CSC 226

Algorithms and Data Structures: II
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ECS 516

All-Pairs Shortest Paths

A dynamic programming approach

All-Pairs shortest paths in weighted digraphs without negative-weight cycles

- Variation of Floyd-Warshall algorithm
- Algorithm-design technique: dynamic programming

Algorithmic Paradigms

- → Greedy Build up a solution incrementally, myopically optimizing some local criterion.
- → Divide-and-Conquer Break up a problem into independent subproblems, solve each subproblem, and combine solutions to subproblems to form solution to original problem.
- → Dynamic Programming Break up a problem into a series of overlapping subproblems, and build up solutions to larger and larger subproblems.

fancy name for caching intermediate results in a table

Dynamic Programming History

- → Bellman Pioneered the systematic study in dynamic programming in the 1950s.
- **→** Etymology
 - Dynamic programming = planning over time.
 - Secretary of Defense was hostile to mathematical research.
 - Bellman sought an impressive name to avoid confrontation.



THE THEORY OF DYNAMIC PROGRAMMING

RICHARD BELLMAN

 Introduction. Before turning to a discussion of some representative problems which will permit us to exhibit various mathematical features of the theory, let us present a brief survey of the fundamental concepts, hopes, and aspirations of dynamic programming.

To begin with, the theory was created to treat the mathematical problems arising from the study of various multi-stage decision processes, which may roughly be described in the following way: We have a physical system whose state at any time t is determined by a set of quantities which we call state parameters, or state variables. At certain times, which may be prescribed in advance, or which may be determined by the process itself, we are called upon to make decisions which will affect the state of the system. These decisions are equivalent to transformations of the state variables, the choice of a decision being identical with the choice of a transformation. The outcome of the preceding decisions is to be used to guide the choice of future ones, with the purpose of the whole process that of maximizing some function of the parameters describing the final state.

Examples of processes fitting this loose description are furnished by virtually every phase of modern life, from the planning of industrial production lines to the scheduling of patients at a medical clinic; from the determination of long-term investment programs for universities to the determination of a replacement policy for machinery in factories; from the programming of training policies for skilled and unskilled labor to the choice of optimal purchasing and inventory policies for department stores and military establishments.

Algorithm Design Technique Dynamic Programming

Simple subproblems

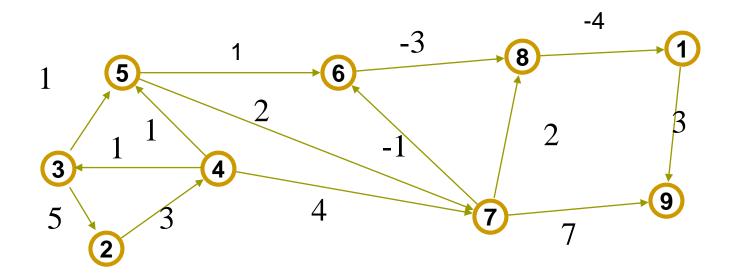
- There is a way to break down the problem into simple subproblems of similar structure
- The subproblems can easily be defined with a few indices (i.e., i, j, k)

Subproblem optimality

 An optimal solution to the global problem is a composition of optimal subproblem solutions using a simple combining operation

Subproblem overlap

 Optimal solutions to unrelated subproblems can have subproblems in common. Such overlap is recognized and improves the efficiency significantly



```
Input: An edge-weighted digraph G=(V,E)
  without negative-weight cycles. Further
  V={1,2,...,n}
```

Output: Matrix D s.t. for all i,j∈V, D[i,j]
 denotes the length of a shortest path from
 i to j

Terminology and Notation

- → Let $v_1, v_2, ..., v_l$ be the vertices of a path p in directed graph G.
- → Then the vertices $v_2, v_3, ..., v_{l-1}$ are called intermediate vertices of p.
- + Let $d_{ij}^{(k)}$ be the length of a shortest path from i to j such that all intermediate vertices that are on the path are members of the set $\{1, 2, ..., k\}$.
- → Then $d_{ij}^{(0)}$ is the weight of the edge from i to j if such an edge exists, $+\infty$ otherwise
- + $d_{ij}^{(n)}$ is the shortest path from i to j

Observations

1.A shortest path does not contain the same vertex twice.

Proof. Otherwise the path would contain a cycle, and removing the cycle would shorten the path.

Observations

2. If vertex k is not on a shortest path from i to j with intermediate vertices from $\{1, 2, ..., k\}$ then $d_{ij}^{(k)} = d_{ij}^{(k-1)}$.

Proof. Since k is *not* on a shortest path from i to j with intermediate vertices from $\{1, 2, ..., k\}$, adding k to the set $\{1, 2, ..., k-1\}$ of intermediate vertices will not improve the length of the shortest path.

