Six Degrees of Kevin Bacon

Introduction - Six Degrees of Kevin Bacon is a game based on the "six degrees of separation" concept, which posits that any two people on Earth are six or fewer acquaintance links apart. Movie buffs challenge each other to find the shortest path between an arbitrary actor and prolific actor Kevin Bacon. It rests on the assumption that anyone involved in the film industry can be linked through their film roles to Bacon within six steps. The analysis of social networks can be a computationally intensive task, especially when dealing with large volumes of data. It is also a challenging problem to devise a correct methodology to infer an informative social network structure. Here, we will analyze a social network of actors and actresses that co-participated in movies. We will do some simple descriptive analysis, and in the end try to relate an actor/actress's position in the social network with the success of the movies in which they participate.

Rules & Notes - Please take your time to read the following points:

1. The submission deadline will be set for the 30th of May at 23:59h.
2. It is acceptable that you **discuss** with your colleagues different approaches to solve each step of the problem set, but the assignment is individual. That is, you are responsible for writing your own code, and analyzing the results. Clear cases of cheating will be penalized with 0 points in this assignment.
3. After review of your submission files, and before a mark is attributed, you might be called to orally defend your submission.
4. You will be scored first and foremost by the number of correct answers, secondly by the logic used in trying to approach each step of the problem set.
5. You can add as many cells as you like to answer the questions.
6. It is also important you clearly indicate what your final answer to each question is when you are using multiple cells (for example you can use `print("My final anwser is:")` before your answer or use cell comments).
7. Consider skipping questions that you are stuck on, and get back to them later.
8. Expect computations to take a few minutes to finish in some of the steps.
9. It is recommended you read the whole assignment before starting.
10. You can make use of caching or persisting your RDDs or Dataframes, this may speed up performance. You do not need to cache every dataframe, but usually you want to do this at least once after the data has been imported.
11. If you have trouble with graphframes in databricks (specifically the import statement) you need to make sure the graphframes package is installed on the cluster you are running. If you click home on the left, then click on the graphframes library which you loaded in Lab 11 you can install the package on your cluster (check the graphframes checkbox and click install)
12. Be careful, you must not 'Publish' this notebook in databricks.
13. **IMPORTANT** It is expected you have developed skills beyond writing SQL queries. Any question where you directly write a SQL query (by for example creating a temporary view and then using spark.sql to pass the query) will receive a 25% penalty. Using the spark syntax (for example dataframe.select("*").where("conditions")) is acceptable and does not incur this penalty.
14. **Questions** – Any questions about this assignment should be posted in the Forum@Moodle. Questions by e-mail will not be answered. The lab will run at the normal time. During this period you can ask any questions you have about the exam (we can't provide you the actual answers of course, but there may be helpful tips if you are stuck on any of the steps). As such, it is probably useful to attempt the assignment before the scheduled lab.
15. **Delivery** - To fulfil this activity you will have to upload the following materials to Moodle:

    - An exported IPython notebook. From the menu at the top, select 'File', then 'Export', then 'IPython Notebook', to download the notebook. The notebook should be solved (have results displayed), but should contain all necessary code so that when the notebook is run in databricks it should also

replicate these results. This means that all data downloading and processing should be done in this notebook. It is also important you clearly indicate where your final answer to each question is when you are using multiple cells (for example you can us `print("My final answer is:")` before your answer or use cell comments).
- A PDF version of your code and answers. There are a couple of ways you can do this. You can convert the downloaded IPython Notebook to pdf (check out nbconvert if you have Jupyter notebook), or you can just copy your code and answers into a word file and save as pdf, or finally you can take screenshots of each page of the notebook and put them into a word file and save it as pdf. It is important that all code and aswers are visible in this pdf.
- You will also need to provide a signed statement of authorship, which is available on Moodle.

Data Sources and Description

We will use data from IMDB. You can download raw datafiles from https://datasets.imdbws.com (https://datasets.imdbws.com). Note that the files are tab delimited (.tsv) You can find a description of the each datafile in https://www.imdb.com/interfaces/ (https://www.imdb.com/interfaces/)

Questions

Data loading and preperation

Review the file descriptions and load the necessary data onto your databricks cluser and into spark dataframes or rdds. You will need to use shell commands to download the data, unzip the data, load the data into spark. Note that the data might require parsing and preprocessing to be ready for the questions below.

Hints You can use `gunzip` to unzip the .tz files. The data files will then be tab seperated (.tsv), which you can load into a dataframe using the tab seperated option instead of the comma seperated option we have typically used in class: `.option("sep","\t")`

In [3]:

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%sh wget https://datasets.imdbws.com/name.basics.tsv.gz

%sh
gunzip name.basics.tsv.gz
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--2020-05-30 13:04:40--  https://datasets.imdbws.com/name.basics.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.26, 13.224.13.3
2, 13.224.13.37, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.26|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 197587198 (188M) [binary/octet-stream]
Saving to: ‘name.basics.tsv.gz.1’

