

Computer Engineering as a Discipline

Assignment 4.1: Applying the Engineering Design Process

Given Scenario: Managing Power Consumption in a Student Boarding House

In a student boarding house near your campus, the electricity bill has been increasing every month. The landlord notices that many students forget to unplug their devices, leave lights or fans on when they go out, and use appliances inefficiently.

The landlord asks you, as a computer engineering student, to come up with a solution to help monitor and reduce electricity waste.

1. Identify the problem clearly

- Electricity is wasted due to students forgetting to unplug their devices, leaving their lights and fans on even when they're not present, and other appliances that they leave unplugged or unattended. These issues affect the landlord because the electricity bill keeps going higher and higher, this also affects the students who are staying inside the boarding house because their rent will also increase if this problem continues.

2. Research

- Some common causes of high electricity usage are the appliances left running and “phantom load” from chargers or devices that are not unplugged. Some existing solutions are timers, mobile reminder apps, and smart power strips that turn off automatically in a certain amount of time when not used.

3. Specify requirements - The solution must be:

- Affordable, since most students are on a tight budget
- Easy to use, so everyone can operate it fairly easily
- Effective, in terms to reduce wasted electricity

4. Brainstorm 3 Solutions

- A motion detection or sensor on auto-off lights and fans
- A mobile reminder app available on all devices
- A dashboard that shows the power usage of each room

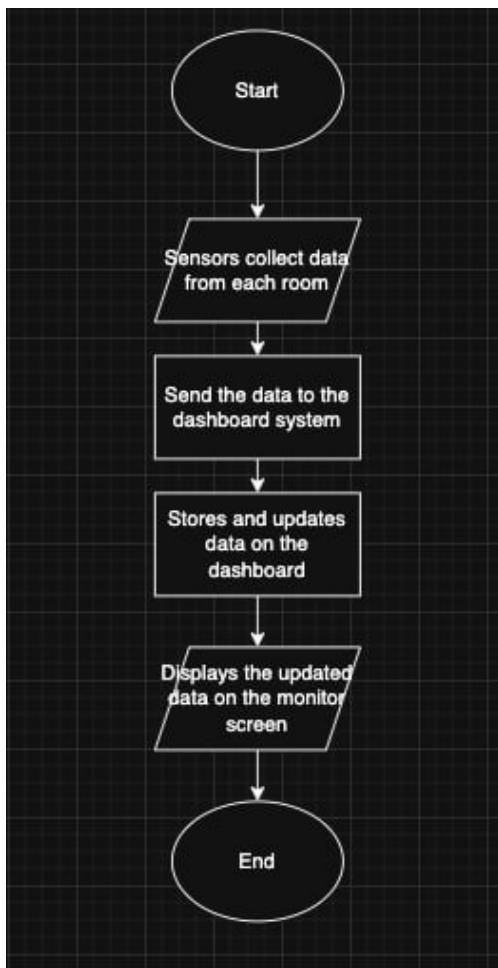
5. Choose the best solution and justify why.

- The best solution for me is the dashboard for power usage monitoring with the help of sensors. This makes the electricity usage visible for all students and the landlord inside of the boarding house. When students see the power consumption of each room, they become more aware of their habits of leaving specific appliances or devices unattended and unplugged. This web dashboard will be displayed on a monitor or small screen near the exit of the boarding house so it encourages the students to be more responsible with their belongings and serves as a long-term discipline for them.



- This image is an example of how the dashboard monitor will display the electricity usage of each room. Instead of temperature monitoring the dashboard will display the electricity usage/consumption of each room and also contain the total usage of the boarding house.

6.



- This flowchart will represent how the system works. This system will make students and the landlord more aware of how the electricity usage is being used for each room, as a result will make their bill and rent stay as is and help them save up electricity inside of the boarding house.