Observations

3. If vertex k is on a shortest path from i to j with intermediate vertices from $\{1, 2, ..., k\}$ then

$$d_{ij}^{(k)} = d_{ik}^{(k-1)} + d_{kj}^{(k-1)}$$

Proof. k is somewhere on the shortest path from i to j. Let us consider the shortest paths from (1) i to k and (2) k to j. The internal vertex set for these is $\{1,2,...,k-1\}$ since k is an external vertex for both paths. Thus,

$$d_{ij}^{(k)} = d_{ik}^{(k-1)} + d_{kj}^{(k-1)}$$

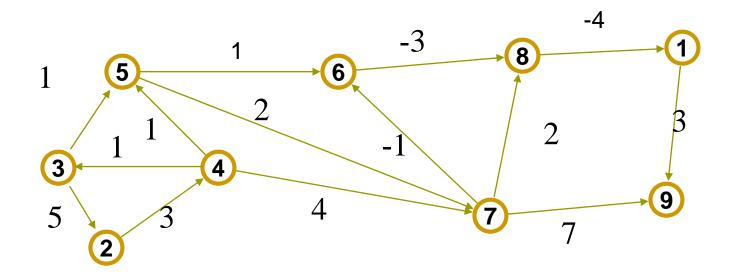
We conclude for a shortest path from i to j with intermediate vertices from $\{1, 2, ..., k\}$:

$$d_{ij}^{(k)} = \min\{d_{ij}^{(k-1)}, d_{ik}^{(k-1)} + d_{kj}^{(k-1)}\}\$$

Developing the Dynamic Programming Algorithm

- + Let D be an $n \times n$ matrix for each pair of vertices in the graph
- → Initially, each cell D[i,j] contains the weight of edge (i,j), if existent, 0 if i=j, and $+\infty$ otherwise.
- We then iterate over the included intermediate vertices and update each cell for the (possibly) improved paths.
- → Once all vertices are included in the set of intermediate vertices, D[i,j] contains the weight of a shortest path from i to j if existent, 0 if i = j, and $+\infty$ otherwise.

```
// Initializing
for i ←1 to n do
   for j ←1 to n do
    if i=j then
        D[i,j] \leftarrow 0
    if (i,j)∈G then
        D[i,j] \leftarrow w((i,j))
    else
    D[i,j] \leftarrow +\infty
```

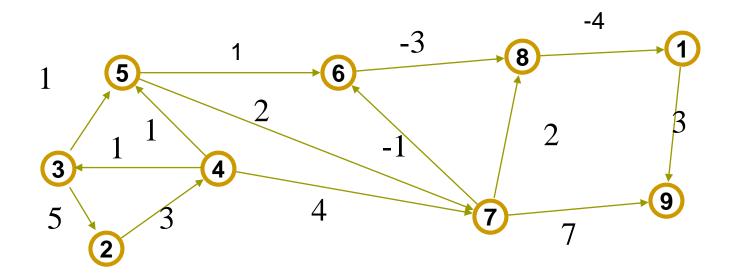


	1	2	3	4	5	6	7	8	9
1	0								
2		0							
3			0						
4				0					
5					0				
6						0			
7							0		
8								0	
9									0

	1	2	3	4	5	6	7	8	9
1	0								3
2		0		3					
3		5	0		1				
4			1	0	1		4		
5					0	1	2		
6						0		-3	
7						-1	0	2	7
8	-4							0	
9									0

	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

```
//Compute shortest paths
for k ← 1 to n do //k is the latest included vertex
for i ← 1 to n do //path starts at i
    for j ← 1 to n do //path ends at j
        if i≠k and j≠k then
        D[i,j] ← min{D[i,j],D[i,k]+D[k,j]}
return D
```



	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+8	1	+8	+8	+8	+8
4	+∞	+∞	1	0	1	8	4	+8	+8
5	+∞	+∞	+8	8	0	1	2	+8	+8
6	+∞	+∞	+∞	+8	+8	0	+8	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+8	+8	+8	+∞	+∞	0

K=1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+8	+∞	+∞
3	+∞	5	0	+∞	1	+8	8	+8	+∞
4	+∞	+∞	1	0	1	+8	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	+∞	+∞	+8	+∞	+∞
3	+8	5	0	8	1	+8	8	+∞	+∞
4	8	+8	1	0	1	+8	4	+8	+∞
5	+	+8	8	8	0	1	2	+∞	+∞
6	+8	+8	8	+8	+∞	0	+8	-3	+∞
7	+8	+8	+8	+8	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+00	+∞	+∞	+∞	+∞	3
2	+∞	0	+8	3	+8	+∞	+∞	+	+8
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+8	8	8	+8
4	+∞	+∞	1	0	1	+∞	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+8
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	+8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+00	+∞	+∞	3
2	+8	0	+∞	3	+8	+∞	+8	+∞	+∞
3	+8	5	0	8	1	+8	8	+∞	+∞
4	8	8	1	0	1	+8	4	+8	+∞
5	+8	+8	+∞	+8	0	1	2	+∞	+∞
6	+8	+8	+∞	+8	8	0	+8	-3	+∞
7	+8	+8	+∞	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	+8	1	8	8	+∞	+∞
4	+8	+8	1	0	1	8	4	+8	+∞
5	+	+8	8	+	0	1	2	+∞	+∞
6	+8	+8	8	+8	8	0	+8	-3	+∞
7	+8	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+8	1	+∞	+8	8	+8
4	+∞	+∞	1	0	1	+∞	4	+8	+8
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+8	+∞	+∞
3	+∞	5	0	+∞	1	+∞	8	+∞	+∞
4	+∞	8	1	0	1	+∞	4	+8	+∞
5	+∞	+8	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+∞	+∞	0	8	-3	+∞
7	+∞	+8	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+∞	+∞	+∞	+8	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+∞	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	+8	1	+8	+8	+8	+∞
4	+8	+8	1	0	1	8	4	+8	+8
5	+8	+8	+∞	+8	0	1	2	+8	+8
6	+8	+8	+∞	+8	+8	0	+8	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+8	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+∞	+∞	+∞	+∞	+∞	3
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3	+8	5	0	+8	1	+8	+8	+∞	+∞
4	8	+8	1	0	1	+8	4	+8	+∞
5	+8	+8	8	+8	0	1	2	+∞	+8
6	+8	+8	8	+8	8	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+8	8	+∞	+∞
4	+∞	+8	1	0	1	+∞	4	+∞	+∞
5	+∞	+8	+8	+8	0	1	2	+∞	+∞
6	+∞	+8	+8	+∞	+∞	0	+8	- 3	+∞
7	+∞	+8	8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+∞
9	+∞	+8	+8	+∞	+8	+∞	+8	+∞	0

