

Individual Assignment #4

Full assignment worth: 7% of course grade (draft + final submission)

Draft Due: Thursday, Feb. 18 by start of class (worth 2%) — no late submissions accepted

Final Due: Tuesday, Feb. 23 by start of class (worth 5%)—10% per 24 hours late, up to 48 hours

Last modified: 14 February 2021

Overview

In this assignment, begin by reviewing the reading material and previous class slides. You may also want to review the Greenberg “Ten plus ten” supplemental document (from the Greenberg text).

The following sections of chapters 3 and 4 of the *OPTIONAL* Greenberg et al. text (*Sketching User Experiences: The Workbook*) may also be helpful in your completion of this assignment:

- In Section 3.2, you will learn how to draw what you see.
- In Section 3.3, you will learn to compose a collection of basic sketch elements.
- In Section 3.4, you will learn to compose “vanilla sketches” that include drawings, annotations, and notes.
- In Section 3.7, you will learn how to use *office supplies* to create sketches that are more easily modifiable.
- In Section 3.9, you will learn how to create photo-realistic sketches by tracing actual photos.
- In Section 4.1, you will learn how to build *sequential storyboards*.
- In Section 4.2, you will learn how to construct *state-transition diagrams*.

This assignment has the following learning objectives:

- To apply the design processes explored in this class to a design problem.
- To apply the principles and concepts explored in this class to the design of humanly-usable artifacts within a given design space.

Instructions

1. Using the techniques described in class, including the “ten plus ten” design method, generate *multiple* design sketches for the following design challenge described on the next page. Note: For task 2, you are required to apply at least **four design principles** from the Johnson text to your analysis.

In generating designs, pay particular attention to the design concepts explored in class thus far:

<p><u>Norman Text</u></p> <ul style="list-style-type: none"> • Affordances • Signifiers • Feedback • Natural Mappings • Constraints • Conceptual Model • Visibility <p>Additional consideration for:</p> <ul style="list-style-type: none"> • Transfer effects • Gulfs of execution and evaluation 	<p><u>Johnson text</u></p> <ul style="list-style-type: none"> • Ch. 1: Human perception is biased <ul style="list-style-type: none"> – Avoid ambiguity in information displays – Be consistent – Understand users' goals • Ch. 2: Human perception optimized to see structure <ul style="list-style-type: none"> – Gestalt principles • Ch. 3: Humans seek and use visual structure <ul style="list-style-type: none"> – Impose visual structure on information displays • Ch. 4: Color vision is limited <ul style="list-style-type: none"> – Use color redundantly with other cues – Make sure colors are distinguishable, even for colorblind • Ch. 5: Peripheral vision is poor <ul style="list-style-type: none"> – Use a combination of movement, color, different font to make things stand out in periphery and optimize visual search • Ch. 6: Reading is unnatural <ul style="list-style-type: none"> – Avoid unfamiliar words, difficult fonts, poorly contrasting backgrounds – Minimize text in interfaces
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Design Challenge: *Smart Home Manager*

Smart devices are becoming more and more prevalent in homes around the world. According to July 2017 research by [Transparency Market Research](#), the global market for home automation is expected to rise to a valuation of \$21.6 billion by the end of 2020. There are many mainstream smart hubs and modular smart devices already available for consumer use and there is much debate over which devices are the 'best' (e.g. the [Apple HomePod](#), [Amazon Echo](#), or [Google Home](#)).

Home automation revolves around the connection of many "smart" devices in and around your home, turning your home into a "smart home". A smart home consists of automated, digitized and connected home assets, electrical services, controls and appliances. These run within a communications network and offer enhanced monitoring, comfort, energy conservation, maintenance, home activities and security of its occupants. Residents have access to the services and controls via special displays and controllers, including built-in wall displays, remote controls, and computing devices.

