# Lab 2: Network Structure

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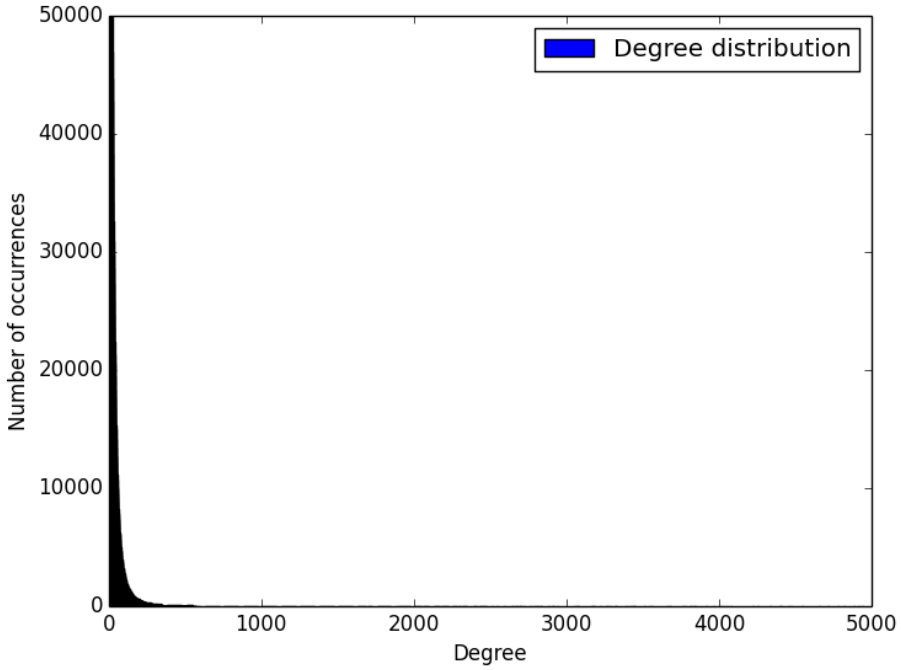
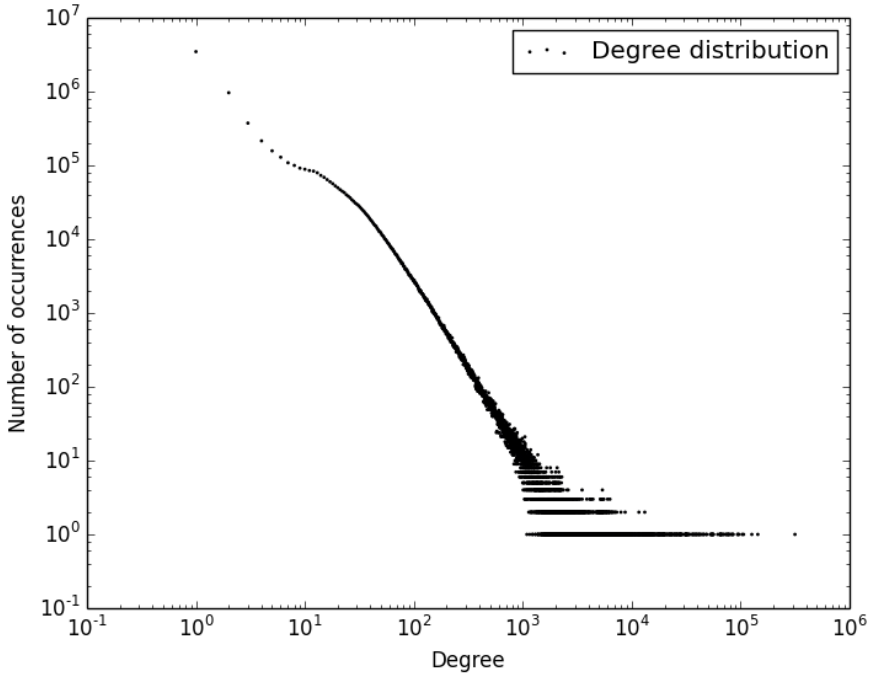
## 1 Degree Distribution

After hadoop work and passing the file to the Python script, I got 2 plots as below.
And the *log-plot looks more useful*, since it persents the property more clearly and we can obviously see a linear relationship on the lower part of the plot;
We can also see the *nodes with small degress are most frequent*, and *the fraction of highly connected nodes decreases*;
It is like *Exponential Distribution*.






## 2 Robustness of Giant Componet

See file *TargetedRemoval.java* to view my implementation of the class. And here's the pseudo-code of the algorithm:

```
1: function APPLY(graph)
2:     originalSize ← graph.GCsize()
3:     while graph.GCsize > originalSize * 0.2 do
4:         removeSum ← 0
5:         while There exists Edges E=(a,b) such that the removal of E makes the
   distance of a and b larger than 2 do
6:             remove E
7:             removeSum ← removeSum + 1
8:         end while
9:         while removeSum < 100 do
10:            randomly remove a edge E
11:            removeSum ← removeSum + 1
12:        end while
13:    end while
14: end function
```

The Random algorithm uses 121,000 removals, and 92,000 for TragetedRemoval algorithm. See plot as below: