

Contest Duration: 2018-01-14(Sun) 20:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20180114T2100&p1=248>) ~ 2018-01-14(Sun) 22:10 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20180114T2310&p1=248>) (local time) (130 minutes)

iso=20180114T2100&p1=248) ~ 2018-01-14(Sun) 22:10 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20180114T2310&p1=248>) (local time) (130 minutes)

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Time Limit: 2 sec / Memory Limit: 512 MB

Score : 1100 points

Problem Statement

Let $f(A, B)$, where A and B are positive integers, be the string satisfying the following conditions:

- $f(A, B)$ has length $A + B$;
- $f(A, B)$ contains exactly A letters 'A' and exactly B letters 'B' ;
- The length of the longest substring of $f(A, B)$ consisting of equal letters (ex., 'AAAAA' or 'BBBBB') is as small as possible under the conditions above;
- $f(A, B)$ is the lexicographically smallest string satisfying the conditions above.

For example, $f(2, 3) = \text{'BABAB'}$, and $f(6, 4) = \text{'AABAABAABB'}$.

Answer Q queries: find the substring of $f(A_i, B_i)$ from position C_i to position D_i (1-based).

Constraints

- $1 \leq Q \leq 10^3$
- $1 \leq A_i, B_i \leq 5 \times 10^8$
- $1 \leq C_i \leq D_i \leq A_i + B_i$
- $D_i - C_i + 1 \leq 100$
- All input values are integers.

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Partial Score

- 500 points will be awarded for passing the testset satisfying $1 \leq A_i, B_i \leq 10^3$.

Input

Input is given from Standard Input in the following format:

```
Q
A1 B1 C1 D1
A2 B2 C2 D2
:
AQ BQ CQ DQ
```

Output

For each query i in order of input, print a line containing the substring of $f(A_i, B_i)$ from position C_i to position D_i (1-based).

Sample Input 1

[Copy](#)

```
5
2 3 1 5
6 4 1 10
2 3 4 4
6 4 3 7
8 10 5 8
```

[Copy](#)

Sample Output 1

[Copy](#)

```
BABAB
AABAABAABB
A
BAABA
ABAB
```

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#telegram)

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