Project Goal Statement:

The goal of this project is to design and build a reliable, low-cost printed circuit board (PCB) that steps down 12V DC from a standard cigarette lighter (car power outlet) to a regulated 5V DC output suitable for use through a USB-C port. The device will be capable of charging common electronic devices such as smartphones and basic USB-powered devices, and will include basic protection features and user indicators, such as a fuse and a power indicator LED.

High Level Requirements:

- The device shall connect to a standard 12V automotive power source (e.g., car outlet).
- The device shall output 5V DC suitable for charging smartphones and similar electronic devices.
- The output shall be delivered through a USB-C port.
- The device shall include an LED to indicate power status.
- The device shall incorporate overcurrent or short-circuit protection.
- The device shall receive power using a barrel jack during testing (first version).
- The device shall be manufacturable at low-cost using off-the-shelf components.
- The physical PCB shall be compact and compatible with enclosure mounting, to be designed and manufactured at a later date.