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+00	+∞	+∞	+∞	+∞	3
2	+00	0	+∞	93	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+8	+8	+8
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+∞	+∞	3
2	+∞	0	+8	3	8 +	+8	+∞	+∞	+∞
3	+∞	5	0	+8	1	8	8	+∞	+∞
4	+∞	8	1	0	1	8	4	+8	+∞
5	+∞	8	8	+8	0	1	2	+∞	+∞
6	+∞	8	8	+8	+8	0	+8	-3	+∞
7	+∞	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+∞
9	+∞	+8	+8	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+00	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+ 60	+∞	+∞	+8
3	+∞	5	0	+8	1	+∞	8	+8	8
4	+∞	+∞	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	+8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+8	+∞	+∞
3	+∞	5	0	+∞	1	8	8	+∞	+∞
4	+∞	+8	1	0	1	+8	4	+∞	+∞
5	+∞	+8	+8	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+∞	8	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+8	+∞	+∞
3	+∞	5	0	+∞	1	8	8	+∞	+∞
4	+∞	+8	1	0	1	+8	4	+∞	+∞
5	+∞	+8	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+∞	8	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+8	+∞
3	+∞	5	0	+∞	1	+∞	+8	+8	+∞
4	+∞	+∞	1	0	1	+8	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+8	5	0	+8	1	+8	+8	+8	+∞
4	+8	+8	1	0	1	+8	4	+8	+∞
5	+8	+8	8	+8	0	1	2	8	+∞
6	+8	+8	8	+8	8	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	8	+8	+∞	+8	+∞
3	8	5	0	8	1	8	+8	8	+8
4	+8	+8	1	0	1	+8	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+∞
7	+8	+8	+8	+8	8	-1	0	2	7
8	-4	8	+8	8	8	8	+∞	0	+8
9	+∞	+8	+∞	+8	+8	+8	+∞	+8	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+8	+8	+8	+8
4	+∞	+8	1	0	1	+8	4	+8	+8
5	+∞	+8	+∞	+∞	0	1	2	+8	8
6	+∞	+8	+∞	+∞	8	0	+8	- 3	8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	+8	+8	+8	0	8
9	+∞	+8	+∞	+∞	+8	+8	+∞	+8	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	+8	1	8	8	8	+8
4	+∞	+∞	1	0	1	8	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+∞
7	+∞	+∞	+8	+8	8	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	8	8	+8	+8	+8	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8+
3	+∞	5	0	8	1	+8	+8	+8	+∞
4	+∞	+∞	1	0	1	8	4	+8	+∞
5	+∞	+∞	+∞	+8	0	1	2	+8	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	8	+8	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	8	11	8	8	8	+8
4	+∞	+∞	1	0	1	8	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	8	0	+8	-3	+8
7	+∞	+∞	+8	+8	8	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+00	+∞	+∞	3
2	+∞	0	+8	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	8	1	8	8	8	+∞
4	+∞	+∞	1	0	1	8	4	+8	+∞
5	+∞	+∞	+8	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+8	+∞	+8	0	+∞	-3	+∞
7	+∞	+∞	8	+8	8	-1	0	2	7
8	-4	+∞	+8	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+8	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+8	+8	+8	3
2	+∞	0	+8	3	+8	8	+8	8	+8
3	+8	5	0	8	1	8	8	8	+8
4	+∞	+8	1	0	1	8	4	8	+∞
5	+∞	+8	+∞	+8	0	1	2	+	+∞
6	+∞	+8	+∞	+8	8	0	8	- 3	+8
7	+∞	+8	+∞	+8	8	-1	0	2	7
8	-4	+8	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+8	+8	+8	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	+8	+∞	+8	+8	+∞
3	8	5	0	8	1	8	8	8	+∞
4	8	+8	1	0	1	+8	4	8	+∞
5	+8	+8	+8	+8	0	1	2	8	+∞
6	8	+8	8	+8	8	0	8	3	+∞
7	8	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+8	0

