Roach Invasion

On the alien planet, Nightfall, human settlers have run into a pesky native life form that is very similar to the cockroaches of Earth. Every night, the roaches swarm the food stockpiles. The alien roaches have an internal communication system that allows them to synchronize their attack waves. They only attack in groups.

The humans are not without resources however. They have an advanced motion detection system that allows them to know how many roaches will attack at any given minute through the night. They have also discovered a plant, native to Nightfall, that produces a natural poison that kills the alien roaches with no side effects to humans. This plant can be prodded to release its anti-roach chemical at will. However, the number of roaches affected by the poison depends on the number of minutes since the last release of poison. Only roaches that arrive at the minute of the prodding are affected by the poison. The longer they wait, up to some maximum, the more roaches are killed by the poison. At the start of a set of attacks, the plant starts at the beginning of its charge cycle.

The humans can stomp on the roaches not killed by the poison, provided the number is low enough. They need a computer program that will take the list of numbers of roaches arriving each minute, and the number of roaches that can be killed by the poisonous plant, given the wait time. Then it needs to tell them when to use the poisonous plant to minimize the number of roaches that need to be stepped on.

For example, if the motion detector indicates that there will be roaches arriving in waves of { 6, 10, 3, 5, 1, 32 } over the next 6 minutes, and the plant is able to kill { 1, 2, 4, 8, 16, 32 } roaches after 1, 2, 3, 4, 5, or 6 minutes respectively, then the program needs to tell the humans which minutes to prod the plant, such that the number of roaches not killed by the plant is minimized.

If the humans prod the plan every minute, then one roach will be killed each minute by the poison, leaving $(5 + 9 + 2 + 4 + 0 + 31 = 51)$ roaches to be squished. However, waiting until the sixth minute to prod the plant will kill all 32 in the last wave, leaving the humans with $(6 + 10 + 3 + 5 + 1 + 0 = 25)$ roaches to squish. Your program must find the BEST timings.

The input file will contain four lines. The first line will contain a single number indicating the number of waves of roaches. The second line will contain a list of space separated integers, corresponding to the number of roaches to arrive at each minute. The number of waves will be less than 60. Each wave will have at most 100 roaches. The third line will contain a single number indicating the maximum number of minutes that the plant will charge. The fourth line will contain a list of space separated integers, corresponding to the number of roaches killed by the plant after waiting a number of minutes. The first number corresponds to a one minute pause, the second is for two minutes, etc. Wait times larger than the last position in this list only kill the number listed last. There will be at most 15 numbers in this list. No number in this list will be larger than 100.

The output file should contain one line. The first number on the line will be the total number of roaches that must be squished by the humans in the optimal solution. The rest of the line will be the minutes at which the plant must be prodded to produce this result. Each value on the line should be

space separated. The last value may have a trailing space, but it is not required.

Examples

input.txt
6$
6 10 3 5 1 32$
6$
1 2 4 8 16 32$

output.txt
25 6$

input.txt
6$
2 12 7 5 3 6$
4$
1 2 4 8$

output.txt
27 2 6$

input.txt
21$
36 14 53 29 4 29 64 33 34 55 45 65 19 54 44 1 63 56 1 41 29$
6$
1 2 3 5 8 13$

output.txt
727 3 9 15 21$