## The FA cup

## English

## Vietnamese

The FA Cup is the oldest footbal cup. All the matches will play on knock-out rule. There are $2^{\wedge} \mathrm{N}$ teams in the cup playing in $N$ rounds. There are $2^{\wedge}(N-1)$ matches in the first round and $2^{\wedge}(\mathrm{N}-1)$ winners advances to the second round. And so on. Until there is only a team left. This is the champion.

Matches in the first round are numbered as 1 to $2^{\wedge}(\mathrm{N}-1)$ : team 1 vs team 2, team 3 vs team $4, \ldots$, and team $\left(2^{\wedge} N-1\right)$ vs team $2^{\wedge} N$. Matches in the second round are: match 1 's winner vs match 2 's winner, ..., match $2^{\wedge}(\mathrm{N}-2)$ 's winner vs match $2^{\wedge}(\mathrm{N}-1)$ winner.

Matches in the second round are numbered as 1 to $2^{\wedge}(\mathrm{N}-2)$ and matches in the third round are: match 1 's winner vs match $2^{\prime}$ 's winner, ..., match $2^{\wedge}(\mathrm{N}-3)$ 's winner vs match $2^{\wedge}(\mathrm{N}-2)$ winner.

There is no tie in a game (if a game is tied at the end of regulation time it goes into extra time and/or penalty shootout). Given the fixtures and result's probability of every matches. Your task is to sort the teams decreasingly according to the chance of becoming champion.

## Input

- The first line containg an integer $N(1 \leq N \leq 8)$.
- In the next lines there is a matrix $P$ of size $\left(2^{\wedge} N\right)^{*}\left(2^{\wedge} N\right)$ containing integers in the interval $[0,100]$. $P[x, y]$ is the percentage that team $x$ can defeat team $y$. The sum of $P[x, y]$ and $P[y$, $x]$ is always 100 and $P[x, x]=0$ for all $x$.


## Output

Print out $2^{\wedge} \mathrm{N}$ lines. Each line contains the index of a team sorted in deceasing order according to the chance of become champion for a team. If there are two teams with the same chance of becoming champion, print the team with smaller index first.

## Example

## Input

2
0905050
1001010
5090050
5090500

## Output

Let the teams be MANCHESTER, FULHAM, ARSENAL, CHELSEA. The giants MANCHESTER, ARSENAL, CHELSEA all have $90 \%$ winning chance when vs FULHAM. When the three teams plays with one another, the winning chance is equally $50 \%-50 \%$. However, because MANCHESTER has advantages in playing schedule, they have the highest chance to become champion.


MANCHESTER is the champion if:

- MANCHESTER wins over FULHAM, MANCHESTER wins over ARSENAL and ASERNAL wins over CHELSEA. This probability is $90 \%$ * $50 \%$ * $50 \%=22.5 \%$
- MANCHESTER wins over FULHAM, MANCHESTER wins over CHELSEA and CHELSEA wins over ARSENAL. This probability is $90 \%$ * $50 \%$ * $50 \%=22.5 \%$

MANCHESTER has a total of $45 \%$ chance to become FA Cup's winner.
ARSERNAL wins FA cup if:

- ARSENAL wins over CHELSEA, ARSENAL wins over MANCHESTER, MANCHESTER wins over FULHAM. This probability is $50 \%$ * $50 \%$ * $90 \%=22.5 \%$
- ARSENAL wins over CHELSEA, ARSENAL wins over FULHAM, FULHAM wins over MANCHESTER. This probability is $50 \%$ * $90 \%$ * $10 \%=4.5 \%$

ARSENAL has a total of $27 \%$ chance to become FA Cup's winner.
CHELSEA's chance to win FA Cup is calculated in the same way as ARSENAL and is also $27 \%$.
FULHAM wins FA Cup if:

- FULHAM wins over MANCHESTER, FULHAM wins over ARSENAL and ARSENAL wins over CHELSEA. This probability is $10 \%$ * $10 \%$ * $50 \%=0.5 \%$
- FULHAM wins over MANCHESTER, FULHAM wins over CHELSEA and CHELSEA wins over ARSENAL. This probability is $10 \%$ * $10 \%$ * $50 \%=0.5 \%$

So FULHAM has only $1 \%$ chance to become FA Cup's winner.