Excerpted and adapted from:

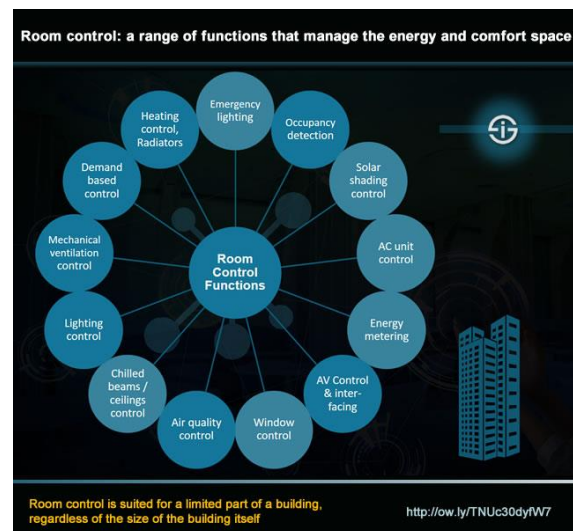
<https://www.i-scoop.eu/smart-home-home-automation/>

What might an interface for a smart home look like? How might home residents interact with a house full of devices digitally connected through that interface? One method might be through a centrally located controller. In this design challenge, you design a *Smart Home Manager* to help users monitor and control their connected devices.

As the device's designer, assume that your interface will be a **wall-mounted touch screen device**. Your job is to design the layout of and user interface for the device while keeping in mind that the user will expect to be able to connect this device to an unknown (and possibly large) number of "smart" devices located throughout their home.

Here are the specific functional requirements for the device:

- *Users must be able set the date, time, and location.* Date, time, and location are a vital part of many smart devices! Many rely on accurate data to provide services and information.
- *Users must be able to configure other device settings.* It must be possible to configure other device specific settings, i.e., the smart home manager interface settings. Examples could be device network connectivity (wired? wireless?), brightness settings, security, privacy, accessibility settings, etc.
- *Users must be able to add and remove connected smart devices.* One of the advantages of many smart devices is the ability to add and remove from the system as desired (i.e., they are not stand-alone devices). The interface must support adding and removing any compatible smart devices.
- *Users must be able to monitor all connected device statuses.* All connected devices should have a status (e.g. connection or other data made available via the connected device).



- *Users must be able to manually control individual devices.* Sometimes, a user will want to manually adjust individual device settings, which will vary by device. At a minimum a device should support on/off with the ability to control more advanced settings based on device complexity.
- *Users must be able to create, modify, and remove automated tasks.* A user must be able to input a specific automated task for any of their connected smart devices. Automated tasks should support turning a device on and off or adjusting its settings based on available data, including the time, temperature, and state of other connected devices.

2. In your analysis, **cite at least 7 relevant design principles, where 4 of those design principles are derived from the Johnson text (Chapters 1-6)**. These are outlined above. You are welcome to use the Norman principles for your other 3 design principles. However, it would be a good idea to practice applying the new design principles you have learned since Norman. Please be sure to put each concept or principle you apply in **bold type**.

By **2/18 at the start class**, submit two *preliminary* designs to the “Individual Assignment 4 Draft” assignment in MS Teams. These preliminary designs do *not* have to have a justification section. Nonetheless, be prepared to present and justify your preliminary designs in class on February 18.

By **2/23 at the start of class**, submit one *final design* to MS Teams with your analysis. Some of you may have a chance to present your final designs to the class for feedback and discussion.

Assessment

Your draft submission will be graded pass/fail based on whether it contains two reasonable designs. The final submission will be graded on the following four-value scale:

Points	Meaning	Description
0	Missing	Assignment not submitted, or submitted late
5	Incomplete	Assignment is incomplete or significantly deficient. Part of the assignment is missing or contains significant gaps.
8	Satisfactory	Assignment is complete but could be improved. Minor and obvious deficiencies exist with respect to one or more parts of the assignment
10	Exceptional	Assignment is complete and acceptable as is. No obvious deficiencies exist. The student has demonstrated mastery of the material. <ul style="list-style-type: none"> • Design sketches are shown in sufficient detail to clearly illustrate design principles • Design sketches address all 6 functional requirements (<i>core tasks</i>) • Design sketches are annotated where appropriate to highlight important details and design principles • Analysis clearly and correctly considers relevant design principles applied to the design sketches • Analysis applies at least 4 design principles from the Johnson text • Analysis applies at least 3 other design principles covered in class (Norman or Johnson text)

Handing in your Assignment

Submit your draft and final designs as a **.pdf** or **.docx** files through MS Teams by the due date.