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K=1	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+∞	+∞	+∞	+∞	+8	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+8
3	+∞	5	0	+∞	1	+∞	+∞	+8	+8
4	+∞	8	1	0	1	+∞	4	8	8
5	+∞	+8	+∞	+∞	0	1	2	+8	8
6	+∞	+8	+∞	+∞	+∞	0	+∞	-3	8
7	+∞	+8	+∞	+∞	+∞	-1	0	2	7
8	-4	8	+∞	+∞	+8	+∞	+∞	0	8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+∞	+∞	+∞
3	+∞	5	0	8	1	8	8	+8	+8
4	+8	+∞	1	0	1	8	4	+8	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+∞
7	+∞	+∞	+8	+8	8	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+8	+∞	+∞	8
4	+8	+∞	· .	0	1	8	4	+8	+8
5	+∞	+∞	+8	8	0	1	2	+8	+8
6	+∞	+∞	+∞	+8	8	0	+8	-3	+8
7	+∞	+∞	+∞	+8	8	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+8	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	+8	+∞	+∞	+∞	+∞
3	8	5	0	+8	1	+8	8	+∞	+∞
4	8 +	+8	1	0	1	+8	4	+8	+∞
5	+8	+8	+8	+8	0	1	2	+∞	+∞
6	8	+8	8	+8	8	0	+8	-3	+∞
7	8	+8	+8	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+8
3	+∞	5	0	+∞	1	+8	+∞	+∞	8
4	+∞	+∞	1	0	1	+∞	4	+∞	8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+8	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+8	3	+8	+∞	+∞	+∞	+∞
3	+8	5	0	8	1	8	8	8	+∞
4	+8	+8	1	0	1	+80	4	+8	+∞
5	+∞	+8	8	+	0	1	2	+8	+8
6	+∞	+8	8	+8	8	0	+8	-3	+8
7	+∞	+8	8	+8	8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+8	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+8	0	+8	3	+8	+∞	+∞	+∞	+8
3	+8	5	0	8	1	+8	8	+∞	8
4	+8	+8	1	0	1	+8	4	+∞	8
5	+8	+8	8	+8	0	1	2	+∞	8
6	+8	+8	8	+8	8	0	+8	-3	8
7	+8	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	8
9	+8	+∞	+8	+∞	+8	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+8	+8	+8	+8	+∞
3	+∞	5	0	8	1	8	8	8	+8
4	+8	+	1	0	1	8	4	8	+∞
5	+∞	+8	+∞	+∞	0	1	2	8	+∞
6	+∞	+8	+∞	+8	8	0	8	3	+8
7	+∞	+8	+∞	+8	8	-1	0	2	7
8	-4	+8	+∞	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+∞	+∞	+8	+8	+8	+8	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	+8	3	+8	+8	+∞	+8	+∞
3	+8	5	0	8	1	8	8	8	+∞
4	8	8	1	0	1	8	4	+	+∞
5	+∞	+8	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+8	+∞	+8	0	+∞	- 3	+∞
7	+8	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	8	+8	0	+∞
9	+8	+8	+8	+∞	+8	+8	+∞	+8	0

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	K=1	1	2	3	4	5	6	7	8	9
	1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
	2	8	0	+∞	3	+∞	+∞	+∞	+8	+8
	3	8	5	0	+∞	1	+8	+8	8	8
$\left\{ \right.$	4	+8	+∞	1	0	1	+∞	4	+8	+8
	5	8	+∞	+∞	+∞	0	1	2	+8	+8
	6	8	+∞	+∞	+∞	+∞	0	+8	3	8
	7	8	+∞	+∞	+∞	+∞	-1	0	2	7
	8	-4	+∞	+∞	+∞	+∞	+8	+8	0	+8
	9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

j-loop not necessary

```
//Compute shortest paths
for k \leftarrow 1 to n do //k is the latest included vertex
  for i \leftarrow 1 to n do //path starts at i
    if i≠k then
      if D[i,k] < +\infty then
        for j \leftarrow 1 to n do //path ends at j
          if k≠j then
            if D[k,j] < +\infty then
              D[i,j] \leftarrow min\{D[i,j],D[i,k] + D[k,j]\}
return D
```

j

K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+8
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+8
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+8	3	+8	+8	+∞	+∞	+∞
3	+8	5	0	8	1	8	8	8	+∞
4	+∞	8	1	0	1	8	4	+8	+∞
5	+∞	+8	8	+8	0	1	2	+8	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	+8	0	+∞
9	+∞	+∞	+8	+∞	+8	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+8	+8	0	1	2	+8	+∞
6	+∞	+∞	8	+8	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+8	+∞	+∞	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+8	+∞	+∞	+∞	+∞	+∞	0

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K=1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+00	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+8	+8	8	8	8	+8	+8	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8+
3	+∞	5	0	+8	1	+8	+8	+8	+∞
4	+∞	+∞	1	0	1	+8	4	+∞	+8
5	+∞	+8	+∞	+8	0	1	2	+8	+8
6	+∞	+8	+∞	+8	8	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8+
3	+∞	5	0	8	1	8	8	+8	+∞
4	+∞	8	1	0	1	8	4	+8	+∞
5	+∞	8	8	8	0	1	2	+8	+8
6	+∞	8	8	+8	8	0	+8	-3	+∞
7	+∞	+8	+8	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	8	+8	+∞	0	+∞
9	+∞	+8	+∞	+∞	+∞	+8	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+00	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+8	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+8	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+	5	0	+∞	1	+∞	+8	+∞	+
4	+8	+8	1	0	1	+8	4	+∞	+8
5	+8	8	8	+8	0	1	2	+∞	+8
6	+8	8	+8	+8	+8	0	8	-3	+8
7	+8	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+8	8	0	+8
9	+∞	+8	+8	+∞	+∞	+8	+8	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+8	+∞	+∞	+8
3	+8	5	0	+8	1	+8	+∞	+∞	+8
4	+8	8	1	0	1	+8	4	+8	+
5	+8	8	+∞	+8	0	1	2	+8	+8
6	+8	8	+∞	+8	+8	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+∞	+∞	+∞	+∞	0	+∞
9	+∞	+8	+∞	+∞	+∞	+∞	+∞	+∞	0

