

University of Massachusetts Dartmouth  
Department of Electrical and Computer Engineering

ECE 160  
Project #2 – SOLUTION

Name: bittwittle.txt  
Due: see <http://www.ece160.org>

Any of the answers below are acceptable for a particular problem. There are also possible answer which are not listed below.

1.     PORTA = PORTA | 1<<4;  
       PORTA = PORTA | 0x10;  
       PORTA = PORTA | 16;  
       PORTA = PORTA | 0b00010000;     // valid on Atmel, NOT Visual Studio
2.     PORTB = PORTB & ~(1<<7);  
       PORTB = PORTB & 0x7F;  
       PORTB = PORTB & 127;  
       PORTB = PORTB & 0b01111111;     // valid on Atmel, NOT Visual Studio
3.     PORTA = PORTA & ~1;  
       PORTA = PORTA & 0XFE;  
       PORTA = PORTA & 254;  
       PORTA = PORTA & 0b11111110;     // valid on Atmel, NOT Visual Studio
4.     PORTC = PORTC ^ 1<<5;  
       PORTC = PORTC ^ 32  
       PORTC = PORTC ^ 0x20;  
       PORTC = PORTC ^ 0b00100000;     // valid on Atmel, NOT Visual Studio
5.     PORTD = PORTD & ~(1<<4) | 1<<5 | 1<<3;  
       PORTD = PORTD & 239 | 32 | 8;  
       PORTD = PORTD & 0xEF | 0x28;  
       PORTD = PORTD & 0b11101111 | 0b00101000; // valid Atmel, NOT VS
6.     PORTD = PORTD ^ 0xFF;  
       PORTD = PORTD ^ 255;
7.     PORTA = PORTA & ~(1<<2) | 1<<3;
8.     PORTX = (PORTX>>4) | 0xF0;
9.     PORTZ = PORTZ<<4;
10.    PORTY = ((PORTY | 1<<2) & ~(1<<1)) ^ 1<<5;
11.    PORTW = PORTW ^ 0xFF;  
       PORTW = PORTW ^ 255;  
       PORTW = PORTW ^ 0b11111111;
12.    PORTX = PORTX & ~(1<<6 | 1<<4 | 1<<2 | 1<<0);  
       PORTX = PORTX & 0b10101010;  
       PORTX = PORTX & 0xAA;  
       PORTX = PORTX & 170;
13.    PORTS = PORTS | (1<<7 | 1<<5 | 1<<3 | 1<<1 );  
       PORTS = PORTS | 0b10101010;  
       PORTS = PORTS | 0xAA  
       PORTS = PORTS | 170
14.    PORTT = (PORTT & ~(1<<5)) | (1<<7 | 1<<6 | 1<< 4);  
       PORTT = (PORTT & 0b11011111) | 0b11010000;  
       PORTT = (PORTT & 0xDF) | 0xDF;  
       PORTT = PORTT & 223 | 223;15. PORTR = PORTR & ~(1<<6) | 1<<2;  
       PORTR = PORTR & ~0b01000000 | 0b00000100;  
       PORTR = PORTR & 0b10111111 | 0b00000100;  
       PORTR = PORTR & 191 | 4;