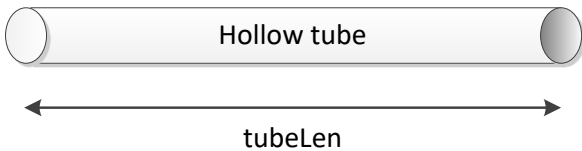


Suppose we have a collection of solid cylindrical pins with discrete lengths. The lengths of the cylindrical pins are stored in a vector of unsigned integers.



We want to pack/store the cylindrical pins into the smallest number of **fixed-length** cylindrical tubes.



Design a program to find the smallest number of fixed-length tubes required to store all the pins, and print the assignment of the pins to each tube. **This problem can be solved using recursion and backtracking.** Example outputs of the program:

```
Select D:\Work\TEACH\EE2331 - C-Plus-Plus\2020-01\Project-2020-01\De...
Lengths of cylindrical pins (cm) :
 4, 10, 7, 12, 6, 10, 10, 8, 5, 13,
13, 11, 3, 14,

-----
tubeLen = 22 cm
Tube 1 : len = 22, pins : 14, 8,
Tube 2 : len = 22, pins : 13, 7,
Tube 3 : len = 22, pins : 13, 6, 3,
Tube 4 : len = 22, pins : 12, 10,
Tube 5 : len = 22, pins : 11, 10,
Tube 6 : len = 22, pins : 10, 5, 4,
Total no. of pins = 14; space utilization = 95.4545%

-----
tubeLen = 19 cm
Tube 1 : len = 19, pins : 14, 5,
Tube 2 : len = 19, pins : 13, 6,
Tube 3 : len = 19, pins : 13, 4,
Tube 4 : len = 19, pins : 12, 7,
Tube 5 : len = 19, pins : 11, 8,
Tube 6 : len = 19, pins : 10, 3,
Tube 7 : len = 19, pins : 10,
Tube 8 : len = 19, pins : 10,
Total no. of pins = 14; space utilization = 82.8947%

-----
tubeLen = 16 cm
Tube 1 : len = 16, pins : 14,
Tube 2 : len = 16, pins : 13, 3,
Tube 3 : len = 16, pins : 13,
Tube 4 : len = 16, pins : 12, 4,
Tube 5 : len = 16, pins : 11, 5,
Tube 6 : len = 16, pins : 10, 6,
Tube 7 : len = 16, pins : 10,
Tube 8 : len = 16, pins : 10,
Tube 9 : len = 16, pins : 8, 7,
Total no. of pins = 14; space utilization = 87.5%

-----
tubeLen = 13 cm
No solution.
Press any key to continue . . .
```

The minimum number of tubes and space utilization are unique for a give set of test data, but the **assignment of the pins to the tubes is not unique.**