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•	1	
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K = 1	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+8	+8	+∞	+8
3	+∞	5	0	+8	1	+8	+8	+∞	+8
4	+∞	8	1	0	1	8	4	+∞	+8
5	+∞	+	+∞	+	0	1	2	+∞	+8
6	+∞	+8	+∞	+8	+8	0	8	-3	+8
7	+∞	+8	+∞	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+8	0	+∞/ -1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 1	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+8	+8	+8	+∞	+∞	3
2	+8	0	+∞	3	+8	8	+8	+∞	+8
3	+8	5	0	8	1	8	8	+8	+8
4	+8	8	1	0	1	8	4	+∞	+8
5	+8	8	+∞	+	0	1	2	+∞	+8
6	+8	8	+∞	+8	+8	0	+8	-3	+8
7	+8	8	+∞	+8	+8	-1	0	2	7
8	-4	+8	+∞	+∞	+∞	+8	+∞	0	+∞/ -1
9	+∞	+8	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8
3	+∞	5	0	+8	1	+∞	+8	+∞	8
4	+∞	+∞	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+8
3	+∞	5	0	+∞	1	+∞	+8	+∞	+
4	+∞	+∞	1	0	1	+∞	4	+8	+8
5	+∞	+8	+8	+8	0	1	2	+8	+8
6	+∞	+8	+8	+8	+∞	0	8	- 3	+
7	+∞	+8	+8	+8	+∞	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+8	+8	+∞	+∞	+8	+8	0

K=2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8+
3	+∞	5	0	+8	1	+∞	+∞	+∞	+∞
4	+∞	+8	1	0	1	+8	4	+∞	+∞
5	+∞	+8	+∞	+8	0	1	2	+∞	+8
6	+∞	+8	+∞	+8	+8	0	+∞	-3	+8
7	+∞	+8	+∞	+8	+8	-1	0	2	7
8	-4	+8	+∞	+8	+8	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞ /8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	8+
3	+∞	E 9	0	+∞ /8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	8+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=2	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+8	5	0	+∞ /8	1	+∞	+8	+8	+∞
4	+∞	+8	1	0	1	+∞	4	+∞	8+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞ /8	1	+∞	+∞	+∞	+8
4	+∞	+∞	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+8	+8	+∞	+∞	0	+∞	-3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞ /8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	+∞ /8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+
3	+∞	5	0	+∞ /8	1	+∞	+∞	+∞	+8
4	+∞	+∞	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 2	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+8
3	+∞	5	0	+∞ /8	1	+8	+∞	+∞	+8
4	+∞	+∞	1	0	1	+∞	4	+∞	+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 3	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+8	3	+∞	+∞	+∞	+∞	+∞
3	+8	5	0	8	1	+8	8	+∞	+∞
4	+∞	8	1	0	1	+∞	4	+∞	+∞
5	+∞	+	+8	+∞	0	1	2	+∞	+∞
6	+∞	8	+8	+8	+8	0	+8	-3	+∞
7	+∞	8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+8	+∞	+∞	0	-1
9	+∞	+8	+∞	+∞	+8	+∞	+∞	+∞	0

K = 3	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	8	5	0	8	1	8	8	+8	+∞
4	+8	8	1	0	1	8	4	+∞	+∞
5	+∞	+	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+8	8	+∞	+8	+8	-1	0	2	7
8	-4	+8	+∞	+8	+8	+8	+∞	0	-1
9	+∞	+8	+∞	+∞	+∞	+8	+∞	+∞	0

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K=3	1	2	3	4	5	6	7	8	9
1	0	+8	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	11	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+8	+∞	0	1	2	+∞	+8
6	+∞	+8	+ 8	+8	+∞	0	+8	-3	+8
7	+∞	+8	+8	+8	+∞	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

K=3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+∞	0	-1
9	+∞	+8	+8	+8	+∞	+∞	+∞	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+8	+∞	+∞	+8	+∞	3
2	+∞	0	+8	3	+∞	+∞	+8	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+8	+8	+∞	0	+8	- 3	+8
7	+∞	+∞	+8	+8	+8	-1	0	2	7
8	-4	+∞	+8	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

j

K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	8+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+8	+∞	+∞	+∞	+∞	0

j

K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	8+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+8	+∞	+∞	+∞	+∞	0

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K=3	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+8	+8	+8	+8	+∞	3
2	+∞	0	+∞	3	+8	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+8	+8	0	1	2	+∞	+8
6	+∞	+∞	+8	+8	+8	0	+8	- 3	+8
7	+∞	+∞	8	+8	+8	-1	0	2	7
8	-4	+∞	+8	+8	+8	+8	+8	0	-1
9	+∞	+∞	+8	+8	+8	+8	+8	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+8	+8	0	1	2	+∞	+∞
6	+∞	+∞	+8	+8	+∞	0	+8	- 3	+8
7	+∞	+∞	+8	+8	+8	-1	0	2	7
8	-4	+∞	+8	+8	+∞	+8	+8	0	-1
9	+∞	+∞	+8	+8	+∞	+∞	+8	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	8	+∞	+8	0	+8	-3	+
7	+∞	+∞	+8	+∞	+8	-1	0	2	7
8	-4	+∞	+8	+∞	+8	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	8	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=3	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+8	3	+∞	+∞	+8	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+8
5	+∞	+8	+8	+∞	0	1	2	+∞	+∞
6	+∞	+8	+8	+∞	+∞	0	+8	-3	+∞
7	+∞	8	8	+∞	+8	-1	0	2	7
8	-4	8	8	+∞	+8	+8	+	0	-1
9	+∞	+8	+8	+∞	+8	+8	+8	+∞	0

