CS 378 – Big Data Programming

Lecture 27

Page Rank

An Iterative Algorithm in Spark

Review

- Assignment 12
  - Read data into a dataset
  - Queries

- Questions?

Example - Page Rank

- Walk through page rank algorithm for Spark
- See a more complex algorithm using Spark
  - Iterative

Basic Page Rank Algorithm

From Learning Spark, pp. 66-67

- Give each page an initial rank of 1
- On each iteration, have page `p` send a contribution of `rank(p)/numNeighbors(p)` to its neighbors
- Set each page's rank to

```
0.15 + 0.85 * contributionsReceived
```

Page Rank - Example

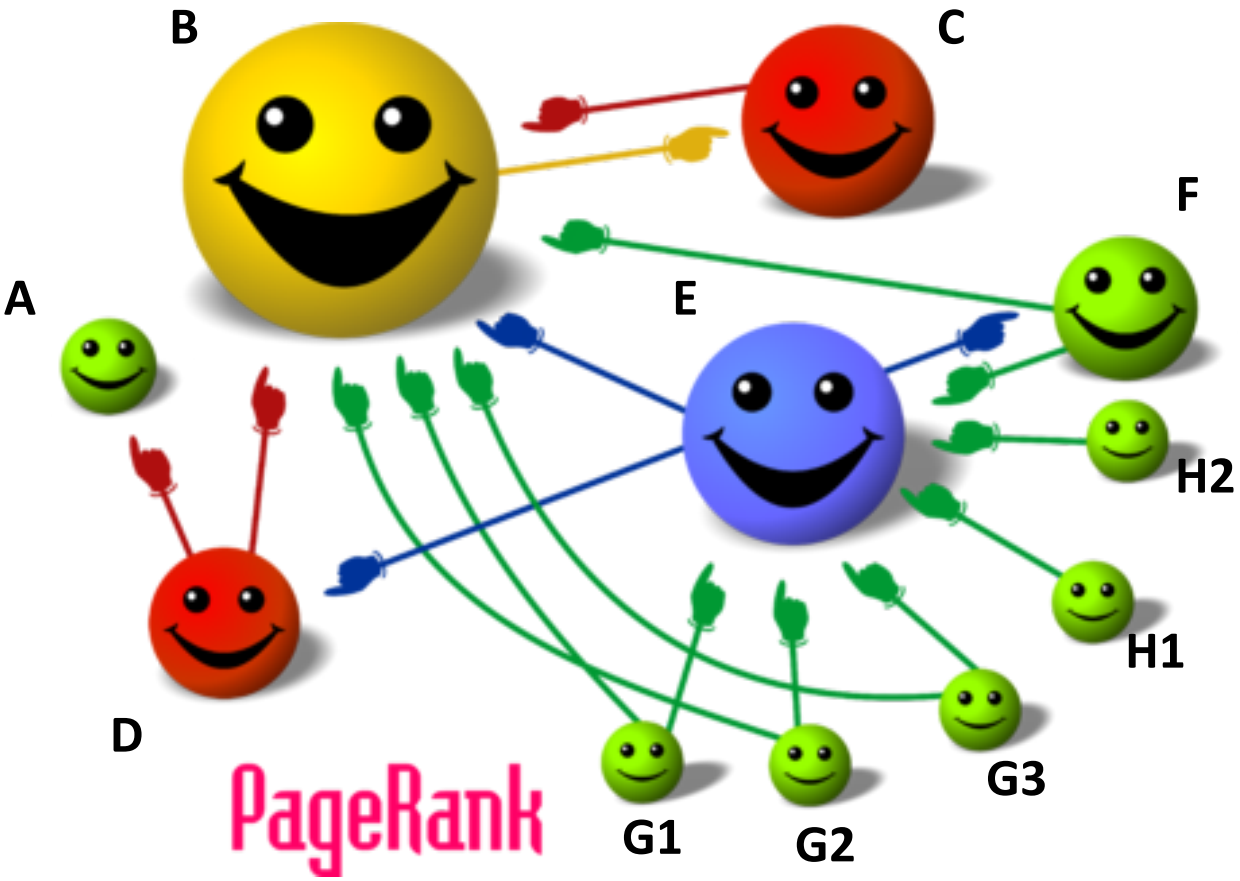
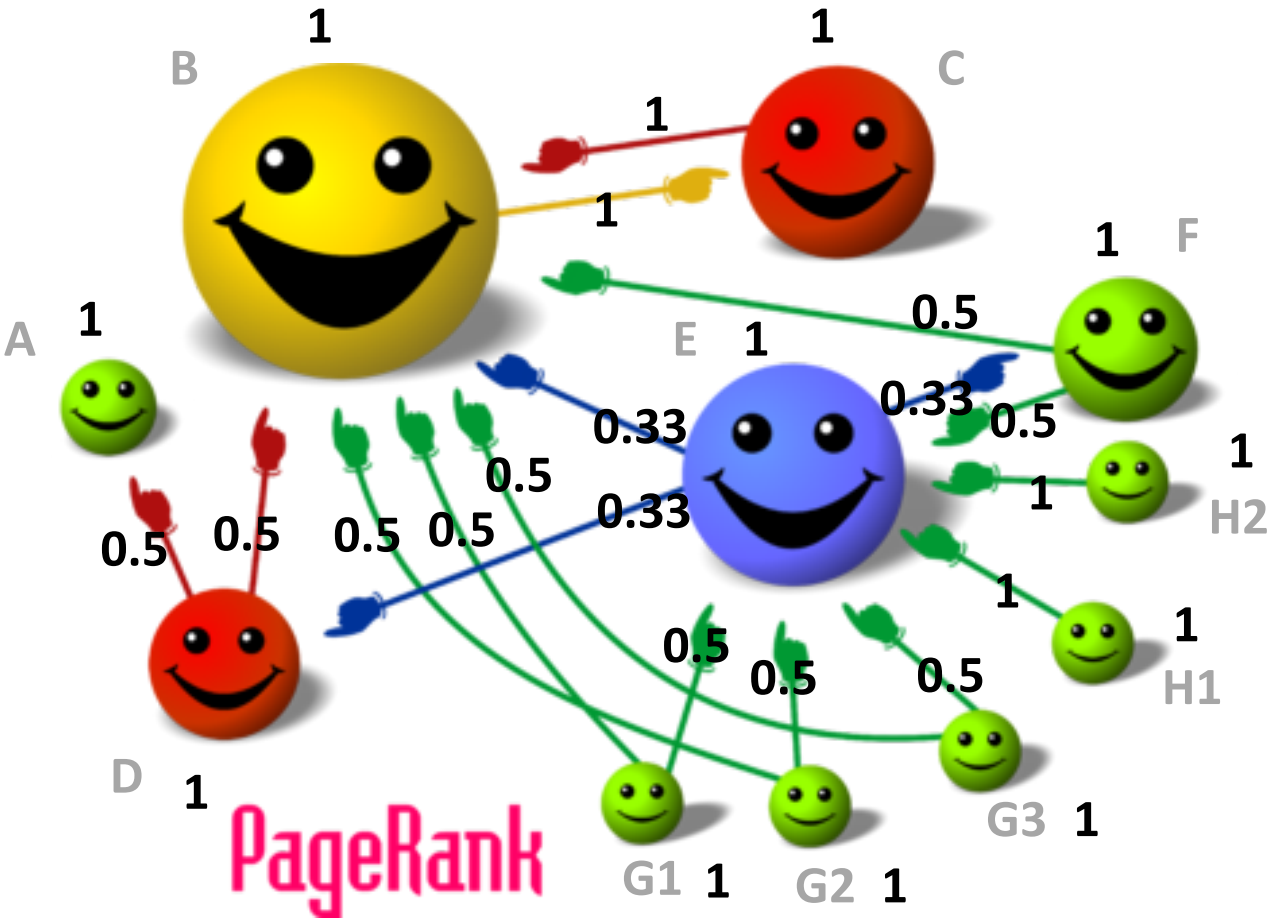


