Team1: Project1 Description for Project1

This project is to develop a program for controlling the train in Lab. The are several issues we need to concern before starting programming.

First, there are hardware and software platform requirement. The train has to be controlled by serial RS232 connection, so the hardware platform we use is the X86 computer with RS232 connection. As regarding the Software, we use C/C++ mainly because it could be easier to migrate to embedded linux system in the future than Java or Python.

Secondly, the programme needs extensively bit-manipulation skills. Unlike the common plain text used nowadays, the commands are bit-coded in compact way. It is mainly because the bit-coded could save a lot a bandwidth back then, but the bandwidth problem is not a big issue now.

Thirdly, the program is not very easy to migrate to different platform. The serial driver provided by different Operating System like linux, windows are different. So we need different C/C++ library when we need to connect the serial port.

Fourthly, the program sends all the serial command in non-blocking way. All the serial commands are sent asynchronously. Besides, there are no response from train controller regarding the execution result. So we need to add sleep to limit the command sending ratio to avoid overflow the serial port.

Fifthly, the program doesn’t require keep any persistent status of the train. In other words, the program doesn’t need to remember any previous commands or store the commands in queue at this stage.

Sixthly, we found linux platform could be used as the operating system if we use virtualization tools like virtualbox. In out case, we installed Ubuntu guest os on the windows virtualbox. In order to use the serial port on the guest machine, we need to map the serial port in the host machine to guest machine. Then we found when the serial port under windows[host] won’t work as long as the linux[guest] is working . Another issue is the /dev/ttyS0 device will be generated automatically after booting , however, it requires root access to manipulate other wise the port will reject any requests from our program.