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K = 3	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	+∞/6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+8	+8	+8	0	+8	- 3	+∞
7	+∞	+8	+8	+8	+8	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+8	0	-1
9	+∞	+8	8	+8	+∞	+∞	+8	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+8	+8	+∞	+∞	+∞	3
2	+∞	0	+8	3	8	+∞	8	+	8
3	+∞	5	0	8	1	+∞	+8	+∞	+8
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+8	8	8	0	8	- 3	8
7	+∞	+8	+8	8	8	-1	0	2	7
8	-4	+∞	+∞	+8	8	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+8	+∞	+∞	+∞	0

K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞	ന	+∞	+∞	+8	+∞	+∞
3	+∞	5	0	8	1	+∞	+8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+8	0	1	2	+∞	+8
6	+∞	+∞	+∞	+8	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+8	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+8	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+	+8	+	3
2	+∞	0	+∞	3	+8	+8	+8	+8	8
3	+∞	5	0	8	1	8	8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+8
6	+∞	+∞	+∞	+∞	+	0	+8	-3	+∞
7	1 00	1				4	()	
	+∞	+∞	+∞	+∞	8	-1	0	2	7
8	<u>+</u> ∞ −4	+∞	+∞	+∞	+∞	<u>-1</u> +∞	+∞	0	7 -1

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	+∞/4	3	+∞	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+8
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+8	+∞	+8	+∞	+∞
3	+∞	5	0	8	1	+∞	+8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	+8	0	+8	- 3	+8
7	+∞	+∞	+∞	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	-1
9	+∞	+∞	+∞	+8	+8	+∞	+8	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+8	+∞	+8	+∞	+∞
3	+∞	5	0	8	1	+∞	+8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	+8	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+8	+8	+8	+8	0	-1
9	+∞	+∞	+∞	+8	+8	+∞	+8	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞	+∞	+8
3	+∞	5	0	8	1	+∞	+8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	+8	0	+∞	-3	+∞
7	+∞	+∞	+∞	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+8	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+8	+∞	+∞	+∞	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+8	+8	+∞	+∞
3	+∞	5	0	8	1	+8	+8	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+8	8	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+8	8	+	+	0	-1
9	+∞	+8	+∞	+8	8	+	+8	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6						l			
	+∞	+8	+∞	+∞	+	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞ +∞	0 -1	+∞ 0	-3 2	+∞ 7
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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+8	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+8
3	+∞	5	0	8	1	+∞	+8	+∞	+8
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+8	0	8	-3	+8
7	+∞	+∞	+∞	+∞	8	-1	0	2	7
8	-4	+∞	+∞	+∞	8	+∞	8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+8	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+∞	+8	+	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+8	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
	1		·						

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+8
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+8	+8	0	+8	- 3	+8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+8	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+∞	+8	0	+8	- 3	+8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	8	+∞	+8	0	-1
9	+∞	+8	+∞	+∞	8	+8	+8	+8	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+	+∞
6	+∞	+∞	+∞	+∞	0 +∞	0	2 +∞	+∞ -3	+∞
			_			_	_		
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+8	+∞	+∞	+∞	+	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+8	+8
3	+∞	5	0	80	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
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5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+8	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9				+∞	+∞	+∞	+∞	8 +	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+8	+∞	+∞	+8	0	+8	- 3	+8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	8	+∞	+8	0	-1
9	+∞	+8	+∞	+∞	8	+8	+8	+8	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+8	+8	+∞	+8	+8	0	+8	- 3	+∞
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	+8	8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+8	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	+8	8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+8	0

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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+8
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+8
7	+∞	+8	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+∞
4	+∞	6	1		1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	0	2 +∞	+∞ -3	+8
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+8	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	+∞	0	+∞	- 3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+8	+∞	+∞	+∞	+∞	0

K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+8	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+8	+∞
3	+∞	5	0	8	1	+∞	+∞/12	+8	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	8	+8	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+8	+∞	0	+8	- 3	+8
7	+∞	+∞	+∞	+8	+8	-1	0	2	7
8	-4	+∞	+∞	+8	+∞	+8	8	0	-1
9	+∞	+∞	+∞	+8	+∞	+∞	+8	+∞	0

K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+8
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+8
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+8	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+8	+∞
3	+∞	5	0	8	1	+∞	+∞/12	+8	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	- 3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	8	+8	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+∞	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+∞
3	+8	5	0	8	1	+8	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+8	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+8	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 4	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	+∞/4	3	+∞/4	+∞	+∞/7	+∞	+
3	+∞	5	0	8	1	+∞	+∞/12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+8	0	1	2	+∞	+8
6	+∞	+∞	+∞	8	+∞	0	+∞	-3	+8
7	+8	+8	+8	8	+8	-1	0	2	7
8	-4	+8	+8	8	+8	+∞	+∞	0	-1
9	+∞	+∞	+∞	8	+∞	+∞	+∞	+∞	0