Image from: en.wikipedia.org/wiki/File:PageRank-hi-res.png

Page Rank



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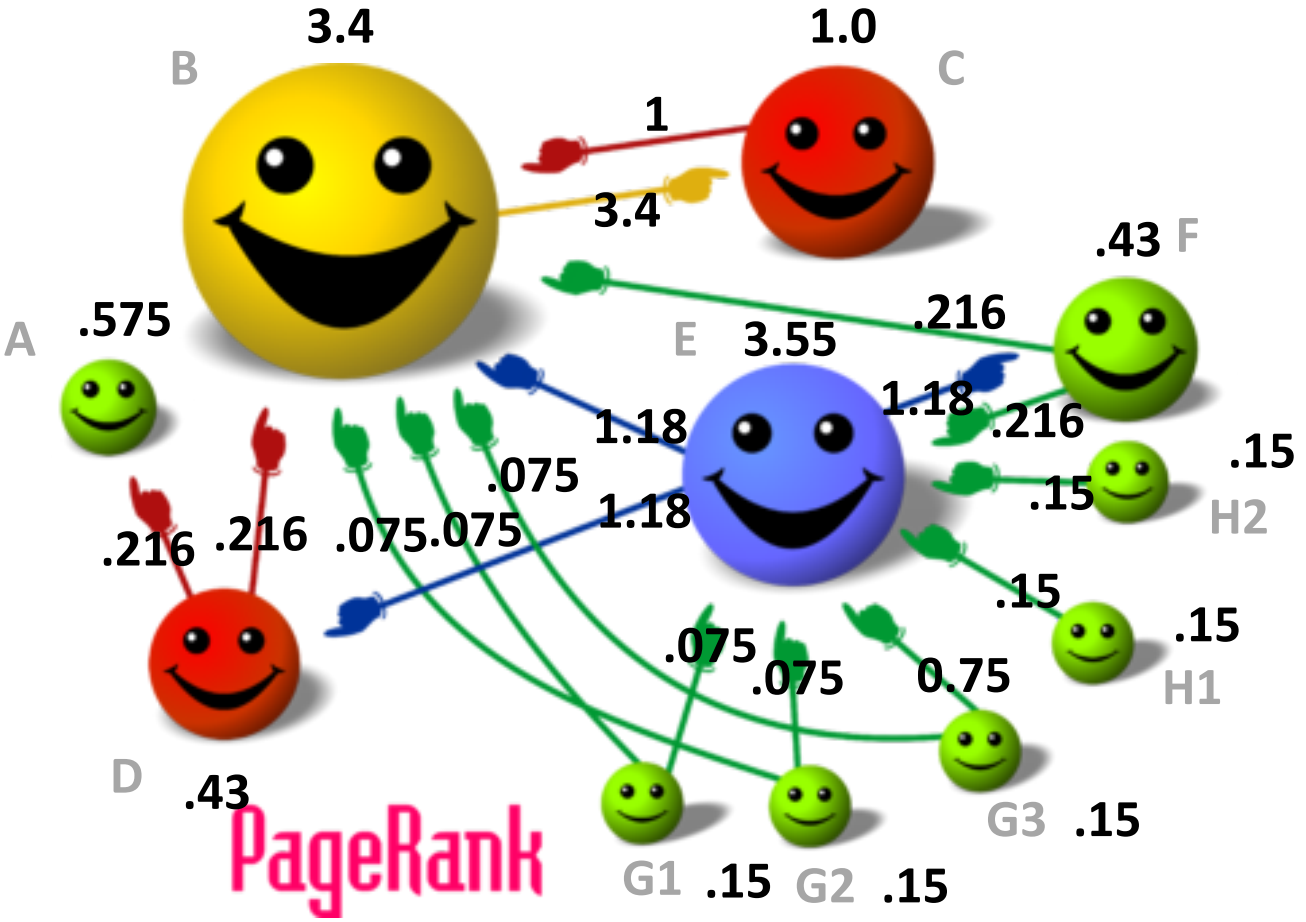
Page Rank



