Section 7.1.2: Creating a time delay in AVR Studio

To make delays, the delay.h header file can be used. Since the clock period is dependent on crystal frequency, the frequency of the crystal should be mentioned by defining F_CPU before including the delay header file:

```
#define F_CPU 8000000UL  //XTAL frequency = 8 MHz
#include "util/delay.h"
```

The delay header file provides the following two delay functions:

```
void _delay_ms(double _ms); //wait _ms milliseconds
void _delay_us(double _us); //wait _us microseconds
```

See the following program. It uses the _delay_ms to make a 1000 millisecond delay and toggles PORTB, every second.

```
#include "avr/io.h"

#define F_CPU 8000000UL  //XTAL frequency = 8 MHz
#include "util/delay.h"

int main(void)
{
  DDRB = 0xFF; // Port B is output

  while (1)
  {
     PORTB ^= 0xFF; //toggle PORTB

     _delay_ms(1000); //wait 1000 milliseconds
  }
}
```