

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 Arduino, NOT Visual Studio
```
2. 

```
PORTB = PORTB & ~(1<<7);
PORTB = PORTB & 0x7F;
PORTB = PORTB & 127;
PORTB = PORTB & 0b01111111; // valid on Arduino, NOT Visual Studio
```
3. 

```
PORTA = PORTA & ~1;
PORTA = PORTA & 0xFE;
PORTA = PORTA & 254;
PORTA = PORTA & 0b11111110; // valid on Arduino, NOT Visual Studio
```
4. 

```
PORTC = PORTC ^ 1<<5;
PORTC = PORTC ^ 32;
PORTC = PORTC ^ 0x20;
PORTC = PORTC ^ 0b00100000; // valid on Arduino, 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 Arduino, NOT VS
```
6. 

```
PORTD = PORTD ^ 0xFF;
PORTD = PORTD ^ 255;
```
7. 

```
PORTA = PORTA & ~(1<<2) | 1<<3;
```
8. 

```
PORTD = (PORTD>>4) | 0xF0;
```
9. 

```
PORTA = PORTA<<4;
```
10. 

```
PORTX = ((PORTX | 1<<2) & ~(1<<1)) ^ 1<<5;
```