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞	7	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+8	+8
4	+∞	6	1	0	1	+∞	4	+∞	+
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K=5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞	7	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞	7	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
									•
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞	7	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7	+∞	+8
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
			_						
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
_									
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
						_	_		
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	0	2 +∞	+∞ -3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	0	2 +∞	+∞ -3	+∞
				_					
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K=5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+8
3	+∞	5	0	8	1	+∞/2	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	1 00	1 ~	$\pm \infty$	0	1	2	+∞	+∞
	$+\omega$	+∞	+∞	+∞	0	1	2	100	00
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
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6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

							_		
K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	4	3	4	+∞/5	7/6	+∞	+
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	8	6	1	0	1	+8	4	+8	8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	8+
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+8	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+8	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+8	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+8
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
5 6	+∞	+∞	+∞	+∞	0 +∞	1 0	2 +∞	+∞ -3	+∞
			_						
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞/2	4	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+8	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	8	+∞	+∞	8	+8	3
2	+∞	0	4	3	4	+∞/5	7/6	+	+
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	1	+∞/2	4	+8	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12/3	+8	+∞
4	+∞	6	1	0	1	+∞/2	4/3	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1

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K = 5	1	2	3	4	5	6	7	8	9
1	0	8	+8	8	+8	+∞	8	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+8
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+∞
4	+∞	6	1	0	11	+∞/2	4/3	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+	+∞	+	+∞	-1	0	2	7
8	-4	8	+8	8	+8	+∞	8	0	-1
9	+∞	+8	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+∞
3	+∞	5	0	8	1	+∞/2	12/3	+8	+∞
4	+∞	6	1	0	1	+∞/2	4/3	+8	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+8	-1	0	2	7
8	-4	+8	+∞	+∞	+8	+8	8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=5	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	+∞/5	7/6	+∞	+8
3	+∞	5	0	8	1	+∞/2	12/3	+∞	+8
4	+∞	6	1	0	1	+∞/2	4/3	+∞	+8
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
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K=6	1	2	3	4	5	6	7	8	9
1	0	8	+8	+∞	+8	8	8	+∞	3
2	+∞	0	4	3	4	5	6	+∞	+∞
3	+∞	5	0	8	1	2	3	+∞	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	8	+8	+8	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+8	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞	+∞
3	+∞	5	0	8	1	2	3	+∞	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+8	+∞	+8	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+8	8	+8	3
2	+∞	0	4	3	4	5	6	+8	+∞
3	+∞	5	0	8	1	2	3	+8	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+8	+8	8	+8	3
2	+∞	0	4	3	4	5	6	+8	+∞
3	+∞	5	0	8	1	2	3	+8	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	+8	+∞
3	+∞	5	0	8	1	2	3	+8	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+∞	+∞	+8	0	1	2	+8	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

K = 6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	8+
3	+∞	5	0	8	1	2	3	+∞	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+8	+8	+∞	0	1	2	+∞	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+8	+∞	+8	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	8+
3	+∞	5	0	8	1	2	3	+∞	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	8	+8	8	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 62 3 5 7 8 9 4 6 1 3 () $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty/2$ 2 5 3 $+\infty$ 6 $+\infty$ $+\infty/-1$ 3 3 $+\infty$ 8 $+\infty$ 3 4 $+\infty$ $+\infty$ $+\infty$ 5 2 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ 6 **-**3 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ () $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ ()8 0 -1**-4** $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ 9 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$

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K=6	1	2	3	4	5	6	7	8	9
1	0	8	+8	8	+8	+∞	8	+∞	3
2	+8	0	4	3	4	5	6	+∞/2	+∞
3	+8	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	8	+8	8	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+8	+∞	+∞	+8	0	-1
9	+∞	+8	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+8	+	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	8	8	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+8	+8	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	8	+8	8	+8	+∞	8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	8	+8	8	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+8	+∞	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+8	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+
5	+∞	+8	+∞	+∞	0	1	2	+∞	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+8	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+8	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 0	⁶ 1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	8+
3	+∞	5	0	8	1	2	3	+∞/-1	+8
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+8
3	+∞	5	0	8	1	2	3	+∞/-1	+
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

j

K = 0	⁶ 1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	8
3	+∞	5	0	8	1	2	3	+∞/-1	8
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+8	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+8	+8	+∞	+8	0	1	2	+∞/-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+8
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+8	+8	+8	0	1	2	+∞/-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+8	+∞	-1	0	2	7
8	-4	+8	+8	+8	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+8
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2/-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞	0	4	3	4	5	6	+∞/2	+∞
3	+∞	5	0	8	1	2	3	+∞/-1	+8
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	+∞/-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2/-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+8	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K=6	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+8	+8	+	3
2	+∞	0	4	3	4	5	6	+∞/2	+
3	+∞	5	0	8	1	2	3	+∞/-1	+∞
4	+∞	6	1	0	1	2	3	+∞/-1	+∞
5	+∞	+∞	+∞	+8	0	1	2	+∞/-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	2/-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	4	3	4	5	6	2	+∞
3	8	5	0	8	1	2	3	-1	+
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+8	+∞	+8	+∞	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞
3	+∞	5	0	8	1	2	3	-1	+∞
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞
3	+∞	5	0	8	1	2	3	-1	+8
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞
3	+∞	5	0	8	1	2	3	-1	+8
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞
3	+∞	5	0	8	1	2	3	-1	+∞
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 72 3 5 7 8 9 4 6 1 3 () $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty/$ 5 $+\infty$ 6 13 3 3 $+\infty$ 8 $+\infty$ 3 4 $+\infty$ $+\infty$ 5 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ 6 **-**3 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ () $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ ()8 -1**-4** $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ 9 $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$ $+\infty$

