1 Homework Solutions

1. Thinking about user interface design.

(a) Cell Phone

This is the one interface I might interact with more than my computer. People use this for work and social life. It is a way to interact and stay in touch. My particular cell phone is the LG Chocolate 3.

Strengths

1) I like that it is a flip phone. It seems to fit near my face more. The shape is similar to matching a person’s jaw line.
2) Another feature that I like about this phone is when I receive a text message, I don’t have to open up the phone to read it. By simply unlocking the phone (one side button) and then pressing the circular button on the outside I can view the message. There is a wheel on the outside so I can spin up and down to read my message.
3) The third feature I like is that I can change the master volume or speaker volume from the side buttons on my phone. If I’m in a conversation and I’m having a difficult time hearing the person I can simply press the up arrow on the side of the phone.

Weakness

1) The first weakness I’ve noticed is the outside screen is easily scratched. It is also difficult to read my messages when it is bright out. This is mostly on the inside screen.
2) The second weakness I’ve found is, I have a difficult time pushing the buttons sometimes. For example, when I send a text message I tend to hit a few of the buttons at once.
3) The keys always seem to get dirty and smudged easily. They are on a reflective surface that looks pretty when it’s clean, but every time I touch it, it looks bad again.

(b) Alarm Clock

Alarm clocks receive a lot of abuse. I don’t know how many times I’ve hit mine or accidently knocked it off a table. Alarm clocks need to be durable and have a variety of features to wake someone up.

Strengths

1) There is a “Nap” button. By pressing this each time it increases by a certain multiple.
2) I can set up to three alarms. They are each different radio, CD, and buzzer.
3) There is a light available and it has two settings for brightness.

Weakness
1) The radio reception is very poor. There is a long, string-like antenna that seems to serve no purpose.
2) The buzzer is not very effective. I wish there was a way I could have a choice of buzzers, similar to a ring tone.
3) When I change the time it always has me change the date, whenever my clock gets reset. I’m not sure why the date is even important, because the only time I can see it is when I set it after the power went out or something similar.

(c) Canon Digital Camera
Most people travel with the cameras. It is useful if it is compact and light weight. Many features are desirable, such as video, timers, and color enhancements.

Strengths
1) There are many features. I can take a picture in black & white, sepia, etc.
2) The screen flips around. It allows me and a friend to take a picture together, without bothering someone else.
3) The zoom in and out feature is easy to reach and understand.

Weakness
1) The camera is very large and bulky. It is difficult to bring it out places.
2) The lens cap is not very secure. There are two small pieces of plastic that move out of the way. However, if I don’t have my camera case, it is very easy for something in my purse to damage this.
3) There is a spin thing on the top of my camera to change settings. For example, automatic, custom, night time, or video. However, it seems to always move to something I don’t want it to move to. The button to take a picture is right next to it, and I feel that every time I take a picture, I change the setting as well.

2. Learning to listen to users

(a) Matt
i. The external mouse is too far away from the desk top. On the lap top everything is in closer proximity and quicker. Seems like the user prefers to have mouse and keyboard as one utility. Create a new keyboard with mouse similar to lap top, such as touch pad.
ii. CPU is too big and too many cords. User likes a more compact system. Not much to say expect just use a lap top.
iii. Formatting in Microsoft Word is difficult for resumes. Used resume template, but is very difficult to make changes.

(b) Toni
i. “The slowness. Sometimes it can take 30 minutes for a report to run in Discoverer. Corp is trying to run everything off of one server, which I don’t
think can handle the volume of information. It might be easier to let each location have its own server and just do an upload to a Corp server every night. But then Corp won’t be able to view the information on-line, it will be a day later. The system in general seems to be slow at times. Screens will lock up, so you need to shut down and reboot. When you have deadlines to meet, it gets very frustrating. It slows down productivity. What should take a couple of minutes, ends up taking 1/2 an hour or more.” The company may need more RAM and get faster systems.

ii. “Oracle screens are not user friendly. You have to click about 10 times to get to the screen you need. I have worn out a spot on my mouse because I have to click so much. The information we need should be easier to get too.”

iii. “Sometimes we have hiccups when two systems have to talk to each other. MDIS - production program and Oracle. We sometimes end up losing information between the two and have to reenter in Oracle. There seems to be no rhyme or reason why this happens.”

(c) Vivian

i. Application When saving an application Work automatically saves as docx format. Not everyone has this format. Not very user friendly. Microsoft should change the format

ii. Try to use a function. Can’t find it. Help function doesn’t actually help with what you want to do. Expand its results. Highlight something on page. Be able to get information about what is highlighted. Help button is too general. For example, with formatting something.

iii. On a website. Contact us forces you to use your browsers mail client such as Outlook or Thunderbird. Many people don’t have these e-mail clients set up.

