

Task 1

0. State your names. Only one of you needs to submit this.

- Dakota Condos
- Hieu Tran

1. Present the problem statement. For example, an average homeowner designing a new house wants to play with options for installing solar panels.

- An average homeowner designing or renovating a house wants to play with options for installing a climate control system with smart thermostats.

2. Explain who the intended user is. It can be you or a fictitious entity you will represent.

For example, the user is a homeowner building a new house.

- The user is a homeowner designing or renovating a house.

3. Describe why the user has this problem. For example, there are decisions to make and many options, which are difficult to manage for the average user.

- HVAC systems, sensor placement and smart thermostats are complex systems with many different options that are difficult to compare for the average user.

4. Describe how a solution would benefit the user. For example, maximizing the solar generation while minimizing the cost saves the homeowner money. Stay within the scope of the problem; e.g., do not consider climate change because the connection is too indirect.

- Maintaining adequate climate control while minimizing energy consumption and/or balancing energy usage to off peak times allows the homeowner to save money.

5. Describe the general flow for addressing the problem. The existing (or imagined) flow does not have to involve a computation solution. For example, the user defines the property and house layout and expected energy needs, then the system proposes solutions that best satisfy the criteria. This used to be done on paper by expensive expert contractors.

- The user defines the building layout, location, utility type(s) and rates, then the system proposes solutions that best satisfy the criteria. This is traditionally done by expensive expert contractors.

6. What is the general nature of the solution? For example, app, standalone program, website, plug-in.

- The general nature of the solution is a website

7. List the general software components you envision playing a role. For example, web server, database, game engine.

- Web server for hosting the website, database for user authentication and any saved configurations, and a game engine for manipulating the house design and climate system configurations.

8. List the general hardware components you envision playing a role. For example, a drone, VR headset, tablet... You are responsible for your own hardware, so be reasonable.

- A local or cloud based computer capable of running a web server and database.

9. Describe similar solutions, if any, and justify (or make up a justification) for why they are inadequate. For example, SolarBlaster 9000 does something similar, but its cost and complexity are prohibitive.

- Current solutions like the *eDesign Suite* from Carrier (<https://www.carrier.com/commercial/en/us/software/hvac-system-design/>) are multiple programs designed for engineers to design a system. An average homeowner would not have the expertise necessary to operate such software, and the cost of that software is prohibitively expensive.