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞
4	+∞	6	1	0	1	2	3	-1	+
5	+∞	+∞	+∞	+∞	0	1	2	-2	8+
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+8
4	+∞	6	1	0	1	2	3	-1	+8
5	+∞	+∞	+∞	+∞	0	1	2	-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+8	5	0	8	1	2	3	-1	+8
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+8	+∞	+∞	+∞	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞
4	+∞	6	1	0	1	2	3	-1	+8
5	+∞	+∞	+∞	+∞	0	1	2	-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+8
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+8	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+8
5	+∞	+∞	+∞	+∞	0	1	2	-2	8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+
5	+∞	+∞	+∞	+∞	0	1	2	-2	+8
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

						J		1	
K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+8	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	8
6	+∞	+8	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	8+
6	+∞	+∞	+∞	+8	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+8	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	8	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

17 7						J			
K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+8	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+8	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 7	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	+∞/ 13
3	+∞	5	0	8	1	2	3	-1	+∞/ 10
4	+∞	6	1	0	1	2	3	-1	+∞/ 10
5	+∞	+∞	+∞	+∞	0	1	2	-2	+∞/9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞	0	4	3	4	5	6	2	13
3	+8	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

	J	-	_		_				_
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13
3	+∞	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13
3	+∞	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

	_			_					J
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13
3	+∞	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

									J
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+8	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	1	10
4	+8	6	1	0	1	2	3	-1	10
5	+8	+8	+8	+∞	0	1	2	-2	9
6	+8	+8	+8	+∞	+∞	0	+∞	-3	+8
7	+8	+8	+8	+∞	+8	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

						_			J	
j	K = 8	1	2	3	4	5	6	7	8	9
	1	0	+∞	+∞	+∞	+∞	+∞	+∞	+8	3
	2	+∞/ -2	0	4	3	4	5	6	2	13/1
	3	+∞/ -5	5	0	8	1	2	3		10
	4	+∞	6	1	0	1	2	3	-1	10
	5	+∞	+∞	+∞	+∞	0	1	2	-2	9
	6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+8
	7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
	8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
	9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K=8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

										<u> </u>
K	8 =	1	2	3	4	5	6	7	8	9
	1	0	+∞	+∞	+∞	+∞	+∞	+∞	+8	3
	2	+∞/ -2	0	4	3	4	5	6	2	13/1
	3	+∞/ -5	5	0	8	1	2	3	() () () () () () () () () ()	10/-2
	4	+∞	6	1	0	1	2	3	-1	10
	5	+8	+∞	+∞	+∞	0	1	2	-2	9
	6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
	7	+8	+∞	+∞	+∞	+8	-1	0	-4	7
	8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
	9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

	J								
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

_	J								
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

								J	
K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+8	- 3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+8	- 3	+
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	8
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+8	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+8	- 3	+∞/ -4
7	+∞	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+8	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	- 3	+∞/ -4
7	+8	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞/ -4
7	+∞/ -8	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+8	+8	+∞	+∞	+∞	+∞	+8	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞/ -4
7	+∞/ -8	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+8	+∞	+8	+∞	+∞	+8	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞/ -4
7	+∞/ -8	+∞	+∞	+∞	+∞	-1	0	-4	7
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞/ -4
7	+∞/ -8	+∞	+∞	+∞	+∞	-1	0	-4	7/-5
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+8	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+8	+8	+8	+∞	0	+8	-3	+∞/ -4
7	+∞/ -8	+8	+8	+8	+∞	-1	0	-4	7/-5
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K = 8	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+8	+∞	3
2	+∞/ -2	0	4	3	4	5	6	2	13/1
3	+∞/ -5	5	0	8	1	2	3	-1	10/-2
4	+∞/ -5	6	1	0	1	2	3	-1	10/-2
5	+∞/ -6	+∞	+∞	+∞	0	1	2	-2	9/-3
6	+∞/ -7	+∞	+∞	+∞	+∞	0	+∞	-3	+∞/ -4
7	+∞/ -8	+∞	+∞	+∞	+∞	-1	0	-4	7/-5
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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	K = 9	1	2	3	4	5	6	7	8	9
İ	1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
	2	-2	0	4	3	4	5	6	2	1
	3	- 5	5	0	8	1	2	3	-1	- 2
	4	-5	6	1	0	1	2	3	-1	-2
	5	-6	+∞	+∞	+∞	0	1	2	-2	-3
	6	-7	+∞	+∞	+∞	+∞	0	+∞	-3	-4
	7	-8	+∞	+∞	+∞	+∞	-1	0	-4	- 5
	8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
	9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

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K=9	1	2	3	4	5	6	7	8	9
1	0	+∞	+∞	+∞	+∞	+∞	+∞	+∞	3
2	-2	0	4	3	4	5	6	2	1
3	- 5	5	0	8	1	2	3	-1	-2
4	-5	6	1	0	1	2	3	-1	-2
5	-6	+∞	+∞	+∞	0	1	2	-2	-3
6	-7	+∞	+∞	+∞	+∞	0	+∞	-3	-4
7	-8	+∞	+∞	+∞	+∞	-1	0	-4	-5
8	-4	+∞	+∞	+∞	+∞	+∞	+∞	0	-1
9	+∞	+∞	+∞	+∞	+∞	+∞	+∞	+∞	0

