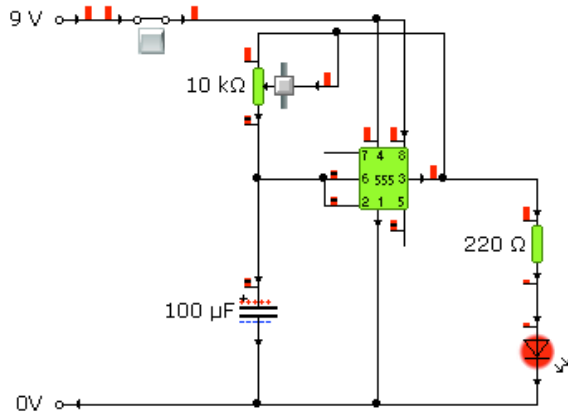# Creating a Dice circuit for my project

Having looked through a few text books and reflecting on the work we did in Yr10 I found the following circuit which might be a good starting point

9 V

10 kΩ

555

220 Ω

100 μF

0V

This is a simple Astable or Pulse Generator circuit which gives a series of pulses out of pin3 of the 555IC. The rate of pulses is determined by the values of the 10K potentiometer and the 100μF capacitor.

By using a potentiometer I have made it variable.

9 V

1 kΩ

10 kΩ

555

10 μF

330 Ω

0V
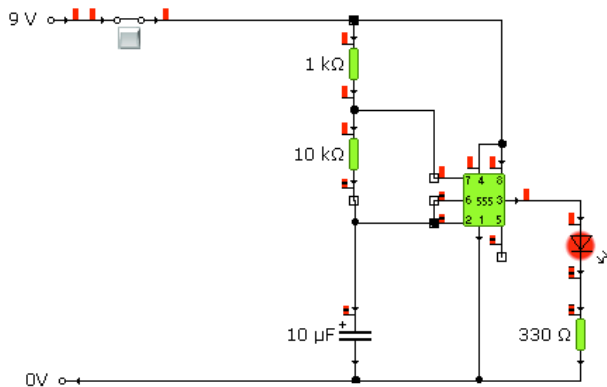
This is another version of the Astable circuit. With the values shown here I have made it give a very rapid train of pulses. By using a potentiometer instead of the 10K resistor I can again make the speed of the output signal variable.

The slight disadvantage is that this circuit uses 1 more resistor than the previous one. This doesn't really matter in school but if this was being made commercially, every component counts.

9 V

1 kΩ

10 kΩ 10 kΩ

330 Ω

0V
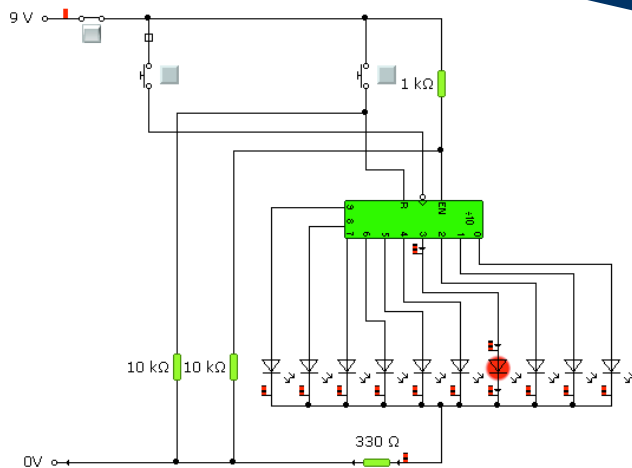
This circuit uses a 4017IC and is a simple counter circuit (which I need for my dice). For every push of the left hand side PTM switch the counter counts on 1 LED.

