

Flow of Control (2F)

Copyright (c) 2014 - 2018 Young W. Lim.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using LibreOffice.

Based on Embedded Software in C for an ARM Cortex M
<http://users.ece.utexas.edu/~valvano/Volume1/>

Compound Statements

```
int main(void) {
    short n1,n2;
    n1=1;
    n2=2;

    {
        short temp;           // put on the stack

        temp = n1;
        n1 = n2;
        n2 = temp;           /* swap n1 and n2 */
    }

    return 1;
}
```

A median filter implementation

```
short Median(short u1, short u2, short u3) {
    short result;

    if(u1>u2)
        if(u2>u3) result=u2;           // u1>u2,  u2>u3           u1>u2>u3
        else
            if(u1>u3) result=u3;       // u1>u2,  u3>u2,  u1>u3   u1>u3>u2
            else result=u1;           // u1>u2,  u3>u2,  u3>u1   u3>u1>u2
    else
        if(u3>u2) result=u2;           // u2>u1,  u3>u2           u3>u2>u1
        else
            if(u1>u3) result=u1;       // u2>u1,  u2>u3,  u1>u3   u2>u1>u3
            else result=u3;           // u2>u1,  u2>u3,  u3>u1   u2>u3>u1
    return(result);
}
```

Switch

```
#define GPIO_PORTA_DATA_R    (*((volatile unsigned long *) 0x400043FC))

void step(void) {                               /* turn stepper motor one step */

    switch (GPIO_PORTA_DATA_R & 0x0F) {
        case 0x05: GPIO_PORTA_DATA_R=0x06;      // 6 follows 5;
                    break;
        case 0x06: GPIO_PORTA_DATA_R=0x0A;      // 10 follows 6;
                    break;
        case 0x0A: GPIO_PORTA_DATA_R=0x09;      // 9 follows 10;
                    break;
        case 0x09: GPIO_PORTA_DATA_R=0x05;      // 5 follows 9;
                    break;
        default:   GPIO_PORTA_DATA_R=0x05;      // start at 5
    }
}
```

Switch

```
// ASCII to decimal digit conversion
unsigned char convert(unsigned char letter){

    unsigned char digit;

    switch (letter) {
        case 'A':
        case 'B':
        case 'C':
        case 'D':
        case 'E':
        case 'F': digit=letter+10-'A';
                 break;

        case 'a':
        case 'b':
        case 'c':
        case 'd':
        case 'e':
        case 'f': digit=letter+10-'a';
                 break;
        default: digit=letter-'0';
    }

    return digit;
}
```

While

```
//-----UART_InChar-----  
// Wait for new serial port input  
// Input: none  
// Output: ASCII code for key typed  
  
unsigned char UART_InChar(void) {  
    while ((UART1_FR_R & 0x10) != 0);  
    return ((unsigned char) (UART1_DR_R & 0xFF));  
}  
  
//-----UART_OutChar-----  
// Output 8-bit to serial port  
// Input: letter is an 8-bit ASCII character to be transferred  
// Output: none  
  
void UART_OutChar(char data) {  
    while ((UART1_FR_R & 0x20) != 0);  
    UART1_DR_R = data;  
}
```


Do ... while

```
i = 4;  
do { array[i] = 0; --i; } while (i >= 0);
```

```
i = 4;  
do array[i--] = 0; while (i >= 0);
```

```
i = 5;  
do array[--i] = 0; while (i);
```

Null Statements

```
while ((UART1_FR_R & 0x20) != 0) ; /* Wait for TXFF to be set */
```

Goto Statement

```
short data[10];

void clear(void) {
    short n;
    n=1;
loop: data[n]=0;
    n++;
    if (n==10) goto done;
    goto loop;
done:
}
```

References

- [1] Essential C, Nick Parlante
- [2] Efficient C Programming, Mark A. Weiss
- [3] C A Reference Manual, Samuel P. Harbison & Guy L. Steele Jr.
- [4] C Language Express, I. K. Chun
- [5] “A Whirlwind Tutorial on Creating Really Teensy ELF Executables for Linux”
<http://cseweb.ucsd.edu/~ricko/CSE131/teensyELF.htm>
- [6] <http://en.wikipedia.org>
- [7] <http://www.muppetlabs.com/~breadbox/software/tiny/teensy.html>
- [8] <http://csapp.cs.cmu.edu/public/ch7-preview.pdf>