CS170 MLST Contest Scoring

May 1, 2013

1 Contest Schedule

A submission to the Maximum Leaf Spanning Tree (MLST) contest consists of three parts:

1. A hard input for the MLST problem: *due May 1, 11:59pm evening.*

2. The best solution you know of for your hard input: *due May 1, 11:59pm evening.*

3. The output of your program on the complete set of inputs, as well as the program itself: *due May 6, 11:59pm evening.*

   (The inputs for part 3 will be made available once we have collected parts 1 and 2 from everyone. The program may be written in any reasonable language. We will not run your program to determine your score: we will use the output you send us.)

Please check Piazza for submission instructions. We will release the input for part 3 within 24 hours of the due date for part 1. The input will consist of every valid submission for part 1, and possibly some contributions of our own.

2 Scoring and Grading

Your team's submission for parts 1 and 2 will be assigned a score H (for **H**ome test cases of **H**ard instances), and your team's submission for part 3 will be assigned a score A (for **A**way test cases of **A**lgorithm), both between 0 and 1. Your team's score in the MLST competition will be:

$$\text{score} = 0.3H + 0.7A.$$

The team with the highest score wins the contest. Your grade will be based on your team's score in the contest. Members of the same team will receive the same grade, and teams with higher scores will receive higher grades.

The exact details of the scoring shouldn't matter too much, but in case you really want to know, read on.

2.1 H: Home score for Hard input

Your team's goal for parts 1 and 2 is to create an input on which your rival teams will perform poorly in part 3, but for which your team know a good spanning tree. The difficulty D of your team's instances will be the maximum of the difficulty over all instances submitted by your team.

$$D = \max\{D_1, D_2, D_3\},$$

where D_i is the difficulty score of the ith hard instance submitted by your team. In other words, it is a good idea to submit more hard instances, and to vary the strategy in generating instances. To compute D_i for the ith instance, we consider the number of leaves $L_{\text{part 2}}$ for your team's submission for part 2, and compute the average number of leaves $L_{\text{avg part 3}}$ by other teams (excluding your team) in part 3 of the contest.

$$D_i = L_{\text{part 2}}/L_{\text{avg part 3}}.$$

Finally, the score H will be computed based on the *ranking* over all teams of the difficulty score D of the instances generated by your team.

2.2 A: Away score for Algorithm

Your team's score for part 3 of the contest will computed by comparing each spanning tree your team submits to the best spanning tree found by any team.

Let m be the number of inputs we give out for part 3 of the contest, *not counting* your team's submission from part 1. (*Note:* your team's submission for part 3 must have one output for every input in the file we provide, *including* your team's submission for part 1. But that will not affect the A score of your team. We will announce submission instructions for part 3 soon.) Your team's score for part 3 of the contest will be an aggregate over all inputs (excluding your team's submission in part 1):

$$S = \left(\frac{1}{m}\sum_{j=1}^{m} S_j^2\right)^{1/2}.$$

For any particular input j, let W_j be the number of leaves of your team's submission for input j, and let $W_{j,\max}$ be the maximum number of leaves any team (excluding the team submitting the instance) finds for input j. Then your team's score for input j is:

$$S_j = \frac{W_j}{W_{j,\max}}.$$

Finally, the score A will be computed based on the *ranking* of the score S of your team.

Good luck!