British Informatics Olympiad Final

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Selection — Part Two

There are n jobs available in an organisation and coincidentally n candidates. Each candidate has a measure of suitability for each job. The 'optimal assignment' problem is to fit the candidates to the jobs in the best possible way. Your task is to write a program to solve this.

The input data will be a single number n indicating the number of candidates/jobs, followed by an n by n array. You can think of the columns representing the candidates, the rows the jobs, and the numbers a measure of suitability. Once again n will be between 1 and 32, and the elements in the array between 0 and 32.

Each candidate should be assigned to one (and only one) job. The value of assigning all these candidates is the sum of the suitabilities for each assignment. An assignment is optimal if it is not possible to assign the jobs and get a lower overall value.

You should output the overall value of your optimal assignment, followed by the assignment itself.

Example

```
5
4  10 8  10 15
10 1  2  13 2
9  16 22 10 12
4  10 4  2  10
7  10 10 1  18
```

```
22
(1,1)
(2,2)
(3,4)
(4,5)
(5,3)
```

[Note: In general you will not be able to give every candidate their optimal job. In the given example candidates 2, 3 and 5 all prefer job 2...]