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11550K .......... .......... .......... .......... ..........  6%  175M 2s
11600K .......... .......... .......... .......... ..........  6%  186M 2s
11650K .......... .......... .......... .......... ..........  6%  211M 2s
11700K .......... .......... .......... .......... ..........  6%  191M 2s
11750K .......... .......... .......... .......... ..........  6%  199M 2s
11800K .......... .......... .......... .......... ..........  6%  191M 2s
11850K .......... .......... .......... .......... ..........  6%  204M 2s
11900K .......... .......... .......... .......... ..........  6%  182M 2s
11950K .......... .......... .......... .......... ..........  6%  170M 2s
12000K .......... .......... .......... .......... ..........  6%  166M 2s
12050K .......... .......... .......... .......... ..........  6%  206M 2s
12100K .......... .......... .......... .......... ..........  6%  207M 2s
12150K .......... .......... .......... .......... ..........  6%  209M 2s
12200K .......... .......... .......... .......... ..........  6%  175M 2s
12250K .......... .......... .......... .......... ..........  6%  189M 2s
12300K .......... .......... .......... .......... ..........  6%  195M 2s
12350K .......... .......... .......... .......... ..........  6%  166M 2s
12400K .......... .......... .......... .......... ..........  6%  166M 2s
12450K .......... .......... .......... .......... ..........  6%  187M 2s
12500K .......... .......... .......... .......... ..........  6%  191M 2s
12550K .......... .......... .......... .......... ..........  6%  198M 2s
12600K .......... .......... .......... .......... ..........  6%  185M 2s
12650K .......... .......... .......... .......... ..........  6%  188M 2s
12700K .......... .......... .......... .......... ..........  6%  172M 2s
12750K .......... .......... .......... .......... ..........  6%  166M 2s
12800K .......... .......... .......... .......... ..........  6%  176M 2s
12850K .......... .......... .......... .......... ..........  6%  187M 2s
12900K .......... .......... .......... .......... ..........  6%  201M 2s
12950K .......... .......... .......... .......... ..........  6%  201M 2s
13000K .......... .......... .......... .......... ..........  6%  173M 2s
13050K .......... .......... .......... .......... ..........  6%  189M 2s
13100K .......... .......... .......... .......... ..........  6%  179M 2s
13150K .......... .......... .......... .......... ..........  6%  179M 2s
13200K .......... .......... .......... .......... ..........  6%  169M 2s
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13250K .......... .......... .......... .......... ..........  6%  205M 2s
13300K .......... .......... .......... .......... ..........  6%  211M 2s
13350K .......... .......... .......... .......... ..........  6%  175M 2s
13400K .......... .......... .......... .......... ..........  6%  169M 2s
13450K .......... .......... .......... .......... ..........  6%  211M 2s
13500K .......... .......... .......... .......... ..........  7%  192M 2s
13550K .......... .......... .......... .......... ..........  7%  181M 2s
13600K .......... .......... .......... .......... ..........  7%  146M 2s
13650K .......... .......... .......... .......... ..........  7%  207M 2s
13700K .......... .......... .......... .......... ..........  7%  204M 2s
13750K .......... .......... .......... .......... ..........  7%  198M 2s
13800K .......... .......... .......... .......... ..........  7%  169M 2s
13850K .......... .......... .......... .......... ..........  7%  199M 2s
13900K .......... .......... .......... .......... ..........  7%  177M 2s
13950K .......... .......... .......... .......... ..........  7%  171M 2s
14000K .......... .......... .......... .......... ..........  7%  167M 2s
14050K .......... .......... .......... .......... ..........  7%  192M 2s
14100K .......... .......... .......... .......... ..........  7%  196M 2s
14150K .......... .......... .......... .......... ..........  7%  203M 2s
14200K .......... .......... .......... .......... ..........  7%  153M 2s
14250K .......... .......... .......... .......... ..........  7%  188M 2s
14300K .......... .......... .......... .......... ..........  7%  210M 2s
14350K .......... .......... .......... .......... ..........  7%  144M 2s
14400K .......... .......... .......... .......... ..........  7%  183M 2s
14450K .......... .......... .......... .......... ..........  7%  208M 2s
14500K .......... .......... .......... .......... ..........  7%  176M 2s
14550K .......... .......... .......... .......... ..........  7%  205M 2s
14600K .......... .......... .......... .......... ..........  7%  132M 2s
14650K .......... .......... .......... .......... ..........  7%  219M 2s
14700K .......... .......... .......... .......... ..........  7%  224M 2s
14750K .......... .......... .......... .......... ..........  7%  180M 2s
14800K .......... .......... .......... .......... ..........  7%  185M 2s
14850K .......... .......... .......... .......... ..........  7%  189M 2s
14900K .......... .......... .......... .......... ..........  7%  204M 2s
14950K .......... .......... .......... .......... ..........  7%  208M 2s
15000K .......... .......... .......... .......... ..........  7%  162M 2s
15050K .......... .......... .......... .......... ..........  7%  185M 2s
15100K .......... .......... .......... .......... ..........  7%  191M 2s
15150K .......... .......... .......... .......... ..........  7%  177M 2s
15200K .......... .......... .......... .......... ..........  7%  183M 2s
15250K .......... .......... .......... .......... ..........  7%  209M 2s
15300K .......... .......... .......... .......... ..........  7%  160M 2s
15350K .......... .......... .......... .......... ..........  7%  197M 2s
15400K .......... .......... .......... .......... ..........  8%  193M 2s
15450K .......... .......... .......... .......... ..........  8%  211M 2s
15500K .......... .......... .......... .......... ..........  8%  205M 2s
15550K .......... .......... .......... .......... ..........  8%  167M 2s
15600K .......... .......... .......... .......... ..........  8%  188M 2s
15650K .......... .......... .......... .......... ..........  8%  208M 2s
15700K .......... .......... .......... .......... ..........  8%  210M 2s
15750K .......... .......... .......... .......... ..........  8%  195M 2s
15800K .......... .......... .......... .......... ..........  8%  166M 2s
15850K .......... .......... .......... .......... ..........  8%  211M 2s
15900K .......... .......... .......... .......... ..........  8%  203M 2s
15950K .......... .......... .......... .......... ..........  8%  182M 2s
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 16000K .......... .......... .......... .......... ..........  8%  179M 2s
 16050K .......... .......... .......... .......... ..........  8%  205M 2s
 16100K .......... .......... .......... .......... ..........  8%  201M 2s
 16150K .......... .......... .......... .......... ..........  8%  199M 2s

