Programming Assignment #1

Two-Way Partition

Objective

An exercise lab to review partition algorithm and compare your result with hMetis

You can use K-L, F-M, or any partitioning algorithm you know.

Input

Given a Net List input file

Example (input.txt)

```
3 5
1 2 3
2 4
1 5
```

Explanation of the Input

1. The first line represents how many nets and how many nodes there are (Ex. 3 means 3 nets, 5 means 5 nodes)
2. The next line to the last line defines the nodes to which the net is connected. (Ex. 1 2 3 means the first net connect to node 1, 2 and 3.)

Output

Output Format (output.txt)

```
1
0
1
0
1
```

Explanation of the Output

The first line to the last line defines the groups to which the node belongs. (Ex. The first line 1 means the first node (node 1 in input) belongs to the group 1. The second line 0 means the second node (node 2 in input) belongs to the group 0.)

Algorithm

You will need to partition the given nodes to two groups and try to minimize the number of cut between the two groups while balancing number of nodes. The balance factor is 0.45 ~ 0.55.

Evaluation

1. You **MUST WRITE YOUR OWN CODE**.
2. Naming rule.
   A. Name of the zip file – **Student_ID.zip**
   B. Execution procedure: **./lab1 [input]**
   C. Name of the output file – **output.txt**
   D. Name of report file – **Student_ID.pdf**
3. 2 publish cases + 2 hidden cases will be evaluated
4. A verifier is released to evaluate your result ➔ ./verifier [input] [output]
(Please make sure that your output results can pass the verifier)

Program Submission

Please upload the following materials in a .zip file (named as Student_ID.zip) to New E3 by the deadline, specifying your student ID in the subject field. (If your submission file is not .zip file, you will get zero point!!)

1. Source code (.cpp, .h).
2. Makefile (if you have)
3. A Readme file (Information to how to compile and execute your code.)
4. A report pdf file (Comparison of your result to shmetis. Note that the result won't affect your grade.)

Grading

We will determine your score according to the minimum cut result of class for 2 publish cases(input2.txt.hgr & input3.txt.hgr) + 2 hidden cases.
And for each case, the run time limit is up to 90 second. It will be regarded as "failed" if you use more than 90 second or the balance factor is not in 0.45 ~ 0.55.

Notices

- **Due Date : 2021/04/05 23:55:00**
- **You'll get origin grade*0.7 if you be late to hand in on time.**
- **Plagiarism is strictly forbidden. 0 grade guarantee!**

Reference

hMETIS、hMETIS paper