1 Implementing PageRank and HITS

(a) The top 5 ids with the highest score are:

```
id: 263; score: 0.0020202911815182184
id: 537; score: 0.0019433415714531497
id: 965; score: 0.0019254478071662631
id: 243; score: 0.001852634016241731
id: 285; score: 0.0018273721700645144
```

The bottom 5 ids with the lowest score are:

```
id: 558; score: 0.0003286018525215297
id: 93; score: 0.00035135689375165774
id: 62; score: 0.00035314810510596274
id: 424; score: 0.0003548153864930145
id: 408; score: 0.00038779848719291705
```

(b) The top 5 ids with the highest hubbiness score are:

```
id: 840; score: 1.0
id: 155; score: 0.9499618624906541
id: 234; score: 0.8986645288972265
id: 389; score: 0.863417110184379
id: 472; score: 0.8632841092495217
```

The bottom 5 ids with the lowest hubbiness score are:

```
id: 23; score: 0.042066854890936534
id: 835; score: 0.057790593544330165
id: 141; score: 0.0645311764622518
id: 539; score: 0.06602659373418493
id: 889; score: 0.07678413939216454
```

The top 5 ids with the highest authority score are:

```
id: 893; score: 1.0
id: 16; score: 0.9635572849634397
id: 799; score: 0.9510158161074017
id: 146; score: 0.9246703586198443
id: 473; score: 0.899866197360405
```

The bottom 5 ids with the lowest authority score are:

```
id: 19; score: 0.056083163776076174
id: 135; score: 0.06653910487622795
id: 462; score: 0.075442286246419
id: 24; score: 0.0817123940681695
id: 910; score: 0.08571673456144878
```

2 Bloom Filter

Empty bloom filter: [0, 0, 0, 0, 0, 0, 0]

$h_1(" hi ") = 1$, $h_2(" hi ") = 6$, intermediate bloom filter: [0, 1, 0, 0, 0, 0, 1]

$h_1(" big ") = 1$, $h_2(" big ") = 2$, intermediate bloom filter: [0, 1, 1, 0, 0, 0, 1]

$h_1(" data ") = 1$, $h_2(" data ") = 5$, intermediate bloom filter: [0, 1, 1, 0, 0, 1, 1]

$h_1(" spark ") = 4$, $h_2(" spark ") = 1$, Final bloom filter: [0, 1, 1, 0, 1, 1, 1]