*** WARNING: skipped 243960 bytes of output ***

176700K .......... .......... .......... .......... .......... 91% 34.5M 0s
176750K .......... .......... .......... .......... .......... 91% 5.51M 0s
176800K .......... .......... .......... .......... .......... 91% 30.0M 0s
176850K .......... .......... .......... .......... .......... 91%  107M 0s
176900K .......... .......... .......... .......... .......... 91%  233M 0s
176950K .......... .......... .......... .......... .......... 91% 37.6M 0s
177000K .......... .......... .......... .......... .......... 91% 34.8M 0s
177050K .......... .......... .......... .......... .......... 91% 26.9M 0s
177100K .......... .......... .......... .......... .......... 91% 36.6M 0s
177150K .......... .......... .......... .......... .......... 91% 53.7M 0s
177200K .......... .......... .......... .......... .......... 91% 46.0M 0s
177250K .......... .......... .......... .......... .......... 91%  201M 0s
177300K .......... .......... .......... .......... .......... 91% 37.1M 0s
177350K .......... .......... .......... .......... .......... 91% 21.4M 0s
177400K .......... .......... .......... .......... .......... 91% 62.4M 0s
177450K .......... .......... .......... .......... .......... 91% 87.4M 0s
177500K .......... .......... .......... .......... .......... 92% 31.2M 0s
177550K .......... .......... .......... .......... .......... 92% 24.7M 0s
177600K .......... .......... .......... .......... .......... 92% 31.9M 0s
177650K .......... .......... .......... .......... .......... 92% 29.4M 0s
177700K .......... .......... .......... .......... .......... 92% 39.1M 0s
177750K .......... .......... .......... .......... .......... 92% 73.0M 0s
177800K .......... .......... .......... .......... .......... 92% 41.1M 0s
177850K .......... .......... .......... .......... .......... 92% 10.3M 0s
177900K .......... .......... .......... .......... .......... 92% 34.7M 0s
177950K .......... .......... .......... .......... .......... 92% 29.7M 0s
178000K .......... .......... .......... .......... .......... 92% 34.6M 0s
178050K .......... .......... .......... .......... .......... 92% 66.8M 0s
178100K .......... .......... .......... .......... .......... 92% 43.0M 0s
178150K .......... .......... .......... .......... .......... 92% 19.8M 0s
178200K .......... .......... .......... .......... .......... 92% 46.7M 0s
178250K .......... .......... .......... .......... .......... 92% 51.5M 0s
178300K .......... .......... .......... .......... .......... 92% 29.7M 0s
178350K .......... .......... .......... .......... .......... 92%  123M 0s
178400K .......... .......... .......... .......... .......... 92% 15.0M 0s
178450K .......... .......... .......... .......... .......... 92% 34.4M 0s
178500K .......... .......... .......... .......... .......... 92% 33.6M 0s
178550K .......... .......... .......... .......... .......... 92% 29.0M 0s
178600K .......... .......... .......... .......... .......... 92%  129M 0s
178650K .......... .......... .......... .......... .......... 92% 10.7M 0s
178700K .......... .......... .......... .......... .......... 92%  125M 0s
178750K .......... .......... .......... .......... .......... 92%  162M 0s
178800K .......... .......... .......... .......... .......... 92%  182M 0s
178850K .......... .......... .......... .......... .......... 92%  203M 0s
178900K .......... .......... .......... .......... .......... 92%  171M 0s
178950K .......... .......... .......... .......... .......... 92%  167M 0s
179000K .......... .......... .......... .......... .......... 92%  172M 0s
179050K .......... .......... .......... .......... .......... 92%  210M 0s
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179100K .......... .......... .......... .......... .......... 92%  166M 0s
179150K .......... .......... .......... .......... .......... 92% 90.0M 0s
179200K .......... .......... .......... .......... .......... 92% 24.4M 0s
179250K .......... .......... .......... .......... .......... 92% 93.3M 0s
179300K .......... .......... .......... .......... .......... 92%  116M 0s
179350K .......... .......... .......... .......... .......... 92% 79.3M 0s
179400K .......... .......... .......... .......... .......... 93%  117M 0s
179450K .......... .......... .......... .......... .......... 93%  146M 0s
179500K .......... .......... .......... .......... .......... 93%  153M 0s
179550K .......... .......... .......... .......... .......... 93%  123M 0s
179600K .......... .......... .......... .......... .......... 93%  155M 0s
179650K .......... .......... .......... .......... .......... 93%  152M 0s
179700K .......... .......... .......... .......... .......... 93% 71.4M 0s
179750K .......... .......... .......... .......... .......... 93%  187M 0s
