

# CS6750 – Assignment P3

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## 1 QUESTION 1

### Elevator Floor Selection

Invisible interfaces are those which completely remove the barriers between the user and their intended task. Specifically, the user does not have to think or interact with the interface, in order to complete the task. Instead, the user assumes he or she is controlling or working with the task directly. Three design principles namely, simplicity, consistence, and ease and comfort will be further described as key principles guiding the creation of invisible interfaces.

#### Simplicity

Simplicity is an invaluable concept, applicable to many disciplines and principles. Occam's razor tells us that the simplest solutions are often the correct ones. Software Engineering relies heavily on an engineer's ability to digest complex problems to simple ones. In general minimalistic simplicity allows the designer to draw the attention of the user exactly to the tasks needed to do next.

Using simplistic design principle implies minimizing distracting information, any information which does not help drive the user to their goal, and minimizing the interface contrasting details which may distract a user as well. Additionally, menus, multi-page navigation and complex keystroke combinations should be avoided as much as possible. Simplicity in interface design requires not only simplifying the visual context of the user, but also the usability of the interface. For an invisible interface, it is critical to simplify the interaction of the user with their task.

#### Consistency

Consistency is a critical concept for creating invisible interfaces. Following certain established use-cases or standards allows a designer to better bridge the gulf of execution and gulf of evaluation.

## **Ease and Comfort**

The ease and comfort principle is essential to invisible interfaces. Making sure that the user is never strained or required to feel an unusual amount of stress in order to achieve their task removes the invisibility part of the interface.

## **Consistency**

Consistency is related to human understanding in such that for an interface to stay consistent, the designer must understand the target audience. If an interface crosses multiple countries, regions, or cultures, then the design of the interface must be able to rise above such differences in order to be understood and remain consistent throughout all these differences.

## **Documentation**

Documentation can be very difficult to maintain across different cultures. Meanings and intentions conveyed in one language become lost or transformed in another language. Additionally the context in which the documentation describes certain actions may drastically change across countries. For example, basic keyboard functions may become irrelevant in languages such as Chinese or Hebrew where letters have different meanings, symbols, counts, and rules.

## **2 QUESTION 2**

The elevator floor selection is a common daily interface that does not afford errors. In general, the elevator floor selection layout contains all possible floors in a grid pattern including Ground and Parking level floors, in addition to force Open, Force Close as well as the Help button all in the same cluster. User errors are extremely common and become exacerbated when the user is loaded with items such as morning coffee, groceries, office work or others. Selecting a wrong floor is an extremely common error, especially if loaded with items. Additionally, having the “Help” button in-line with the floor buttons will sometimes lead the user to call out for help, involving a help-desk and possibly service personnel to cause to visit the building.

Constraints enforce that the user chooses the right thing to do. In case of elevator floor selection, One use of constraints may be to add a verification step is floor selection. Pressing a specific floor button will cause an automated assistant

to call out the selected floor, and then ask for a verification by pressing the “Door Close” button as confirmation. In this way, if an individual selected the wrong floor, they can reselect a different floor as many times as needed before pressing the door close button at which point the elevator would accept their latest choice.

The previously described verification step could include a display on the elevator for assistance. Most modern elevators already come with a display showing the current floor that the elevator is on. There is no reason that that display cannot be used to provide the user with extra information regarding their choice of floor selection. The user, when selecting a floor, will also see their selection appear on the display. Consequently, most common elevators only sound off a “bing” when a floor is selected, but which floor is selected is not immediately apparent. For this reason, a number of “bings” representing the floor number or a voice assistant which announces the floor over the intercom would be a good improvement for mapping principles.

In an elevator, the pressing of a button is usually directly understood to mean that the button value will be the floor to be traveled to. What is missing is any display of the progress of elevator travel. If a wrong floor was selected, there is no way for a user to know what the elevator will do next (i.e travel up or down, or stop on the correct floor or not). Similar to the improvement for mapping, having a display which notifies the user of elevator progression, start, and stop points would allow the user to immediately comprehend the effects of their action.

### 3 QUESTION 3

One sport which is fraught with slips and mistakes is the sport of GoKarting. One slip that a player may make in the sport is while turning, continuing to accelerate at the same time. This is a slip because the user is doing everything correctly but must take their foot off of the accelerator in order to make the turn safely. However, by keeping the foot on the accelerator, the driver may end up losing their place in the race, or spinning out completely.

The player may make the slip since the action requires advanced memory recall, understanding exactly how hard the turn is and how much to slow down in order to make the turn as quickly as possible.

In order to prevent the slip in the future, the track may have reminders posted around the each turn, reminding the racers to slow down at each turn in order to make a successful entrance and exit with maximum speed.

A mistake that a player may make involves correcting a drift. If a racer goes into a turn too quickly, the wheels may loose grip and begin to slip. This would cause the car to continue traveling in a fashion opposite of what the user intends. Most novices would keep the steering wheel pointed in the direction that they were turning, slowing down and stopping, hoping to correct the turn. However, in order to correct the turn, the user must, instead, turn the wheel in the direction of the drift and keep accelerating.

The driver may make this mistake due to lack of experience or simply forgetting the rules of driving through a drift. Since the sequence of events required correcting the mistake demands advanced knowledge.

In order to prevent this mistake, the GoKarts could be outfitted with four-wheel-drive systems. By equipping the cars with four-wheel-drive, the chances of drifting the cars, in the first place, will greatly diminish.

The race itself, competing for first place, is what makes the entire sport a challenge. Being faster than all other drivers requires skill, advanced knowledge of the track and of the machine being driven. By failing to gain first place, the driver would not be conducting slips or mistakes, but simply driving certain paths of the track slower than other drivers.

#### **4 QUESTION 4**

An interface with a good representation of its underlying functions is a household microwave. The number pad on the microwave directly links to the time and start the microwave to cook. The user is not required to enable multiple buttons in order to turn on the microwave, simply pressing one button will enable that number of minutes to be directly programmed and executed by the microwave.

Good representations remove extraneous detail. By removing any necessity for button combinations and requirements, the direct manipulation of the number pad immediately invokes the desired function of the microwave by the user. Additionally, good representation makes relationships explicit.