PROB3: MATCH

Be a match maker.

DESCRIPTION

The dating service MatchMaker.com has a list of men and a list of women. The number of men is equal to the number of women. In addition to their names, MatchMaker.com keeps track of two attributes about each of their clients: the person's IQ (intelligence quotient) and the person's height. MatchMaker.com wishes to match each man with a woman in an optimal way, so that the deviations of the two attributes in the resulting man / woman pairs are minimized.

INPUT: prob3.dat

The input file will consist of one or more data sets of the form

```
N
WOMAN_NAME(1) WOMAN_IQ(1) WOMAN_HEIGHT(1)
WOMAN_NAME(2) WOMAN_IQ(2) WOMAN_HEIGHT(2)
.
.
.
WOMAN_NAME(N) WOMAN_IQ(N) WOMAN_HEIGHT(N)
MAN_NAME(1) MAN_IQ(1) MAN_HEIGHT(1)
MAN_NAME(2) MAN_IQ(2) MAN_HEIGHT(2)
.
.
.
MAN_NAME(N) MAN_IQ(N) MAN_HEIGHT(N)
```

`N` will be a positive integer not larger than 13. The `NAME` of men and women will consist of no more than 11 lower case alphanumeric characters (a-z, 0-9). The `IQ` will be an integer in the range 10..199. The `HEIGHT` will be an integer in the range 145..189. One or more blank spaces will separate the `NAME`, `IQ` and `HEIGHT` values, but there will be no leading or trailing white space.

Here is an example of an input file:

```
       column   11111111112
       12345678901234567890
line 1:7[EOL]
     2:mindy    70 145[EOL]
     3:jennifer 80 155[EOL]
     4:kathy    90 165[EOL]
```

```
 5:allison 100 175[EOL]
 6:alice   105  156[EOL]
 7:jenna   110  158[EOL]
 8:mary    115  160[EOL]
 9:john   110   175[EOL]
10:jack   85    170[EOL]
11:steve  115   170[EOL]
12:bill   105   149[EOL]
13:bob     80   155[EOL]
14:thomas  75   179[EOL]
15:mike   120   168[EOL]
16:3[EOL]
17:mindy 100   180[EOL]
18:jenny 120   155[EOL]
19:kathy 105   168[EOL]
20:jack 104    169[EOL]
21:bob  119    156[EOL]
22:bill  99    179[EOL]
  :[EOF]
```

OUTPUT: **prob3.out**

For each N man-woman pairs in the input data set, there will be N+2 lines of output in the format:

```
N
WOMAN_PAIR_NAME(1) MAN_PAIR_NAME(1) PAIR_DEVIATION(1)
WOMAN_PAIR_NAME(2) MAN_PAIR_NAME(2) PAIR_DEVIATION(2)
.
.
.
WOMAN_PAIR_NAME(N) MAN_PAIR_NAME(N) PAIR_DEVIATION(N)
TOTAL_DEVIATION
```

Each woman-man pair name is separated by exactly one blank space. The PAIR_DEVIATION is defined as the absolute value of the difference in IQ, plus the absolute value of the difference in height of the pair.

The TOTAL_DEVIATION is the sum of the PAIR_DEVIATION. The crucial constraint on the output is that the pairing should minimize the TOTAL_DEVIATION compared to all possible man-woman pairings. Note that there may be more than one such minimal configuration.

One of several possible correct outputs corresponding to the example input would be:

```
       column   1111111111222222223
       123456789012345678901234567890
line 1:Program 3 by team 0[EOL]
     2:7[EOL]
     3:mindy thomas 39[EOL]
```

```
 4:jenna mike 20[EOL]
 5:allison john 10[EOL]
 6:kathy jack 10[EOL]
 7:mary steve 10[EOL]
 8:alice bill 7[EOL]
 9:jennifer bob 0[EOL]
10:96[EOL]
11:3[EOL]
12:jenny bob 2[EOL]
13:kathy jack 2[EOL]
14:mindy bill 2[EOL]
15:6[EOL]
16:End of program 3 by team 0[EOL]
  :[EOF]
```