

User

[Main page](#)[Help](#)[Change password](#)[Logout](#)

Student

[Contests](#)

Graphs and stuff like that (Grafy i takie tam)

~~UWAGA/Attention~~ Testy nie zostały jeszcze wgrane. / Tests are not added yet.

Graphs are an important data structure used in computer science. The task is to load graphs and determine the following parameters:

1. the degree sequence;
2. the number of components;
3. bipartiteness;
4. the eccentricity of vertices (within the components)
5. planarity;
6. vertices colours (consecutive natural numbers from 1) obtained using algorithms:
 - greedy (the vertex order according to its number)
 - LF method (ties are solved by the vertex number)
 - SLF method (ties are solved by highest vertex degree, and if there is still a tie choose the vertex with the lowest number)
7. the number of different C_4 subgraphs
8. the number of the graph complement's edges

Input

In the first line there's a number k of graphs.

The following lines contain k graph data sets.

A single data set contains a number n - the graph order - and n lists of neighbours for each vertex. A list contains the number of neighbours (s) and s neighbours IDs. Neighbours IDs are numbers from 1 to n .

Output

You should print k sets of responses. Each set should contain the designated parameters in the order in which the parameters are listed. For point

- 1, 4, 6a, 6b, 6c you should print sequence of n numbers;
- 7, 8 you should print a number;
- 2, 3, 5 you should print a character T or F (true/false).

Optionality

Only points (parameters) 1 and 2 are required. If any of the point is not implemented, please enter a single '?' character as the output.

Score for a graph parameter will only be included if this parameter is correctly determined in each data set.

The score for each parameter is 10% of the total score.

Wersja polska

Grafy są istotną strukturą danych używaną w informatyce. Zadanie polega na wczytaniu grafów i wyznaczeniu następujących parametrów:

1. ciągu stopniowego;
2. liczby składowych spójności;
3. dwudzielności grafu;

User

[Main page](#)[Help](#)[Change password](#)[Logout](#)

Student

[Contests](#)

Graphs and stuff like that (Grafy i takie tam)

~~UWAGA/Attention~~ Testy nie zostały jeszcze wgrane. / Tests are not added yet.

Graphs are an important data structure used in computer science. The task is to load graphs and determine the following parameters:

1. the degree sequence;
2. the number of components;
3. bipartiteness;
4. the eccentricity of vertices (within the components)
5. planarity;
6. vertices colours (consecutive natural numbers from 1) obtained using algorithms:
 - greedy (the vertex order according to its number)
 - LF method (ties are solved by the vertex number)
 - SLF method (ties are solved by highest vertex degree, and if there is still a tie choose the vertex with the lowest number)
7. the number of different C_4 subgraphs
8. the number of the graph complement's edges

Input

In the first line there's a number k of graphs.

The following lines contain k graph data sets.

A single data set contains a number n - the graph order - and n lists of neighbours for each vertex. A list contains the number of neighbours (s) and s neighbours IDs. Neighbours IDs are numbers from 1 to n .

Output

You should print k sets of responses. Each set should contain the designated parameters in the order in which the parameters are listed. For point

- 1, 4, 6a, 6b, 6c you should print sequence of n numbers;
- 7, 8 you should print a number;
- 2, 3, 5 you should print a character T or F (true/false).

Optionality

Only points (parameters) 1 and 2 are required. If any of the point is not implemented, please enter a single '?' character as the output.

Score for a graph parameter will only be included if this parameter is correctly determined in each data set.

The score for each parameter is 10% of the total score.

Wersja polska

Grafy są istotną strukturą danych używaną w informatyce. Zadanie polega na wczytaniu grafów i wyznaczeniu następujących parametrów:

1. ciągu stopniowego;
2. liczby składowych spójności;
3. dwudzielności grafu;