

## CMPE 451-Microprocessors

### Quiz 1-Solution

Write an AVR C program to toggle only the pins 0, 2 and 3 of Port B and only the pins 1, 3 and 7 of Port D continuously with a 100ms delay. Initial value should be set as 0x2D for port B and 0xFA for port D. Use the WinAVR library's delay function `_delay_ms()` to put a delay.

Note: You should toggle PortB and PortD successively without putting delay between them. Once you toggle both, put the delay.

//Solution

```
#include <avr/io.h>
```

```
#include <util/delay.h >
```

```
int main (void)    //5 pts
```

```
{                //2 pts
```

```
    DDRB = 0xFF;    //6 pts
```

```
    DDRD = 0xFF;    //6 pts
```

```
    PORTB = 0x2D;    //6 pts
```

```
    PORTD = 0xFA;    //6 pts
```

```
    _delay_ms (100); //optional
```

```
    while (1)    //6 pts
```

```
    {          //2 pts
```

```
        PORTB = 0x20; //00101101, toggle (bit 0, bit 2 and bit3) → 00100000 //17pts
```

```
        PORTD = 0x70; //11111010, toggle (bit 1, bit 3 and bit 7) → 01110000 //17pts
```

```
        _delay_ms (100); //5 pts
```

```
        PORTB = 0x2D;    //6 pts
```

```
        PORTD = 0xFA;    //6 pts
```

```
        _delay_ms (100); //5 pts
```

```
    }          //2 pts
```

```
    return 0;    //1 pts
```

```
}              //2 pts
```