Exercise 1

Delay 2ms
XTAL = 16MHz

Max value = (2 ^ 8) -1
=255

Prescaler	T counter clock (us) [prescaler x period (1/16 us)]	Timer Count (delay/period)
8	0.2	10,000>255
64	4	500>255
256	16	125
1024	64	31.25

Therefore suitable prescaler is 256
Initial Counter Value = 255+1-125
= 131

Exercise 2

Clock = (1/16) μs
Delay =500 ms
Max value = (2 ^ 8) -1
=255

Prescaler	T counter clock(us) [prescaler x period (1/16 us)]	Timer Count (delay/period)
8	0.2	2500,000 > 255
64	4	125000 > 255
256	16	31250 > 255
1024	64	7812.5 > 255

Therefore we cannot increase the delay to 500 ms.
But can be implemented using a loop. (2ms x 250)

Exercise 3

To get the maximum time delay, We must use the maximum prescaler (1024).
As the number of bits is 8 and clock period is $\frac{1}{16}\mu s$,

$$2^{8} \times \frac{1}{16} \times 10^{-6} \times 1024 = 16.384\, ms$$