Criterion A: Planning

Defining the Problem

The client is Ioannis Schoinas. Mr. Schoinas lives in an area that suffers from frequent power outages due to trees falling on the power lines. Recently, Ioannis got a Tesla powerwall and solar panels installed. While this is great, the powerwall holds a limited amount of power, especially during the winter when the panels produce less power and more outages occur. When the power goes out, some devices in the home are necessary to keep on while others are not. One specific situation Mr. Schoinas described it when his family was on vacation and the power went out in their home. In order to preserve power his father-in-law had to be called to shut out unnecessary devices. Mr. Schoinas is looking for a solution to this problem, so that load shedding will happen without human intervention.

Since I’m enrolled in IB computer science, Mr. Schoinas sought me out to solve his problem. I saw It as a perfect opportunity for my Internal Assessment and an opportunity to work on a project that interfaces with the real world. My first step was to set up an interview with the client in order to get specific details about the project.

Rationale for Solution

The client’s load consists of desktop computers, storage servers running linux and solaris, and various devices such as lights, TVs, and audio systems. The various devices are controlled by a combination of Tuya Smart and tp-link Kasa Smart plugs.

I decided the best course of action would be to create a python program. The product will use python modules found on Github to interface with the home's smart plugs and other devices (Tuya & Kasa Devices), windows and Linux computers, and the powerwall. The program will constantly run on a computer and check the powerwall for power outages, which if it detects will then run the load shedding function. The devices to be shut down will be listed in a text file.

I Python decided us Python for this program because:

* I’m familiar with Python
* It’s popular for home automation scripts
* There are Python modules to interface with a large variety of devices, including the Tesla power wall
* It’s platform independent
* It has a simple and powerful syntax

Criteria for Success

1. Program will monitor the powerwall and detect when a power outage has occurred
2. Program will then wait 5 minutes and if the power is still out it will run the load shedding function
3. Program will interface with the smart plugs and other smart devices and Windows and Linux computers.
4. Program will read a list to identify which devices and computers to shut down
5. Program will shut of all these devices deemed unnecessary
6. Program will continue to check if the power is out or not and if it is found to be on the program will turn the devices (from the list) it shut down back on