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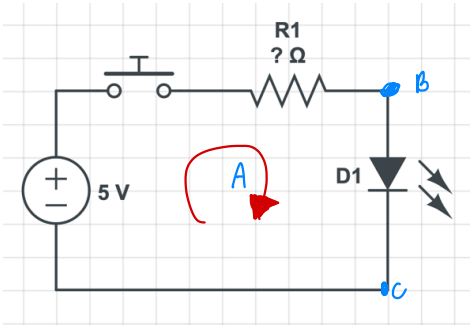
Lab 1: Basic Electronic Circuits with Tinkercad Circuits

1. Convert the following number between decimal, binary and hexadecimal representation

Decimal	Binary	Hexadecimal
182	0b10110110	0xB6
192	0b11000101	0xC5
231	0b11100111	0xE7
92	0b01011100	0x5C

2. Use the following circuit diagram to answer problem 2.1 - 2.3



2.1. Calculate the resistor value using the Ohm laws / KVL / KCL so that the current through the LED is approximately 10 mA (show your work)

KVL :

$-5 + R_1(10\times10^{-3}) + R_{D_1}(10\times10^{-3}) = 0$

$R_1 + R_{D_1} = \frac{5}{10^{-2}}$

$R_1 + R_{D_1} = 500\ [Ohm]$

$R_1 + 200 = 500$

$R_1 = 300\ [Ohm]$

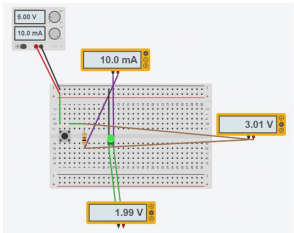
Answer 300 [Ohm] ※

$V_{D_1} \approx 2\ [V]$

$I_{DC} = 10\ [mA]$

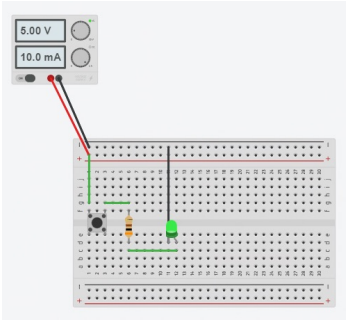
$R_{D_1} = \frac{V_{D_1}}{I_{DC}} = \frac{2}{10\times10^{-3}}$

$R_{D_1} = 200\ [Ohm]$



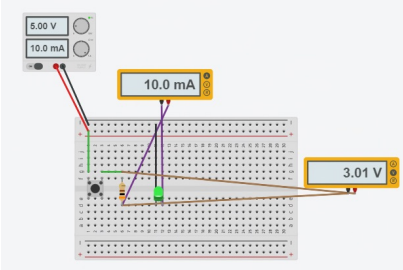
2.2. Draw the following circuit in Tinkercad using a lab power supply, a breadboard, a push button, a resistor and a LED (attach screenshot of your complete circuit)

Answer



2.3. Verify your calculation by measuring the voltage across resistor R1 and current through the LED using two multi meter in Tinkercad (attach screenshot of your complete circuit with both multi meter)

Answer



from Tinkercad, The voltage that across R_1 is 3.01 [V] and current that flow to R_1 is 10 [mA] from question

so $V = IR_{1S}$

$3.01 = (10m)R_{1S}$

$R_{1S} = 301\ [Ohm]$

R_{1S} = R_1 from simulate

R_{1C} = R_1 from calculate

$\therefore R_{1S} \approx R_{1C}$ That mean calculate is correct ※