179800K .......... .......... .......... .......... .......... 93%  247M 0s
179850K .......... .......... .......... .......... .......... 93%  215M 0s
179900K .......... .......... .......... .......... .......... 93%  107M 0s
179950K .......... .......... .......... .......... .......... 93%  146M 0s
180000K .......... .......... .......... .......... .......... 93%  160M 0s
180050K .......... .......... .......... .......... .......... 93%  133M 0s
180100K .......... .......... .......... .......... .......... 93%  158M 0s
180150K .......... .......... .......... .......... .......... 93%  128M 0s
180200K .......... .......... .......... .......... .......... 93%  138M 0s
180250K .......... .......... .......... .......... .......... 93%  166M 0s
180300K .......... .......... .......... .......... .......... 93%  168M 0s
180350K .......... .......... .......... .......... .......... 93%  116M 0s
180400K .......... .......... .......... .......... .......... 93%  153M 0s
180450K .......... .......... .......... .......... .......... 93%  157M 0s
180500K .......... .......... .......... .......... .......... 93%  144M 0s
180550K .......... .......... .......... .......... .......... 93%  119M 0s
180600K .......... .......... .......... .......... .......... 93%  160M 0s
180650K .......... .......... .......... .......... .......... 93%  163M 0s
180700K .......... .......... .......... .......... .......... 93%  140M 0s
180750K .......... .......... .......... .......... .......... 93%  137M 0s
180800K .......... .......... .......... .......... .......... 93%  156M 0s
180850K .......... .......... .......... .......... .......... 93%  138M 0s
180900K .......... .......... .......... .......... .......... 93%  143M 0s
180950K .......... .......... .......... .......... .......... 93%  133M 0s
181000K .......... .......... .......... .......... .......... 93%  163M 0s
181050K .......... .......... .......... .......... .......... 93%  144M 0s
181100K .......... .......... .......... .......... .......... 93%  145M 0s
181150K .......... .......... .......... .......... .......... 93%  143M 0s
181200K .......... .......... .......... .......... .......... 93%  131M 0s
181250K .......... .......... .......... .......... .......... 93%  154M 0s
181300K .......... .......... .......... .......... .......... 93%  156M 0s
181350K .......... .......... .......... .......... .......... 94%  120M 0s
181400K .......... .......... .......... .......... .......... 94%  163M 0s
181450K .......... .......... .......... .......... .......... 94%  136M 0s
181500K .......... .......... .......... .......... .......... 94%  111M 0s
181550K .......... .......... .......... .......... .......... 94%  141M 0s
181600K .......... .......... .......... .......... .......... 94%  158M 0s
181650K .......... .......... .......... .......... .......... 94%  150M 0s
181700K .......... .......... .......... .......... .......... 94%  134M 0s
181750K .......... .......... .......... .......... .......... 94%  135M 0s
181800K .......... .......... .......... .......... .......... 94%  162M 0s
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181850K ..... ..... ..... ..... ..... 94%  150M 0s
181900K ..... ..... ..... ..... ..... 94%  160M 0s
181950K ..... ..... ..... ..... ..... 94%  145M 0s
182000K ..... ..... ..... ..... ..... 94%  120M 0s
182050K ..... ..... ..... ..... ..... 94%  109M 0s
182100K ..... ..... ..... ..... ..... 94%  144M 0s
182150K ..... ..... ..... ..... ..... 94%  123M 0s
182200K ..... ..... ..... ..... ..... 94%  158M 0s
182250K ..... ..... ..... ..... ..... 94%  155M 0s
182300K ..... ..... ..... ..... ..... 94%  161M 0s
182350K ..... ..... ..... ..... ..... 94%  120M 0s
182400K ..... ..... ..... ..... ..... 94%  157M 0s
182450K ..... ..... ..... ..... ..... 94%  156M 0s
182500K ..... ..... ..... ..... ..... 94%  155M 0s
182550K ..... ..... ..... ..... ..... 94%  124M 0s
182600K ..... ..... ..... ..... ..... 94%  163M 0s
182650K ..... ..... ..... ..... ..... 94%  152M 0s
182700K ..... ..... ..... ..... ..... 94%  163M 0s
182750K ..... ..... ..... ..... ..... 94%  144M 0s
182800K ..... ..... ..... ..... ..... 94%  152M 0s
182850K ..... ..... ..... ..... ..... 94%  153M 0s
182900K ..... ..... ..... ..... ..... 94%  153M 0s
182950K ..... ..... ..... ..... ..... 94%  136M 0s
183000K ..... ..... ..... ..... ..... 94%  145M 0s
183050K ..... ..... ..... ..... ..... 94%  147M 0s
183100K ..... ..... ..... ..... ..... 94%  153M 0s
183150K ..... ..... ..... ..... ..... 94%  140M 0s
183200K ..... ..... ..... ..... ..... 94%  164M 0s
183250K ..... ..... ..... ..... ..... 94%  147M 0s
183300K ..... ..... ..... ..... ..... 95%  174M 0s
183350K ..... ..... ..... ..... ..... 95%  108M 0s
183400K ..... ..... ..... ..... ..... 95%  149M 0s
183450K ..... ..... ..... ..... ..... 95%  147M 0s