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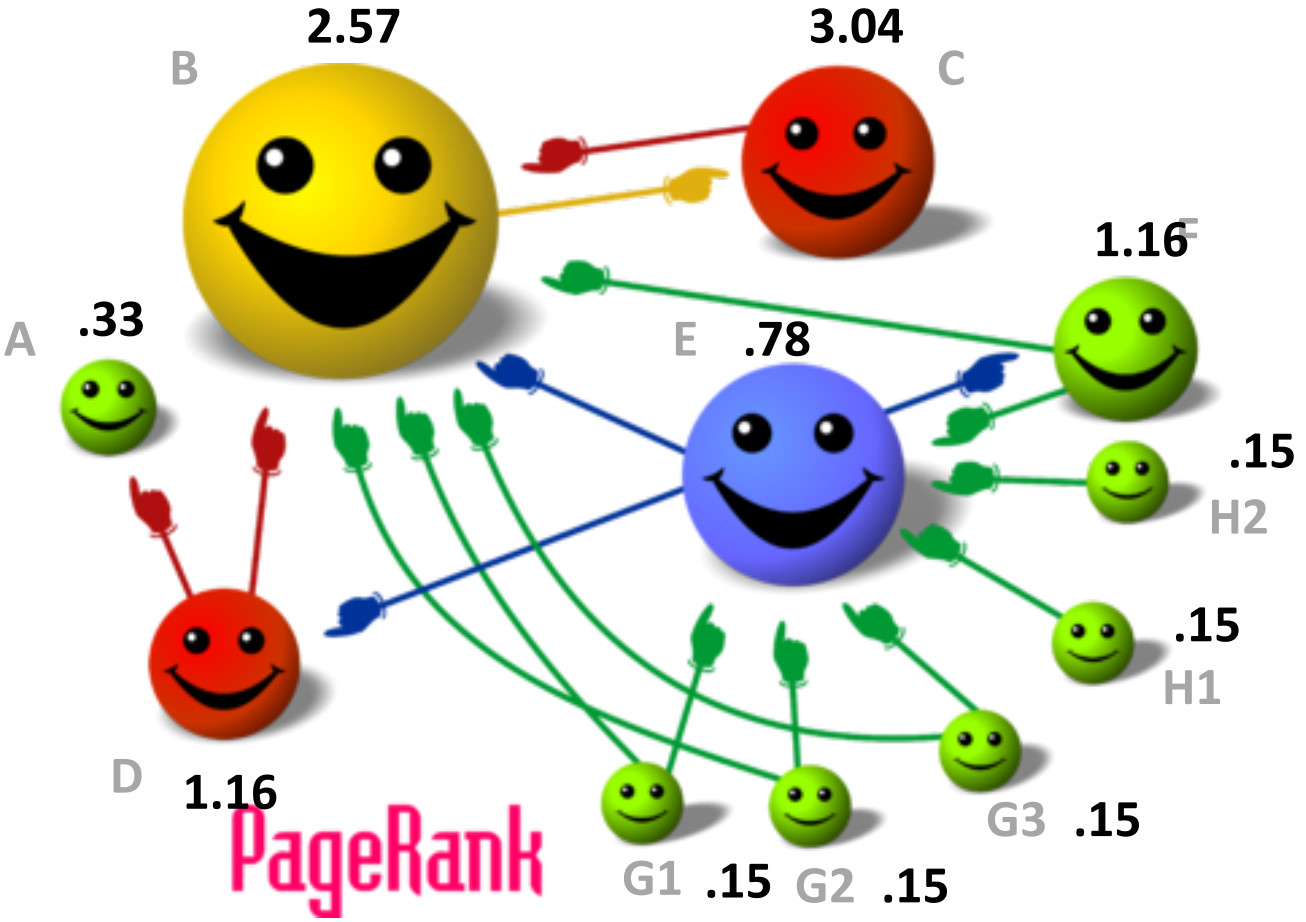
Page Rank



