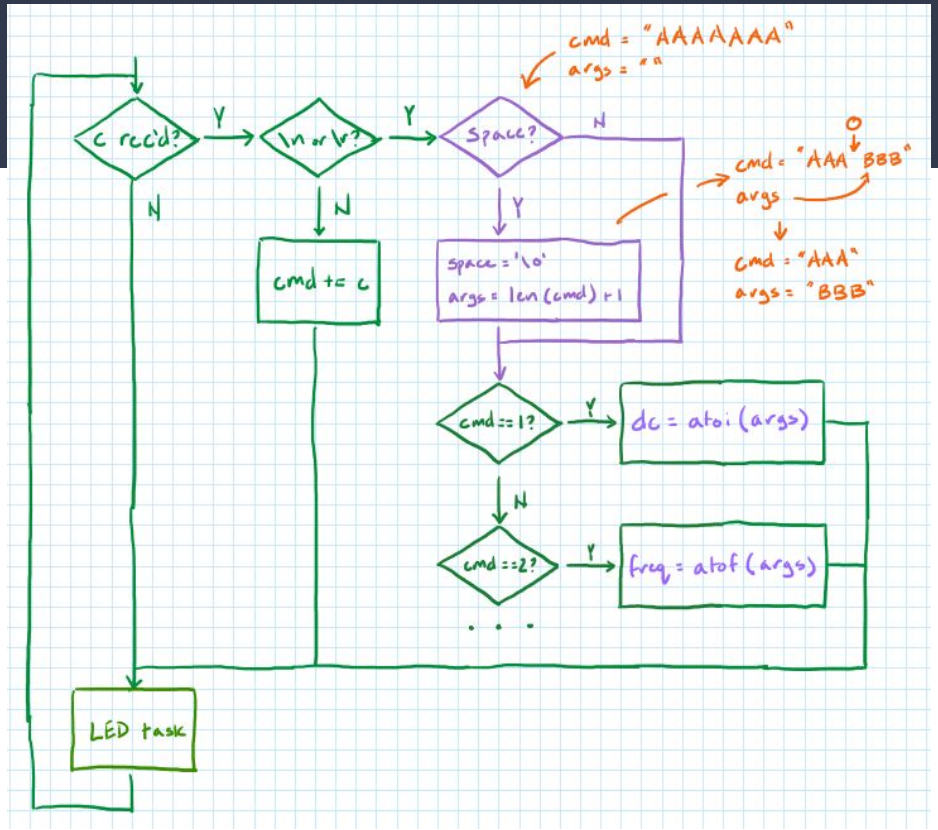

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Thank you for coming and I hope you enjoy the rest of the conference!