183500K ..... ..... ..... ..... ..... 95%  145M 0s
183550K ..... ..... ..... ..... ..... 95%  129M 0s
183600K ..... ..... ..... ..... ..... 95%  141M 0s
183650K ..... ..... ..... ..... ..... 95%  143M 0s
183700K ..... ..... ..... ..... ..... 95%  158M 0s
183750K ..... ..... ..... ..... ..... 95%  127M 0s
183800K ..... ..... ..... ..... ..... 95%  160M 0s
183850K ..... ..... ..... ..... ..... 95%  144M 0s
183900K ..... ..... ..... ..... ..... 95%  158M 0s
183950K ..... ..... ..... ..... ..... 95%  139M 0s
184000K ..... ..... ..... ..... ..... 95% 14.6M 0s
184050K ..... ..... ..... ..... ..... 95% 75.5M 0s
184100K ..... ..... ..... ..... ..... 95%  134M 0s
184150K ..... ..... ..... ..... ..... 95% 65.6M 0s
184200K ..... ..... ..... ..... ..... 95%  126M 0s
184250K ..... ..... ..... ..... ..... 95% 83.2M 0s
184300K ..... ..... ..... ..... ..... 95% 71.8M 0s
184350K ..... ..... ..... ..... ..... 95% 19.0M 0s
184400K ..... ..... ..... ..... ..... 95% 27.4M 0s
184450K ..... ..... ..... ..... ..... 95% 33.4M 0s
184500K ..... ..... ..... ..... ..... 95% 40.5M 0s
184550K ..... ..... ..... ..... ..... 95% 35.7M 0s
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184600K ..... ..... ..... ..... ..... 95% 39.4M 0s
184650K ..... ..... ..... ..... ..... 95% 36.4M 0s
184700K ..... ..... ..... ..... ..... 95% 39.7M 0s
184750K ..... ..... ..... ..... ..... 95% 30.9M 0s
184800K ..... ..... ..... ..... ..... 95% 55.7M 0s
184850K ..... ..... ..... ..... ..... 95% 83.3M 0s
184900K ..... ..... ..... ..... ..... 95% 41.9M 0s
184950K ..... ..... ..... ..... ..... 95% 51.7M 0s
185000K ..... ..... ..... ..... ..... 95% 83.0M 0s
185050K ..... ..... ..... ..... ..... 95% 85.3M 0s
185100K ..... ..... ..... ..... ..... 95%  107M 0s
185150K ..... ..... ..... ..... ..... 95% 70.4M 0s
185200K ..... ..... ..... ..... ..... 96%  119M 0s
185250K ..... ..... ..... ..... ..... 96% 34.0M 0s
185300K ..... ..... ..... ..... ..... 96% 55.2M 0s
185350K ..... ..... ..... ..... ..... 96% 52.4M 0s
185400K ..... ..... ..... ..... ..... 96% 64.5M 0s
185450K ..... ..... ..... ..... ..... 96% 84.3M 0s
185500K ..... ..... ..... ..... ..... 96% 77.5M 0s
185550K ..... ..... ..... ..... ..... 96% 79.1M 0s
185600K ..... ..... ..... ..... ..... 96% 84.5M 0s
185650K ..... ..... ..... ..... ..... 96% 38.9M 0s
185700K ..... ..... ..... ..... ..... 96% 78.0M 0s
185750K ..... ..... ..... ..... ..... 96% 81.1M 0s
185800K ..... ..... ..... ..... ..... 96%  147M 0s
185850K ..... ..... ..... ..... ..... 96%  128M 0s
185900K ..... ..... ..... ..... ..... 96%  104M 0s
185950K ..... ..... ..... ..... ..... 96%  140M 0s
186000K ..... ..... ..... ..... ..... 96%  140M 0s
186050K ..... ..... ..... ..... ..... 96%  143M 0s
186100K ..... ..... ..... ..... ..... 96%  150M 0s
186150K ..... ..... ..... ..... ..... 96%  130M 0s
186200K ..... ..... ..... ..... ..... 96%  152M 0s
186250K ..... ..... ..... ..... ..... 96%  137M 0s
186300K ..... ..... ..... ..... ..... 96%  146M 0s
186350K ..... ..... ..... ..... ..... 96% 97.2M 0s
186400K ..... ..... ..... ..... ..... 96%  109M 0s
186450K ..... ..... ..... ..... ..... 96%  106M 0s
186500K ..... ..... ..... ..... ..... 96%  111M 0s
186550K ..... ..... ..... ..... ..... 96% 89.8M 0s
186600K ..... ..... ..... ..... ..... 96% 95.8M 0s
186650K ..... ..... ..... ..... ..... 96%  109M 0s
186700K ..... ..... ..... ..... ..... 96% 83.1M 0s
186750K ..... ..... ..... ..... ..... 96%  141M 0s
186800K ..... ..... ..... ..... ..... 96%  148M 0s
186850K ..... ..... ..... ..... ..... 96%  147M 0s
186900K ..... ..... ..... ..... ..... 96%  151M 0s
186950K ..... ..... ..... ..... ..... 96%  134M 0s
187000K ..... ..... ..... ..... ..... 96%  101M 0s
187050K ..... ..... ..... ..... ..... 96%  107M 0s
187100K ..... ..... ..... ..... ..... 96% 93.1M 0s
187150K ..... ..... ..... ..... ..... 97% 88.1M 0s
187200K ..... ..... ..... ..... ..... 97%  108M 0s
187250K ..... ..... ..... ..... ..... 97%  118M 0s
187300K ..... ..... ..... ..... ..... 97% 85.3M 0s
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187350K ..... ..... ..... ..... ..... 97%  104M 0s
187400K ..... ..... ..... ..... ..... 97%  115M 0s
187450K ..... ..... ..... ..... ..... 97% 84.2M 0s
187500K ..... ..... ..... ..... ..... 97%  115M 0s
187550K ..... ..... ..... ..... ..... 97%  149M 0s
187600K ..... ..... ..... ..... ..... 97%  145M 0s
187650K ..... ..... ..... ..... ..... 97%  156M 0s
187700K ..... ..... ..... ..... ..... 97% 82.1M 0s
187750K ..... ..... ..... ..... ..... 97% 98.7M 0s
187800K ..... ..... ..... ..... ..... 97% 85.2M 0s
187850K ..... ..... ..... ..... ..... 97%  112M 0s
187900K ..... ..... ..... ..... ..... 97%  103M 0s
187950K ..... ..... ..... ..... ..... 97% 90.1M 0s
188000K ..... ..... ..... ..... ..... 97% 90.1M 0s
188050K ..... ..... ..... ..... ..... 97%  121M 0s
188100K ..... ..... ..... ..... ..... 97%  102M 0s