3. Power Law of Practice

\[ T_n = T_1 \ast n^{(-\alpha)} \]
\[ T_{22} = T_1 \ast 22^{(-\alpha)} \text{ or } 3872 = 15128 \ast 22^{(-\alpha)} \]
\[ \ln(3872/15128) = (-\alpha) \ast \ln(22) \]
\[ -1.3628 = (-\alpha) \ast 3.091 \]
\[ -0.441 = -\alpha \]

Therefore, our learning constant is 0.441.
As the trials continued, my subject improved at typing. However, at some point she was distracted. This is visible by the jump in data. The first number sticks out because the time starts immediately each time after enter is hit. At first I noticed she used one finger to type each letter. After the little jump occurred, she started to use two fingers. The pointer and middle finger on her right hand.

View Appendix for source code.

4. **Choice Reaction**

(a) The amount of time it will take a user to select an item from the menu is approximately as follows:

\[ \text{Movement Time} = a + b \times \text{ID} \]

By looking at the lecture slide, we use the same constants data gathered using 240 observations (12 participants x 20 trials per condition) via regression, \( A \) was determined to be 545; \( B \) was 420

Therefore, \( MT = 548 + 420 \times \text{ID} \) where \( \text{ID} = \log (A / W + 1) \) or \( \text{ID} = \log (n) \)

our \( n \) is 12.

Therefore our Movement Time is 2.05 seconds.

(b) i. 50/50: \( .5 \times (548 + 420 \times \log_2(4)) + .5 \times (548 + 420 \times \log_2(8)) = 1598 \text{ ms} \) or 1.6 seconds

ii. 75/25: \( .75 \times (548 + 420 \times \log_2(4)) + .25 \times (548 + 420 \times \log_2(8)) = 1493 \text{ ms} \) or 1.5 seconds

iii. 90/10: \( .90 \times (548 + 420 \times \log_2(4)) + .10 \times (548 + 420 \times \log_2(8)) = 1430 \text{ ms} \) or 1.4 seconds

iv. Minimum: when the probability is 100% our time is about 1.39 seconds.

v. Maximum: when the ratio is 0/100 our time is about 1.81 seconds.

(c) Some limitations of applying Hick’s Law to the real world include the constants \( A \) and \( B \). These constants are found by empirical data. If there is something
wrong with the experiments used to get these constants, we can’t expect our data to be accurate measures.
import javax.swing.JOptionPane;
import java.io.*;

public class BackalphaMain{
    public static long startTime = 0;
    public static long endTime = 0;
    public static OutputStreamWriter buffOut = null;

    /**
     * Starts taking time.
     *
     */
    public static void start() {
        startTime = System.currentTimeMillis();
    }

    /**
     * Stops taking time.
     *
     */
    public static void stop() {
        endTime = System.currentTimeMillis();
    }

    /**
     * Gets the time it took from start to finish.
     *
     */
    public static long getTime() {
        long totalTimeSec;
        totalTimeSec = (endTime - startTime);
        return totalTimeSec;
    }

    public static void createFile()
    try{
        File backalphafile = new File("cs465results.csv");
        FileOutputStream fos = new FileOutputStream("cs465results.csv");
    } catch (IOException e) {
        e.printStackTrace();
    }
buffOut = new OutputStreamWriter(fos, "UTF-8");

writeToFile("Trial Number, Time, Correctness" + "\n");
}catch(Exception ex){
ex.printStackTrace();
}

}

public static void writeToFile(String strToWrite){
try{
buffOut.write(strToWrite);
}catch(Exception ex){
ex.printStackTrace();
}
}

public static void closeFile(){
try{
buffOut.close();
}catch(Exception ex){
ex.printStackTrace();
}
}

/**
 * @param args
 */

public static void main(String[] args) {

    // Create CSV File to write to
    createFile();
    // Run trials
    // run 25 trials
    int numtrials = 23;
    for (int i = 1; i < numtrials; i++){
        String trialNum = Integer.toString(i);
        writeToFile(trialNum + ",");
        start();
        // Prompt User To Type Data
        String input = JOptionPane.showInputDialog("Please Enter the last 8 " + "letters of the alphabet \"stuvwxyz\" backwards." + "\n (zyxwvuts)"));
        stop();
}
int match = input.compareTo("zyxwvuts");
long totalTime = getTime();
System.out.println("Time it took: " + totalTime + " milliseconds");
writeToFile(Integer.toString((int)totalTime) + ",");
if (match == 0){
    System.out.println("You typed it correctly!");
    writeToFile("Yes");
} else{
    System.out.println("Please type zyxwvuts.");
    writeToFile("No");
    numtrials++;
}
writeToFile("\n");
}