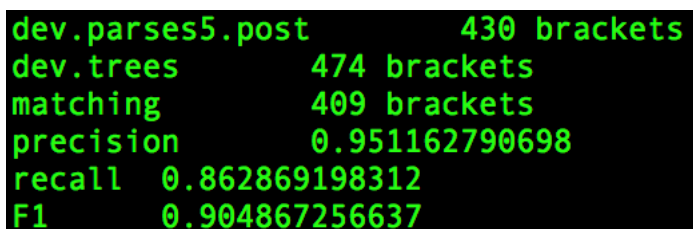# CSCI 544 HW4

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5:

```
dev.parses5.post        430 brackets
dev.trees        474 brackets
matching         409 brackets
precision        0.951162790698
recall  0.862869198312
F1      0.904867256637
```

The picture above is the best result I can get, and I am using 3 methods:

1: **Parent annotation**. This method is adding all the parent node to each rule so that we know where each rule came from, this method is used against NOT specific enough scenario. And it works really well combined with Vertical Markovization.

2: **Adding sibling words (Vertical Markovization)**. This method is used against TOO specific scenario, how I implement it is that I add sibling label to rules with * only, since rules with * is the joint of left binary branch, and it is very easy to occur duplicated rule printed for the final result, thus I decide to avoid the duplicated scene. And it works really well individually or combined.

3: **Smooth for unknown words**. The unk tag is always a tricky situation to handle since the wordsbase doesn't have the specific

rules for it (highly based on training data what rule has unk tag or not), so I add unk to every single rule, if from the training data the rule did not have unk as child, I add the occur time of unk to 0.5, and of course I add 0.5 to all other words. This method works pretty well individually.

Reason:

So, all of them helped in either combined way or individual. However, the parent annotation doesn't help individually, the accuracy goes up indeed, but the recall goes down a lot, thus the F1 score is low when using this method individually. The reason I can think of is that the most of sentences in dev.strings file is TOO specific, thus parent annotation can't handle it. On the contrast, Vertical Markovization works pretty well for this test file input since it can handle TOO specific really well. As the smoothing, when combined it did not help too much, I can think of the reason may be the smooth model is too rough (ignored some cases), and calculation need to be more specific such as the value chosen for theta.