188150K ..... ..... ..... ..... ..... 97%  127M 0s
188200K ..... ..... ..... ..... ..... 97%  147M 0s
188250K ..... ..... ..... ..... ..... 97%  150M 0s
188300K ..... ..... ..... ..... ..... 97%  153M 0s
188350K ..... ..... ..... ..... ..... 97%  143M 0s
188400K ..... ..... ..... ..... ..... 97% 84.9M 0s
188450K ..... ..... ..... ..... ..... 97%  101M 0s
188500K ..... ..... ..... ..... ..... 97% 77.8M 0s
188550K ..... ..... ..... ..... ..... 97%  129M 0s
188600K ..... ..... ..... ..... ..... 97%  111M 0s
188650K ..... ..... ..... ..... ..... 97%  101M 0s
188700K ..... ..... ..... ..... ..... 97%  154M 0s
188750K ..... ..... ..... ..... ..... 97%  145M 0s
188800K ..... ..... ..... ..... ..... 97%  112M 0s
188850K ..... ..... ..... ..... ..... 97%  108M 0s
188900K ..... ..... ..... ..... ..... 97%  128M 0s
188950K ..... ..... ..... ..... ..... 97%  120M 0s
189000K ..... ..... ..... ..... ..... 97%  150M 0s
189050K ..... ..... ..... ..... ..... 98%  159M 0s
189100K ..... ..... ..... ..... ..... 98%  156M 0s
189150K ..... ..... ..... ..... ..... 98% 76.8M 0s
189200K ..... ..... ..... ..... ..... 98%  108M 0s
189250K ..... ..... ..... ..... ..... 98% 80.6M 0s
189300K ..... ..... ..... ..... ..... 98% 89.4M 0s
189350K ..... ..... ..... ..... ..... 98% 78.2M 0s
189400K ..... ..... ..... ..... ..... 98%  141M 0s
189450K ..... ..... ..... ..... ..... 98%  145M 0s
189500K ..... ..... ..... ..... ..... 98%  151M 0s
189550K ..... ..... ..... ..... ..... 98% 86.1M 0s
189600K ..... ..... ..... ..... ..... 98% 74.4M 0s
189650K ..... ..... ..... ..... ..... 98%  215M 0s
189700K ..... ..... ..... ..... ..... 98%  227M 0s
189750K ..... ..... ..... ..... ..... 98%  133M 0s
189800K ..... ..... ..... ..... ..... 98%  143M 0s
189850K ..... ..... ..... ..... ..... 98%  156M 0s
189900K ..... ..... ..... ..... ..... 98% 60.1M 0s
189950K ..... ..... ..... ..... ..... 98% 78.5M 0s
190000K ..... ..... ..... ..... ..... 98% 81.9M 0s
190050K ..... ..... ..... ..... ..... 98%  152M 0s
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190100K ..... ..... ..... ..... ..... 98%  150M 0s
190150K ..... ..... ..... ..... ..... 98%  129M 0s
190200K ..... ..... ..... ..... ..... 98%  137M 0s
190250K ..... ..... ..... ..... ..... 98%  103M 0s
190300K ..... ..... ..... ..... ..... 98% 88.4M 0s
190350K ..... ..... ..... ..... ..... 98%  106M 0s
190400K ..... ..... ..... ..... ..... 98%  146M 0s
190450K ..... ..... ..... ..... ..... 98%  157M 0s
190500K ..... ..... ..... ..... ..... 98%  146M 0s
190550K ..... ..... ..... ..... ..... 98%  117M 0s
190600K ..... ..... ..... ..... ..... 98% 77.5M 0s
190650K ..... ..... ..... ..... ..... 98%  101M 0s
190700K ..... ..... ..... ..... ..... 98% 88.3M 0s
190750K ..... ..... ..... ..... ..... 98%  138M 0s
190800K ..... ..... ..... ..... ..... 98%  152M 0s
190850K ..... ..... ..... ..... ..... 98%  160M 0s
190900K ..... ..... ..... ..... ..... 98%  155M 0s
190950K ..... ..... ..... ..... ..... 98%  130M 0s
191000K ..... ..... ..... ..... ..... 99%  159M 0s
191050K ..... ..... ..... ..... ..... 99% 91.7M 0s
191100K ..... ..... ..... ..... ..... 99% 83.6M 0s
191150K ..... ..... ..... ..... ..... 99% 82.6M 0s
191200K ..... ..... ..... ..... ..... 99%  151M 0s
191250K ..... ..... ..... ..... ..... 99%  162M 0s
191300K ..... ..... ..... ..... ..... 99%  140M 0s
191350K ..... ..... ..... ..... ..... 99% 64.9M 0s
191400K ..... ..... ..... ..... ..... 99%  109M 0s
191450K ..... ..... ..... ..... ..... 99%  156M 0s
191500K ..... ..... ..... ..... ..... 99%  159M 0s
191550K ..... ..... ..... ..... ..... 99%  147M 0s
191600K ..... ..... ..... ..... ..... 99%  153M 0s
191650K ..... ..... ..... ..... ..... 99%  156M 0s
191700K ..... ..... ..... ..... ..... 99%  150M 0s
191750K ..... ..... ..... ..... ..... 99%  121M 0s
191800K ..... ..... ..... ..... ..... 99%  153M 0s
191850K ..... ..... ..... ..... ..... 99%  148M 0s
191900K ..... ..... ..... ..... ..... 99%  155M 0s
191950K ..... ..... ..... ..... ..... 99%  142M 0s
192000K ..... ..... ..... ..... ..... 99%  139M 0s
192050K ..... ..... ..... ..... ..... 99%  156M 0s
192100K ..... ..... ..... ..... ..... 99%  150M 0s
192150K ..... ..... ..... ..... ..... 99%  134M 0s
192200K ..... ..... ..... ..... ..... 99%  156M 0s
192250K ..... ..... ..... ..... ..... 99%  152M 0s
192300K ..... ..... ..... ..... ..... 99%  163M 0s
192350K ..... ..... ..... ..... ..... 99%  141M 0s
192400K ..... ..... ..... ..... ..... 99%  158M 0s
192450K ..... ..... ..... ..... ..... 99%  149M 0s
192500K ..... ..... ..... ..... ..... 99%  149M 0s
192550K ..... ..... ..... ..... ..... 99%  132M 0s
192600K ..... ..... ..... ..... ..... 99%  160M 0s
192650K ..... ..... ..... ..... ..... 99%  153M 0s
192700K ..... ..... ..... ..... ..... 99%  159M 0s
192750K ..... ..... ..... ..... ..... 99%  147M 0s
192800K ..... ..... ..... ..... ..... 99%  149M 0s
```

