COMP 6651: Programming Assignment 4

Winter 2021

Submission is due by February 21 at 23:55

Timelimit: 2 sec (C/C++), 4 sec (Java), 12 sec (python)

It is Saint Valentine's day and love is in the air at the Overlook Hotel. Jack Torrance feels madly in love with his wife. He decides to spend B dollars on creating a gift basket for his wife Wendy. He goes to a shop and identifies n different potential gifts that Wendy would be happy to receive. Given prices of n different gifts, find out how many different maximal combinations (i.e., gift baskets), choosing at most one of each gift, fall within Jack's budget. A valid combination (gift basket) must have total price no more than the budget, and the unused amount (budget − total price) must be less than the price of any gift that was not selected (otherwise he could add it to the gift basket).

Example. Suppose that the budget is 25 dollars, and the prices of 6 different gifts are (whole dollar amounts only)

Gift name	A	B	C	D	H	J
Gift price	8	9	8	7	16	5

Then the possible gift baskets are:

- ABC, BH with total price 25;
- ABD, AH, BCD, CH with total price 24;
- ACD, DH with total price 23;
- ABJ, BCJ with total price 22;
- ACJ, BDJ, HJ with total price 21;
- ADJ, CDJ with total price 20.

There are no other maximal gift baskets. Thus, the answer is 15 combinations for this input.

End of example.

Input

There are several test cases in a single input. The input begins with a line containing an integer value T specifying the number of test cases to follow ($1 \leq T \leq 1000$). Each test case

begins with a line containing two integer values n and B representing the number of gifts ($1 \leq n \leq 30$) and the dollar amount of Jack's budget ($1 \leq B \leq 1000$), respectively. The two values are separated by one or more spaces. The remainder of the test case contains one or more lines consisting of one or more integers representing the cost of each gift. There will be total of n values specified. The cost of the gift is always at least 1. The input values are such that the output fits within a 32-bit integer.

Output

For each test case, the output will be a single line consisting of the test case number (starting with 1), followed by a single space and then the number of combinations for that test case.

Sample Input	**Sample Output**
2 6 25 8 9 8 7 16 5 30 250 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 15 2 16509438