What I need is a counter which will do that automatically once the user has set the counter going.
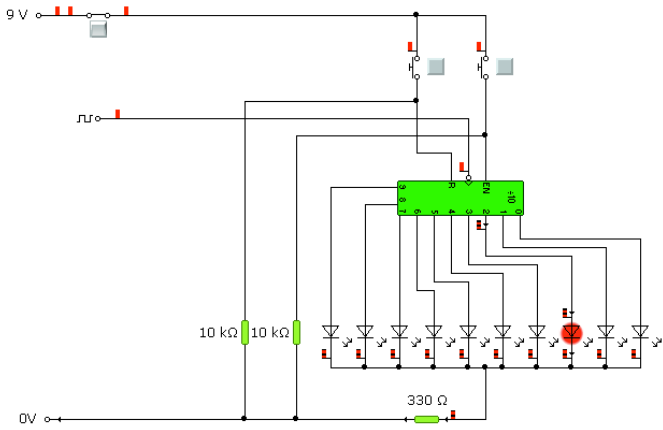
I have now developed the circuit a bit further. With this circuit if I hold down the right hand side PTM switch which is connected to the enable pin, the counter counts through the sequence of LEDs until I let go.
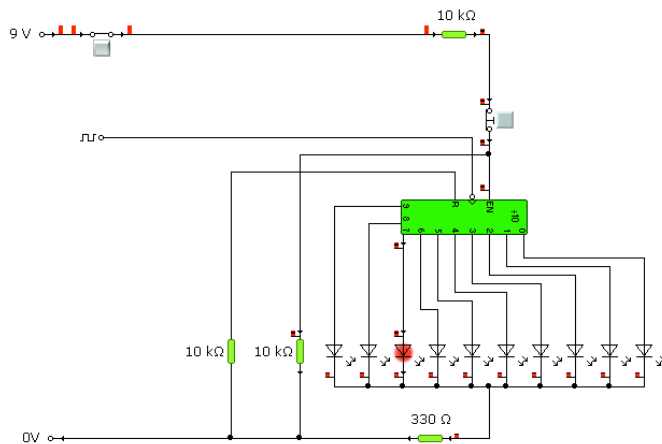
I have now developed it further still so that with a series of clocked input pulses into pin 14 the counter will race through the LEDs, turning them on and off one by one. To select an LED the user has to push and hold down the PTB switch connected to the enable pin.

