Homework #1: Basic LED projects

Due Monday

1. Make an LED bar graph with 5 independently addressable red LEDs. Draw a circuit diagram.
2. Make a counter that counts up to 1000 at .01 sec per count and the number of lit LEDs increases with every count multiple of 200.
3. Repeat this but make it logarithmic: number of lit LEDs increases with every power of 4: 4^0 = 1 LED, $>4^1$ = 2 LEDs, $>4^2$ = 3 LEDs etc.
4. Make a random number. Depending on size of number the bar graph lights up different amounts. Repeat every 2 seconds. Use Random() and randomSeed().
5. Make your 5 LEDs count from 0 to 31 in binary. Code this in two different ways. How many more ways can you think of?

Connect two green LEDs each to a 1 kΩ resistor and two adjacent Digital Output pins.

6. Are they the same brightness?
7. Change the 1k resistor of one of them to 3 560 Ω resistors in parallel and compare the brightness of the two.
8. Write a program that rapidly turns on and off the bright LED so fast that you can't see the blinking. How fast is that?
9. Now experiment with having the blinking LED's off time different from its on time. Try to adjust the off time and on time of the bright LED so that the LED's brightness appears to be the same as the LED with the 1 kΩ resistor.

Make a short writeup describing your results for each of that and paste in your code.