Tao of Arduino

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Summary

- Arduino Uno Board
- 328eForth for Arduino
- Minimal Arduino Board
- Traffic Controller on Minimal Arduino
- Demonstrations
- Tao of Arduino

Arduino Uno

- 8 Bit microcontroller ATmega328P
- 32KB Flash, 2 KB RAM, 1 KB EEPROM
- 3 Counter/Timers
- 6 Channels 10-bit ADC
- USART, SPI, I2C, ISP
- 23 Programmable I/O lines

328eForth for Arduino Uno

- The best way to study 566 pages of Atmega328 data sheets
- Interactive access to all registers and memory in Atmega328
- Easiest way to program and test applications on Arduino Uno board
- Easiest way to build turn key systems

Minimal Arduino Board

- No external crystal
- No external reset
- No current limiting resistors to drive LED's
- No external pull up resistors to read sensors
- 2 AA batteries are sufficient for power

Traffic Controller

- ## Initialize I/O ports

```
: init-ports
 fc 2a c! 3 24 c! 3f 28 c! c 25 c! ;
```

- ## Timing

```
: seconds
 for aft
    100 for 400 for next next
 then next ;
```

Traffic Controller

- Drive LED's

```
: lights ( n -- )
  dup 2b c! 100 / C or 25 c! ;
```

- Read switches

```
: switches ( -- n )
  23 c@ 100 * 26 c@ or
  dup cr . ;
```

Finite State Machine

```
: N-S
  begin 104 lights 5 seconds
  switches c3a and if 108 lights 2 seconds then
     switches a and if 130 lights 3 seconds then
  switches c30 and until ;

: E-W
  begin 50 lights 5 seconds
     switches 82f and if 90 lights 2 seconds then
     switches 820 and if 310 lights 3 seconds then
  switches f and until ;
```

Turn Key Application

- Application

```
: go     init-ports
begin N-S E-W ?key until drop ;
```

- Turn Key

```
' go 100 !
100 erase
100 100 write
```

- Burn Fuses

```
Lfuse=F2, Hfuse=D8, Efuse=FD
```

Demonstrations

- Program eForth with AVRISP-mkll
- Load Traffic.txt to eForth
- Test Traffic Controller on Arduino
- Burn Atmega328P fuses
- Traffic controller running on minimal Arduino

Tao of Arduino

For knowledge, add a little everyday.

For wisdom, delete a little everyday.

Delete and delete, until nothing is left.

With nothing, you can do everything.

--Lao Tzi, Tao Te Ching, Chapter 48

Thank You