```
192850K .......... .......... .......... .......... .......... 99%  158M 0s
192900K .......... .......... .......... .......... .......... 99%  152M 0s
192950K ......                                                   100% 54.3M=1.5s

2020-05-30 13:04:41 (129 MB/s) - ‘name.basics.tsv.gz.1’ saved [197587198/1975871
98]

/bin/bash: line 2: fg: no job control
gzip: name.basics.tsv already exists;   not overwritten
```

In [4]:

```
names_basic = spark.read.option("sep", "\t").csv('file:/databricks/driver/name.basics.t
sv', header=True, inferSchema = True)
names_basic.show(3)
```

```
+---------+---------------+---------+---------+-------------------+------------
--------+
   nconst|    primaryName|birthYear|deathYear|   primaryProfession|      knownFo
rTitles|
+---------+---------------+---------+---------+-------------------+------------
--------+
nm0000001|   Fred Astaire|     1899|     1987|soundtrack,actor,...|tt0043044,tt0
0531...|
nm0000002|  Lauren Bacall|     1924|     2014|  actress,soundtrack|tt0071877,tt0
1170...|
nm0000003|Brigitte Bardot|     1934|       \N|actress,soundtrac...|tt0054452,tt0
0491...|
+---------+---------------+---------+---------+-------------------+------------
--------+
only showing top 3 rows
```

In [5]:

```
%sh wget https://datasets.imdbws.com/title.basics.tsv.gz

%sh
gunzip title.basics.tsv.gz
```

```
--2020-05-30 13:05:03--  https://datasets.imdbws.com/title.basics.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.54, 13.224.13.2
6, 13.224.13.32, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.54|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 121710643 (116M) [binary/octet-stream]
Saving to: ‘title.basics.tsv.gz’

     0K .......... .......... .......... .......... ..........  0% 4.81M 24s
    50K .......... .......... .......... .......... ..........  0% 8.09M 19s
   100K .......... .......... .......... .......... ..........  0% 15.9M 15s
   150K .......... .......... .......... .......... ..........  0% 19.9M 13s
   200K .......... .......... .......... .......... ..........  0% 15.7M 12s
   250K .......... .......... .......... .......... ..........  0% 22.4M 11s
   300K .......... .......... .......... .......... ..........  0% 38.6M 10s
   350K .......... .......... .......... .......... ..........  0% 28.2M 9s
   400K .......... .......... .......... .......... ..........  0% 45.7M 8s
   450K .......... .......... .......... .......... ..........  0% 34.2M 8s
   500K .......... .......... .......... .......... ..........  0% 39.1M 7s
   550K .......... .......... .......... .......... ..........  0%  105M 7s
   600K .......... .......... .......... .......... ..........  0% 52.0M 6s
   650K .......... .......... .......... .......... ..........  0% 52.9M 6s
   700K .......... .......... .......... .......... ..........  0% 54.0M 6s
   750K .......... .......... .......... .......... ..........  0% 83.0M 6s
   800K .......... .......... .......... .......... ..........  0% 79.6M 5s
   850K .......... .......... .......... .......... ..........  0% 65.8M 5s
   900K .......... .......... .......... .......... ..........  0% 85.5M 5s
   950K .......... .......... .......... .......... ..........  0%  141M 5s
  1000K .......... .......... .......... .......... ..........  0% 81.7M 5s
  1050K .......... .......... .......... .......... ..........  0% 57.3M 4s
  1100K .......... .......... .......... .......... ..........  0% 93.1M 4s
  1150K .......... .......... .......... .......... ..........  1% 94.5M 4s
  1200K .......... .......... .......... .......... ..........  1%  133M 4s
  1250K .......... .......... .......... .......... ..........  1%  274M 4s
  1300K .......... .......... .......... .......... ..........  1% 89.2M 4s
  1350K .......... .......... .......... .......... ..........  1% 97.6M 4s
  1400K .......... .......... .......... .......... ..........  1%  118M 4s
  1450K .......... .......... .......... .......... ..........  1%  104M 4s
  1500K .......... .......... .......... .......... ..........  1%  296M 3s
  1550K .......... .......... .......... .......... ..........  1%  187M 3s
  1600K .......... .......... .......... .......... ..........  1% 84.3M 3s
  1650K .......... .......... .......... .......... ..........  1%  103M 3s
  1700K .......... .......... .......... .......... ..........  1% 27.5M 3s
  1750K .......... .......... .......... .......... ..........  1%  101M 3s
  1800K .......... .......... .......... .......... ..........  1% 83.3M 3s
  1850K .......... .......... .......... .......... ..........  1% 73.8M 3s
  1900K .......... .......... .......... .......... ..........  1% 84.3M 3s
  1950K .......... .......... .......... .......... ..........  1% 88.9M 3s
  2000K .......... .......... .......... .......... ..........  1% 64.9M 3s
  2050K .......... .......... .......... .......... ..........  1% 69.1M 3s
  2100K .......... .......... .......... .......... ..........  1%  157M 3s
  2150K .......... .......... .......... .......... ..........  1%  182M 3s
  2200K .......... .......... .......... .......... ..........  1%  281M 3s
```

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2250K .......... .......... .......... .......... ..........  1%  148M 3s
2300K .......... .......... .......... .......... ..........  1%  251M 3s
2350K .......... .......... .......... .......... ..........  2%  147M 3s
2400K .......... .......... .......... .......... ..........  2%  180M 3s
2450K .......... .......... .......... .......... ..........  2%  158M 3s
2500K .......... .......... .......... .......... ..........  2%  260M 2s
2550K .......... .......... .......... .......... ..........  2%  151M 2s
2600K .......... .......... .......... .......... ..........  2%  174M 2s
2650K .......... .......... .......... .......... ..........  2%  152M 2s
2700K .......... .......... .......... .......... ..........  2%  267M 2s
2750K .......... .......... .......... .......... ..........  2%  161M 2s
2800K .......... .......... .......... .......... ..........  2%  185M 2s
2850K .......... .......... .......... .......... ..........  2%  134M 2s
2900K .......... .......... .......... .......... ..........  2%  116M 2s
2950K .......... .......... .......... .......... ..........  2% 55.8M 2s
3000K .......... .......... .......... .......... ..........  2% 83.3M 2s
3050K .......... .......... .......... .......... ..........  2% 58.8M 2s
3100K .......... .......... .......... .......... ..........  2% 72.3M 2s
3150K .......... .......... .......... .......... ..........  2% 80.4M 2s
3200K .......... .......... .......... .......... ..........  2%  115M 2s
3250K .......... .......... .......... .......... ..........  2% 68.2M 2s
3300K .......... .......... .......... .......... ..........  2% 96.1M 2s
3350K .......... .......... .......... .......... ..........  2% 62.7M 2s
3400K .......... .......... .......... .......... ..........  2% 24.0M 2s
3450K .......... .......... .......... .......... ..........  2% 89.8M 2s
3500K .......... .......... .......... .......... ..........  2%  152M 2s
3550K .......... .......... .......... .......... ..........  3%  106M 2s
3600K .......... .......... .......... .......... ..........  3%  125M 2s
3650K .......... .......... .......... .......... ..........  3%  119M 2s
3700K .......... .......... .......... .......... ..........  3%  155M 2s
3750K .......... .......... .......... .......... ..........  3%  138M 2s
3800K .......... .......... .......... .......... ..........  3%  151M 2s
3850K .......... .......... .......... .......... ..........  3%  133M 2s
3900K .......... .......... .......... .......... ..........  3% 99.0M 2s
3950K .......... .......... .......... .......... ..........  3%  150M 2s
4000K .......... .......... .......... .......... ..........  3%  149M 2s
4050K .......... .......... .......... .......... ..........  3%  133M 2s
4100K .......... .......... .......... .......... ..........  3%  107M 2s
4150K .......... .......... .......... .......... ..........  3%  151M 2s
4200K .......... .......... .......... .......... ..........  3%  124M 2s
4250K .......... .......... .......... .......... ..........  3%  100M 2s
4300K .......... .......... .......... .......... ..........  3% 47.3M 2s
4350K .......... .......... .......... .......... ..........  3%  154M 2s
4400K .......... .......... .......... .......... ..........  3%  151M 2s
4450K .......... .......... .......... .......... ..........  3%  138M 2s
4500K .......... .......... .......... .......... ..........  3%  160M 2s
4550K .......... .......... .......... .......... ..........  3%  151M 2s
4600K .......... .......... .......... .......... ..........  3% 89.4M 2s
4650K .......... .......... .......... .......... ..........  3%  126M 2s
4700K .......... .......... .......... .......... ..........  3%  156M 2s
4750K .......... .......... .......... .......... ..........  4%  148M 2s
4800K .......... .......... .......... .......... ..........  4%  151M 2s
4850K .......... .......... .......... .......... ..........  4% 59.6M 2s
4900K .......... .......... .......... .......... ..........  4%  143M 2s
4950K .......... .......... .......... .......... ..........  4% 84.8M 2s
```

