

## Introduction

A well-known shipping company has a distribution center in central Texas. Packages arrive at the truck bay by conveyor belt. There is room at the truck bay for two stacks of packages, which is where they are stacked before being loaded onto the truck. You will write a program to do the stacking.

When a package reaches the end of the conveyor it must be placed on the stack with a top surface area that most closely matches the package size. However, a package must not be placed on a stack if its dimensions exceed the length or width of the top of the stack. The floor space for each stack is 120 cm by 120 cm and no packages will be too large to fit in that space. A package should be rotated left or right (but not turned up on its side) to fit. Also, a package cannot be placed on a stack if it would cause the stack height to exceed 200 cm.

If a package cannot be placed on a stack when the other stack space is empty, then the package becomes the bottom of the other stack. A new stack may not be started if the package will fit on the existing stack. If a package cannot be placed on either stack, then the tallest stack is loaded onto the truck and the package becomes the bottom of a new stack. After all the packages are processed, any remaining stacks are loaded into the truck, in order from the tallest to the shortest.

## Input

The first line of input indicates the number of packages  $N$  that need to be processed. Each line after that will have measurements in centimeters for a single package. Each package is tagged with a single letter and described by three integers: length, width, and height, in that order, in centimeters.

### *Example 1*

```
13
A 59 109 49
B 84 76 58
C 91 54 42
D 43 75 38
E 35 45 25
F 76 89 40
G 26 29 16
H 102 84 46
I 75 75 75
J 71 71 51
K 101 82 42
L 78 88 58
M 77 87 57
```

### *Example 2*

```
14
A 101 83 67
B 82 63 72
C 58 79 70
D 81 55 39
E 80 101 65
F 57 85 51
G 75 46 68
H 97 69 63
I 65 91 64
J 56 82 72
K 65 71 69
L 44 97 63
M 91 43 65
N 41 84 72
```

## Output

The program must print one line for each stack that is loaded into the truck. The stacks must be printed in the order they are loaded. For each stack, the program must print the package tags from bottom to top.

### *Example 1*

```
A C D E
B G
F I J
H K L
M
```

### *Example 2*

```
A B D
C G
H I K
L M N
E F J
```

