1. **Laptop**

Laptop is used almost everyday for doing school work and for entertainment. It’s also a communication tool with friends who I cannot just call and meet. Since it’s a laptop which is meant to be carried around, it is mainly designed to have everything in one machine which means that all I need to run this computer is the computer itself unlike desktops which need a keyboard, a mouse, a and a monitor just for a basic setup. It is also very light so that it is easy to carry around.

**STRENGTH**
- Memory card reader on the laptop is one of the strengths of it. These days there are many devices that use memory cards like digital camera cell phone, and mp3 player. The laptop reads SD card, memory stick, and compact flash, which are the most popular ones so just about any kind of memory card can be read without an external card reader.
- Another strength is its weight. It is hard to say that it’s an interface but it is certainly a good thing that the designer did. Every component is well placed to make the laptop very slim and light making it very portable.

**WEAKNESS**
- To make the laptop light and slim, hardware choices must be limited and so hardwares like graphics card and speaker are not very good, which limits me of running graphical applications or music or movie players.
- It’s been 3 years now that I have been using this laptop but these days it turns off suddenly with no reason. Sometimes, it won’t even start and I have to hit it or give it a shock to power on.
- There is no room for upgrade. It might be a problem for all laptops.

**Backpack**

Backpack is not an electric device but I carry it around and interact with it everyday. It keeps all my stuffs in one place safely so my hands can be free of moving and do other things.

**STRENGTH**
- It has many spaces for storage. There are three main zippers that open up the storages and the one on the front is for small objects like pen or calculator. The main storage is on the middle and that’s where all the books go.
- It also has a waterproof cover for the backpack. It’s on the bottom of the backpack so no one can see if it’s there.
- Another thing that is advantageous is small pockets on both sides of the backpack to hold objects like water bottle. It is very easy to access.
**WEAKNESS**
- The waterproof cover has a weakness to it. It is not easy to make it stay on the backpack. There should be a firm holder for the cover.
- It could have been designed so that the waterproof cover is not needed by making the backpack itself a waterproof.
- There’s a weird string on the front side of the backpack that I don’t know what it’s for.

**Cell phone**
Cell phone is a device now almost everyone uses, connecting people together.

**STRENGTH**
- Its body is slim and light so it is easy to carry it around.
- It supports my own language, Korean, which many cell phones does not offer in the country.
- It supports mp3 files, so it can also work as a mp3 player.

**WEAKNESS**
- There are four touch pad buttons, and it just doesn’t feel like pushing and so there are some times I accidently call someone.
- It has autofocus feature on the camera that’s inside the cell phone, but due to that feature it takes too long to take a picture.
- There are many setup menus, sometimes it is hard to find the correct setup menu I want.

2. – Sometimes wireless connection gets bumpy getting on and off without knowing. If I was writing something on a web board while the wireless connection is lost, the content I wrote could all be gone and nowhere to find it. One solution to this could be to notice it very noticeably of the connection lost and gain. Another solution could be to have an auto saving feature so that the content is automatically being saved when it is updated.
- Using Internet Explorer, there are times when a tab automatically opens and then starts to open a new tab continuously which makes the computer freeze. My friend does not know why it happens and I have no solution either. It could be a spyware or a virus.
- My friend uses a cordless mouse that operates using batteries. There is no on/off switch for the mouse so the batteries die quickly and it is painful to change the batteries so often. Having an on/off switch can be a solution.
- Using Windows XP, blue screen is one of the most popular problems everyone experiences. Sometimes, there is an explicit solution to why the blue screen had appeared and so is easy to fix, but sometimes it is hard to know the reason for the blue screen and the only solution is to format the disk and reinstall Windows.
- Han who uses Windows Vista had a problem with wireless connection. Even though the wireless connection was enabled, the computer could not find any network while it is obvious that there are many networks that she could connect to. She had to reinstall the system in order for it to work.
- There are times when the computer just won’t start. It’s like the case of the blue screen where it is hard to know the reason, after some time has passed, the computer starts again. Overheat might be the problem but it is not the necessary condition for the sudden shutdown.
- Hana who is a mac user has issues using Korean applications and getting into websites using ActiveX which are more of Windows based. A solution for her might be installing Windows on top of MacOSX, but it would be slower than the machine with the same configurations using Windows for its primary operating system.
- A common problem people had was the abnormal termination of applications with no reason especially when in the middle of writing or making something. Many applications now support auto-saving but not all are supported. It would be good if the operating system itself supports the saving.

3.

![Learning Time Graph](image)

- **Learning Time**
- **Time elapsed**
- **Trials**

![Time trials graph](image)
Tf = T1 * N ^ -a. My friend performed 30 trials and got all of them correct.
Tf = 4.626, T1 = 12.217 Therefore, a = 0.286
She used a strategy to keep reminding herself of what the next letter must be. She
also placed her hand in a way to easily and quickly press the letters. The learning
constant of my friend is on the low side which could mean that it she was good from
the first start so not much improvement could be made or it could also mean that
she did not learn much. However, Tf being around 4 secs, I think it is the first case
that she was fast one the first try and had not much room for the improvement.

**SOURCE CODE**
```c++
#include <iostream>
#include <string>
#include <ctime>
#include <fstream>
using namespace std;

int main(int argc, char *argv[]) {
    string buffer;
    clock_t start, finish;
    double time;
    int correct = 0;
    ofstream fout("output.txt");

    // if cannot open a file
    if (!fout) {
        cout << "Cannot open a file!!" << endl;
        return 1;
    }

    // do this for 20 rounds
    for (int j=0; j<20; j++) {
        cout << "ROUND " << j+1 << " Correct = " << correct << endl;
        start = clock();
        cin >> buffer;
        finish = clock();

        for (int i=0; i<(int)buffer.length(); i++)
            buffer[i] = toupper(buffer[i]);

        cout << buffer << endl;
        time = ((double)finish - (double)start) / CLOCKS_PER_SEC;
        if (!buffer.compare("ZYXWVUTS")) {
            correct++;
            fout << time << endl;
        }
    }
}
```
system("cls");
}
fout.close();
return 0;
}

4. (a) Hick's law can be applied to estimate the reaction time. (Ones with the numerical values are using A and B from the values of the example in the lecture notes)

A = 548, B = 420 => RT = 548 + 420 * log2(12) = 2053.68 ms = 2.053 sec

RT = A + 3.585B

(b) 50/50 : 0.5*(548+420*log2(4)) + 0.5*(548+420*log2(8)) = 1598 ms = 1.598 sec

0.5*(A+B*log2(4)) + 0.5*(A+B*log2(8)) = A + 2.5B

75/25 : 0.75*(548+420*log2(4)) + 0.25*(548+420*log2(8)) = 1493 ms = 1.493 sec

0.75*(A+B*log2(4)) + 0.25*(A+B*log2(8)) = A + 2.25B

90/10 : 0.9*(548+420*log2(4)) + 0.1*(548+420*log2(8)) = 1430 ms = 1.430 sec

0.90*(A+B*log2(4)) + 0.10*(A+B*log2(8)) = A + 2.1B

The minimum choice time is 1 * (548+420*log2(4)) + 0*(548+420*log2(8) = 1388 sec

1*(A+B*log2(4)) + 0*(A+B*log2(8)) = A + 2B

The probability split for maximum choice time : since log2(8) is greater than log2(4), the maximum choice time would be 0*(548+420*log2(4)) + 1*(548+420*log2(8)) = 1808 ms = 1.808 sec

0*(A+B*log2(4)) + 1*(A+B*log2(8)) = A + 3B

(c) The constants in the law are only empirical values, so it can be impractical when it is impossible to measure the values.