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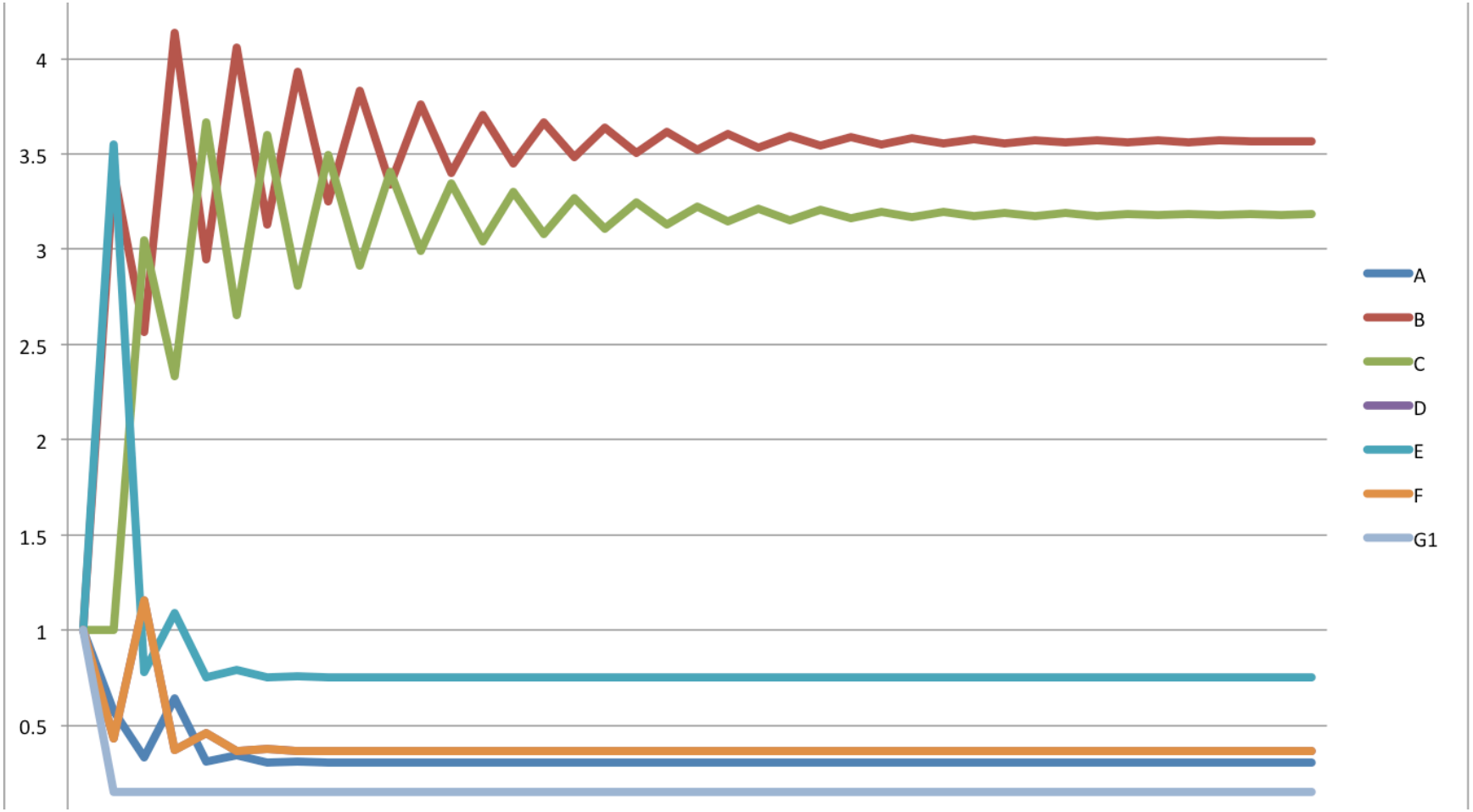
Page Rank - Results



Other Topics

for Further Reading

- Discussed in the textbook
- Other file systems
  - HDFS, S3, …
- Machine learning – MLLib
  - Many algorithms implemented
  - See: spark.apache.org/mllib

Other Topics

for Further Reading

- GraphX – Graph processing
  - Algorithms:
  - PageRank
  - Connected components
  - Label propagation
  - SVD++
  - Strongly connected components
  - Triangle count