Electronic Design Competition

The **Advanced Light Intensity Indicator (ALII)** module is an innovative solution designed to monitor and indicate light intensity levels, providing an average intensity over a specified period.

This module plays a crucial role in energy conservation. By providing real-time data on light intensity, it allows for the efficient use of artificial lighting systems. Lights can be dimmed or switched off when natural light is sufficient, leading to significant energy savings.

Furthermore, the ALII module contributes to creating safer cities. By ensuring adequate lighting in public spaces, it can help prevent accidents and deter criminal activity, enhancing the safety of our urban environments.

The ALII module can also be integrated with solar panels, making the system self-sustaining and promoting the use of renewable energy sources. The solar panels can power the ALII module during the day, with excess energy stored for use during nighttime or cloudy conditions.

Your task is to architect the ALII module, incorporating the following features.

1. A Light Dependent Resistor (LDR) is used to sense the light intensity. This data is then depicted on a seven-segment display, which is set up to show light levels from "0" (lowest) to "7" (highest). This setup enables the module to accurately measure and display varying light intensities in a compact and efficient manner.
2. The module should also include a feature to avoid sudden variations in light intensity. The system should only indicate the output once the light has been stable for a certain period, adjustable between 30 and 300 seconds. A variable resistor can be incorporated to adjust this period. Additionally, a switch should be included to enable or disable this feature as needed. This ensures that the module provides accurate and stable readings, avoiding false triggers due to temporary light fluctuations.
3. The module should also incorporate an additional seven-segment display to indicate the average light intensity over a specified period, adjustable between 300 and 900 seconds. A variable resistor can be used to modify this period. To ensure flexibility and control, a push button should be included to reset the average light intensity reading. This feature allows for a comprehensive understanding of light conditions over an extended period, providing a more accurate and holistic view of the lighting environment.

You are requested to do the complete task on a simulation platform. You are tasked with physically constructing **only the Task 1** on a breadboard. The necessary components will be provided to you.

Note

1. **Programmable ICs** are not allowed.
2. **Pre-built ICs** that render a specified task are not allowed. However, you are allowed to use the ICs provided in the list below.
3. Participants **can use** gate ICs and flip flops.

Physical Evaluation

1. You are restricted to using **only the components provided** in the given list. No additional components may be used.
2. Students should be prepared to explain any part of their simulation and the circuit design during the evaluation. This includes the function of each component and how they interact within the circuit.
3. Ensure that your circuit is built securely and **neatly** on the breadboard. Proper placement and organization of components can impact the functionality and aesthetics of your design.
4. Test your circuit thoroughly before the evaluation. Make sure it functions as expected and rectify any issues beforehand.
5. Be ready to **troubleshoot** your design under supervision during the evaluation. This will demonstrate your understanding of the circuit and your problem-solving skills.

OP Amp 741		10
8 - 3 priority encoder 74148		2
Hex inverter 74HC04D		4
BCD to 7 Segment 4511		2
1-Digit 7-Segment		2
LDR		2
Jumpers	Male-Male (40pin)	3
	Male-Female (40pin)	1
Resistors	330Ω	15
	1k	15
	2k	10
Variable Resistor Preset	1k	1
	5k	1
	10k	1
	50k	1
	100k	1