



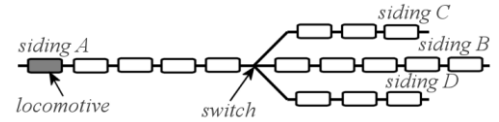
Problem 15

Railway Shunting Crew

15 points (+3 point bonus)

JAVA: program name must be prob15.class
 C/C++ program name must be: prob15.exe

Task Description



A railway shunting crew must fulfill orders for the formation of departing trains from the rail cars in its sidings. There are four sidings, lettered A, B, C and D, with a limited number of positions that a rail car may occupy: five each for A and B, three each for C and D. The formation order will specify the sequence of rail cars to be connected to the locomotive that occupies the outmost position of siding A. The train will be formed from five of the eight cars sitting in the sidings in the order specified. Rail cars may only move to or from siding A. This means, for example, that a car cannot move directly from siding C to siding D. Instead, it must first move from siding C to siding A (where a free space must therefore be available), then to siding D. In other words, all valid moves must have siding A as the source or destination.

Write a program that prints a series of valid rail car movements that fulfills the formation order.

A three-point bonus will be awarded to the team(s) with the most efficient (i.e. fewest moves) average solution for all tested data sets.

Program Input

The input consists of three lines. The first two lines represent the initial configuration of rail cars on the sidings. The representation is logical, not physical. The logical siding layout looks like this:

```
AAAAA+BBBBB
CCC^DDD
```

The + and ^ characters represent the switch. The third line represents the formation order.

```
L-----+86321
 457^----
L12345
```

also try these:

```
L-----+35841      L-----+26381
 267^----          457^----
L12846              L41732
```

Program Output

The program must print the siding configuration at each step from initial configuration to fulfillment, with a blank line between each step. Only one car may move per step. Many correct solutions are possible. It is also possible to return to a previously visited configuration through a long sequence of moves. However, revisiting a previous configuration is a waste of the shunting crew's time (never mind the judges) and will be considered an incorrect solution. In the final train configuration, one of the rail cars must occupy the + location of the switch. The switch must remain unoccupied in all other steps. The program should complete within 15-20 seconds. Programs that do not complete within 60 seconds on a judge's machine will be considered incorrect.

<pre>L-----+86321 457^----</pre>	<pre>L7-----321 45-^-68</pre>	<pre>L54--+-21 3--^768</pre>	<pre>L547-+----- 321^-68</pre>	<pre>L12--+-47 3--^568</pre>
<pre>L8-----6321 457^----</pre>	<pre>L-----+321 45-^768</pre>	<pre>L542-+----1 3--^768</pre>	<pre>L54--+----7 321^-68</pre>	<pre>L123-+-47 ---^568</pre>
<pre>L-----+6321 457^--8</pre>	<pre>L5-----321 4--^768</pre>	<pre>L54--+----1 32-^768</pre>	<pre>L5-----47 321^-68</pre>	<pre>L1234+----7 ---^568</pre>
<pre>L6-----321 457^--8</pre>	<pre>L54-----321 ---^768</pre>	<pre>L541-+----- 32-^768</pre>	<pre>L-----+47 321^568</pre>	<pre>L12345----7 ---^-68</pre>
<pre>L-----+321 457^-68</pre>	<pre>L543-+-21 ---^768</pre>	<pre>L54--+----- 321^768</pre>	<pre>L1--+-47 32-^568</pre>	<pre>23 moves.</pre>