Problem Set 1 Exercise #24: Lifts

Reference: Lecture 3 notes

Learning objective: Selection statements

Estimated completion time: 45 minutes

Problem statement:

[Past Year CS1101 Sit-in Lab Question]

Suppose you are to operate two lifts. Write a program **lifts.c** that reads two lines of operation instructions and moves lifts according to the instructions. The two lifts are both initially positioned at level 1 and it takes 2 seconds for a lift to move one level up or down. Each instruction operates on one lift only and contains 3 integers, e.g.:

```
1 3 6
```

The meaning of each integer in the above instruction is as follows:

- **First number** (*lift number*, either 1 or 2) indicates one of the two lifts to operate on.
- **Second number** (*from* level) indicates which level a passenger presses the button of that lift. The lift would have to travel from where it currently is to that level to pick up that person. The *from* level could be the same as the level where the lift is currently at, in which case there is no need for the lift to move.
- **Third number** (*to* level) indicates which level a passenger wants to go. You can assume that *from* level is always different from *to* level and therefore, no input validation is needed.

For example, let's assume that lift 1 is currently at level 1 and the first instruction is 1 3 6. Hence lift 1 has to move from level 1 to level 3 to pick up the passenger first and then moves to level 6 where the passenger will alight. In brief, lift 1 takes (2+3) * 2 seconds to finish movement and ends at level 6 (a lift will stop at to level and never move without a further instruction).

As another example, assume that the second instruction is 2 6 2 and lift 2 is currently at level 1. Hence lift 2 will move upward to level 6 to pick up a passenger first and then move down to level 2 to let the passenger alight. In total, it takes (5+4) * 2 seconds to finish movement and stops at level 2.

Your program is to read two instructions one by one and print out the time taken for each lift to move and the final position of each lift. Take note of the case that two instructions may operate on the same lift.

Sample run #1:

```
Enter 1st instruction: 2 5 8
Enter 2nd instruction: 1 9 7
Lift 1 took 20 sec. and ended at level 7
Lift 2 took 14 sec. and ended at level 8
```

Sample run #2:

```
Enter 1st instruction: 1 9 7
Enter 2nd instruction: 1 3 10
Lift 1 took 42 sec. and ended at level 10
Lift 2 took 0 sec. and ended at level 1
```