This would be good if I was designing a circuit for a game of skill but not when I want it to randomly select a number.
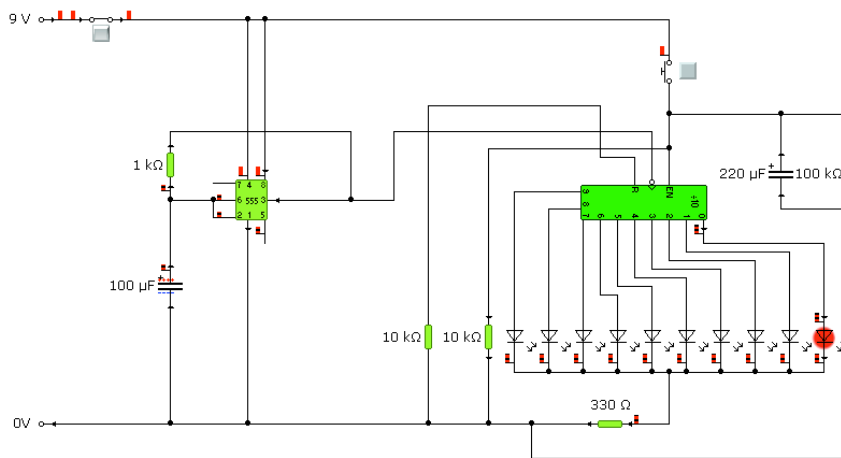
I am nearly there with this circuit. I have now connected my first Astable with the decade counter. It feeds clocked pulses from pin 3 of the 555 into pin 14 of the 4017.
When it is switched on the LEDs go though the sequence automatically until the PTM is pressed. It then continues for a time (determined by the values of the 220μF capacitor and the 100K resistor). After time it will randomly select an LED
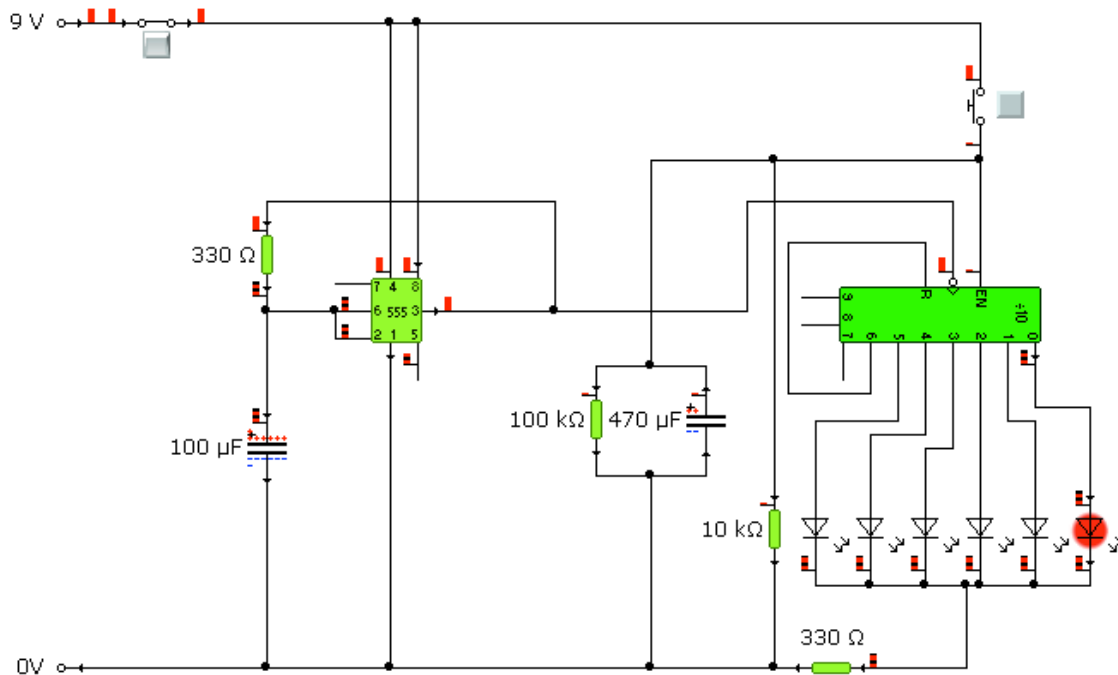
The only problem is that this circuit has 10 LEDs and I only need 6.
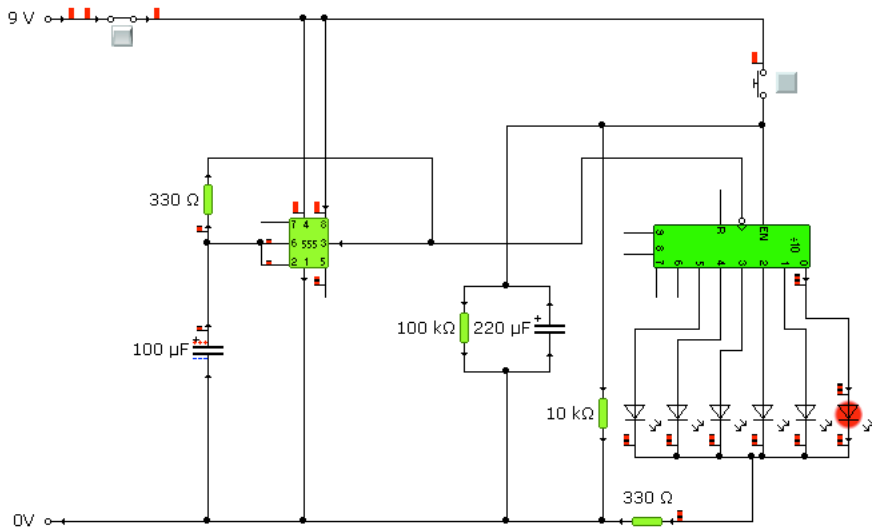
This circuit is almost perfect. It has the 6 LEDs I require but when the decade counter counts up to 6 it then stops.

I need to experiment and find a way of making it go back to the start after the 6th LED.

FINAL IDEA

This is my final circuit. With these values this circuit gives approximately 48 pulses per second which is much faster than the eye can see. I can slow this down by increasing the value of the 330R resistor. When the PTM is pressed the decade counter counts through the LEDs for a period of about 7 seconds before selecting one of the LEDs at random. Again I can alter this delay time by varying the value of either the 100K or the 470µF capacitor. **Component calculations on next page**

Tolerances: because of the tolerances of the components it will never count exactly the same number in a given period so the circuit is exactly what I wanted, a random number selector: a DICE.