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Sommersemester 2017

Woche 08 – (Adv.) Competitive Programming

Abgabe 12.06.2017 17:00 Uhr, über das Judge-Interface

Aufgabe 1 (gardenv2). (100 Points – 5 seconds timelimit)

Following up on their previous request, facility management at HPI has asked you to solve another task: This time, given the complete dataset from the previous task and a starting point, they have asked you to identify the point which is furthest away in terms of the number of intermediate points on the connecting path (that is, you should find an endpoint so that the hops on the shortest path from start to end is maximal).

Input Due to the size of the input, all input is given in binary format, see <https://gist.github.com/TimNN/3f91b744135aac083c76ceb073c10fe7> for instructions on how to do that in C++. The input consists solely of 32 bit unsigned integers.

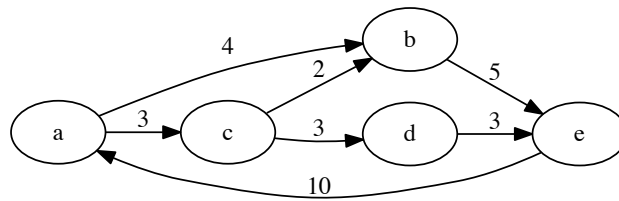
First, read n , the number of test cases. Then, for each test case read k ($0 < k \leq 1024$) the number of points in the network and s ($0 \leq s < k$) the start point, followed by the distance matrix: The distance matrix d contains k^2 entries and the distance from a to b can be found at $d[a \cdot k + b]$. You may assume that the graph is *strongly connected*.

Output For each test case print one line (in text format) containing the endpoint id as well as the number of edges in the shortest path from start to end.

Points There are three groups of test sets:

- *easy*: For the first group worth 25 Points, you can assume, that $k \leq 16$.
- *medium*: For the second group worth 35 Points, you can assume, that $k \leq 512$.
- *hard*: For the third group of test sets worth 40 Points, there are no additional assumptions.

Sample Consider the following graph (which your program of course doesn't has access to):



Your program would initially receive the following input (with letters replaced by numbers and in binary format):

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1
5
b
// The matrix below

```

Then, your program would print one possible answer (with letters replaced by numbers):

```
d 4
```

The complete data set collected by facility management for the graph above would be:

from - to	a	b	c	d	e
a	0	4	3	6	9
b	15	0	18	21	5
c	16	2	0	3	6
d	13	17	16	0	3
e	10	14	13	16	0