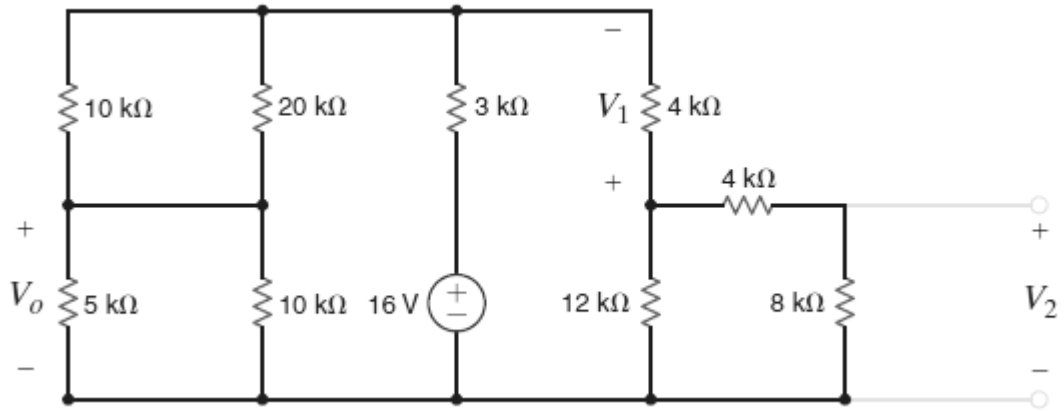
Technical Test – IoT Engineer

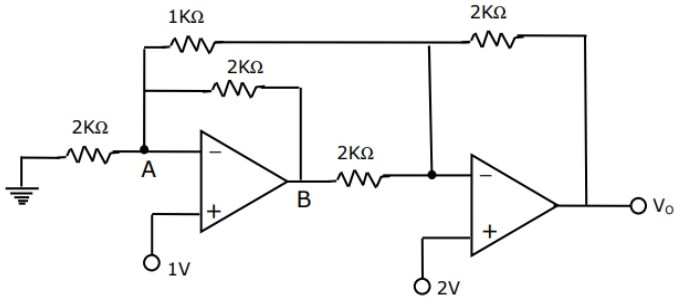
Mandatory

Electrical Test

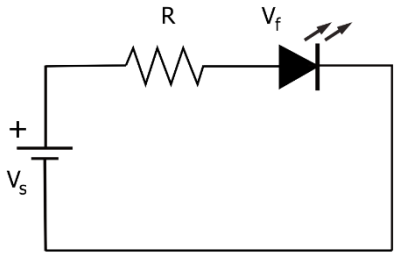
1. Find V0, V1, and V2. Show your work.



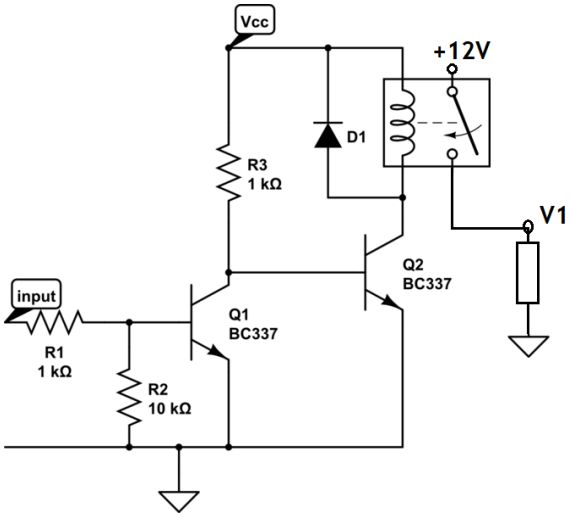
2. Assuming ideal op amps, determine the output voltage V0 in the following circuit (show your steps)

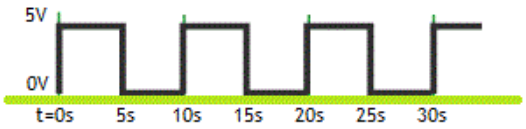


3. Given that Vs is 5V and the forward voltage of the LED is 2V, **(a)** Solve for the resistor value in the circuit below such that the current that flows through the LED is exactly 15mA. **(b)** What is the power consumption of the LED? Show your work.



4. Assuming that the coil voltage of the relay is 5V and Vcc is 5V, the Input voltage is controlled by pulse width modulation as shown in the figure below. find the voltage V1 when t = 13s





 # Programming Test

Assume you have a temperature and humidity sensor which has a return analog value 0-255, and a lamp. There is also a photosensor, which also has a return analog value 0-255. All of them is connected and can be controlled by a microcontroller that running using python code

Write a python code, as well as GUI to fulfill the following requirements:

a. All the sensors should be running independently, concurrently and should not be crashed when other sensors service is crashed
b. There should be a GUI to display all the sensor data, Temperature in Celcius unit, Humidity in percent, and photosensor in Lux. You can assumed that sensors reading interval is every 1s
c. Lamp can be turned on and off by a switch at GUI. The GUI should display the lamp status and the switches itself. You can assumed yourself the value of photosensor to perform the switching process of the lamp

*All the conditions can be assumed (using random numbers / dummy variables and function is allowed) and the backend side is not mandatory, but if you can make one your own it would be beneficial.

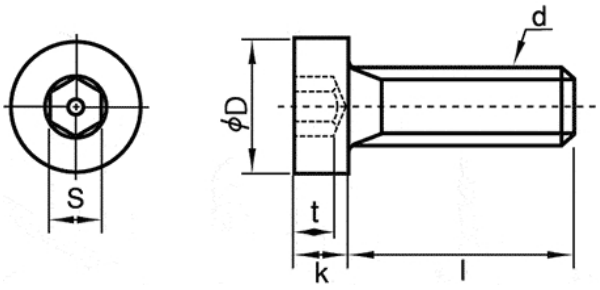
Be creative on how you will describe the problem in code, there's no limitation but make sure the syntax and structure are correct!

Please provide your answer in clear and clean python or C++ code and give short explanations in the form of a text document about all the functions, variables, and logic for the code.

 # 3D Design Test

Create 3D design of a single bolt and nuts that meet these requirements:

1. M8 thread size
2. 20mm Bolt Length
3. 1.5 pitch
4. Cap diameter of 13mm with 8mm thickness
5. Cap socket fit for 6mm Allen key with depth of 5mm



You can use any 3D design software that you're familiar with. Give us mechanical drawing of your design and *.obj or *.stl file

This image is only an example, the requirement is mandatory but any other thing can be assumed