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5000K ..... ..... ..... ..... .....  4%  106M 2s
5050K ..... ..... ..... ..... .....  4% 80.0M 2s
5100K ..... ..... ..... ..... .....  4%  142M 2s
5150K ..... ..... ..... ..... .....  4%  160M 2s
5200K ..... ..... ..... ..... .....  4%  159M 2s
5250K ..... ..... ..... ..... .....  4%  177M 2s
5300K ..... ..... ..... ..... .....  4%  280M 2s
5350K ..... ..... ..... ..... .....  4%  278M 2s
5400K ..... ..... ..... ..... .....  4%  307M 2s
5450K ..... ..... ..... ..... .....  4%  258M 2s
5500K ..... ..... ..... ..... .....  4%  187M 2s
5550K ..... ..... ..... ..... .....  4%  279M 2s
5600K ..... ..... ..... ..... .....  4%  226M 2s
5650K ..... ..... ..... ..... .....  4%  278M 2s
5700K ..... ..... ..... ..... .....  4%  321M 2s
5750K ..... ..... ..... ..... .....  4%  321M 2s
5800K ..... ..... ..... ..... .....  4%  278M 2s
5850K ..... ..... ..... ..... .....  4% 53.0M 2s
5900K ..... ..... ..... ..... .....  5%  290M 2s
5950K ..... ..... ..... ..... .....  5%  265M 2s
6000K ..... ..... ..... ..... .....  5%  289M 2s
6050K ..... ..... ..... ..... .....  5%  263M 2s
6100K ..... ..... ..... ..... .....  5%  107M 2s
6150K ..... ..... ..... ..... .....  5%  272M 2s
6200K ..... ..... ..... ..... .....  5%  292M 2s
6250K ..... ..... ..... ..... .....  5%  232M 2s
6300K ..... ..... ..... ..... .....  5%  284M 2s
6350K ..... ..... ..... ..... .....  5%  314M 2s
6400K ..... ..... ..... ..... .....  5%  228M 1s
6450K ..... ..... ..... ..... .....  5% 84.1M 1s
6500K ..... ..... ..... ..... .....  5%  135M 1s
6550K ..... ..... ..... ..... .....  5%  106M 1s
6600K ..... ..... ..... ..... .....  5%  136M 1s
6650K ..... ..... ..... ..... .....  5%  137M 1s
6700K ..... ..... ..... ..... .....  5%  163M 1s
6750K ..... ..... ..... ..... .....  5%  156M 1s
6800K ..... ..... ..... ..... .....  5%  160M 1s
6850K ..... ..... ..... ..... .....  5% 43.5M 1s
6900K ..... ..... ..... ..... .....  5%  106M 1s
6950K ..... ..... ..... ..... .....  5% 92.1M 1s
7000K ..... ..... ..... ..... .....  5%  110M 1s
7050K ..... ..... ..... ..... .....  5% 84.1M 1s
7100K ..... ..... ..... ..... .....  6% 85.7M 1s
7150K ..... ..... ..... ..... .....  6%  117M 1s
7200K ..... ..... ..... ..... .....  6%  120M 1s
7250K ..... ..... ..... ..... .....  6% 80.7M 1s
7300K ..... ..... ..... ..... .....  6% 86.8M 1s
7350K ..... ..... ..... ..... .....  6%  120M 1s
7400K ..... ..... ..... ..... .....  6%  103M 1s
7450K ..... ..... ..... ..... .....  6%  135M 1s
7500K ..... ..... ..... ..... .....  6%  161M 1s
7550K ..... ..... ..... ..... .....  6%  171M 1s
7600K ..... ..... ..... ..... .....  6%  157M 1s
7650K ..... ..... ..... ..... .....  6% 90.5M 1s
7700K ..... ..... ..... ..... .....  6% 84.2M 1s
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 7750K ..... ..... ..... ..... .....  6%  169M 1s
 7800K ..... ..... ..... ..... .....  6%  151M 1s
 7850K ..... ..... ..... ..... .....  6%  137M 1s
 7900K ..... ..... ..... ..... .....  6%  279M 1s
 7950K ..... ..... ..... ..... .....  6%  185M 1s
 8000K ..... ..... ..... ..... .....  6% 91.6M 1s
 8050K ..... ..... ..... ..... .....  6%  183M 1s
 8100K ..... ..... ..... ..... .....  6%  197M 1s
 8150K ..... ..... ..... ..... .....  6%  202M 1s
 8200K ..... ..... ..... ..... .....  6%  207M 1s
 8250K ..... ..... ..... ..... .....  6% 80.3M 1s
 8300K ..... ..... ..... ..... .....  7%  101M 1s
 8350K ..... ..... ..... ..... .....  7%  148M 1s
 8400K ..... ..... ..... ..... .....  7%  154M 1s
 8450K ..... ..... ..... ..... .....  7%  143M 1s
 8500K ..... ..... ..... ..... .....  7%  150M 1s
 8550K ..... ..... ..... ..... .....  7%  143M 1s
 8600K ..... ..... ..... ..... .....  7%  155M 1s
 8650K ..... ..... ..... ..... .....  7%  137M 1s
 8700K ..... ..... ..... ..... .....  7% 77.4M 1s
 8750K ..... ..... ..... ..... .....  7% 96.2M 1s
 8800K ..... ..... ..... ..... .....  7% 80.9M 1s
 8850K ..... ..... ..... ..... .....  7%  106M 1s
 8900K ..... ..... ..... ..... .....  7%  130M 1s
 8950K ..... ..... ..... ..... .....  7%  150M 1s
 9000K ..... ..... ..... ..... .....  7% 57.8M 1s
 9050K ..... ..... ..... ..... .....  7%  139M 1s
 9100K ..... ..... ..... ..... .....  7%  156M 1s
 9150K ..... ..... ..... ..... .....  7% 83.5M 1s
 9200K ..... ..... ..... ..... .....  7% 68.1M 1s
 9250K ..... ..... ..... ..... .....  7%  117M 1s
 9300K ..... ..... ..... ..... .....  7%  154M 1s
 9350K ..... ..... ..... ..... .....  7%  139M 1s
 9400K ..... ..... ..... ..... .....  7%  152M 1s
 9450K ..... ..... ..... ..... .....  7%  140M 1s
 9500K ..... ..... ..... ..... .....  8%  137M 1s
 9550K ..... ..... ..... ..... .....  8% 69.9M 1s
 9600K ..... ..... ..... ..... .....  8% 78.5M 1s
 9650K ..... ..... ..... ..... .....  8% 53.8M 1s
 9700K ..... ..... ..... ..... .....  8% 95.9M 1s
 9750K ..... ..... ..... ..... .....  8% 70.5M 1s
 9800K ..... ..... ..... ..... .....  8%  167M 1s
 9850K ..... ..... ..... ..... .....  8%  123M 1s
 9900K ..... ..... ..... ..... .....  8%  162M 1s
 9950K ..... ..... ..... ..... .....  8% 97.5M 1s
10000K ..... ..... ..... ..... .....  8%  162M 1s
10050K ..... ..... ..... ..... .....  8%  133M 1s
10100K ..... ..... ..... ..... .....  8%  148M 1s
10150K ..... ..... ..... ..... .....  8%  157M 1s
10200K ..... ..... ..... ..... .....  8%  147M 1s
10250K ..... ..... ..... ..... .....  8%  137M 1s
10300K ..... ..... ..... ..... .....  8%  197M 1s
10350K ..... ..... ..... ..... .....  8%  165M 1s
10400K ..... ..... ..... ..... .....  8%  164M 1s
10450K ..... ..... ..... ..... .....  8% 71.9M 1s
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10500K .......... .......... .......... .......... ..........  8% 91.9M 1s
10550K .......... .......... .......... .......... ..........  8%  108M 1s
10600K .......... .......... .......... .......... ..........  8% 99.2M 1s
10650K .......... .......... .......... .......... ..........  9%  134M 1s
10700K .......... .......... .......... .......... ..........  9%  171M 1s
10750K .......... .......... .......... .......... ..........  9%  156M 1s
10800K .......... .......... .......... .......... ..........  9%  158M 1s
10850K .......... .......... .......... .......... ..........  9%  137M 1s
10900K .......... .......... .......... .......... ..........  9%  290M 1s
10950K .......... .......... .......... .......... ..........  9%  273M 1s
11000K .......... .......... .......... .......... ..........  9%  313M 1s
11050K .......... .......... .......... .......... ..........  9%  125M 1s
11100K .......... .......... .......... .......... ..........  9%  160M 1s
11150K .......... .......... .......... .......... ..........  9%  270M 1s
11200K .......... .......... .......... .......... ..........  9%  314M 1s
11250K .......... .......... .......... .......... ..........  9%  292M 1s
11300K .......... .......... .......... .......... ..........  9%  284M 1s
11350K .......... .......... .......... .......... ..........  9%  309M 1s
11400K .......... .......... .......... .......... ..........  9%  281M 1s
11450K .......... .......... .......... .......... ..........  9%  173M 1s
11500K .......... .......... .......... .......... ..........  9%  125M 1s
11550K .......... .......... .......... .......... ..........  9%  156M 1s
11600K .......... .......... .......... .......... ..........  9%  151M 1s
11650K .......... .......... .......... .......... ..........  9% 85.5M 1s
11700K .......... .......... .......... .......... ..........  9% 87.5M 1s
11750K .......... .......... .......... .......... ..........  9% 85.1M 1s
11800K .......... .......... .......... .......... ..........  9% 70.0M 1s
11850K .......... .......... .......... .......... .......... 10% 72.8M 1s
11900K .......... .......... .......... .......... .......... 10%  142M 1s
11950K .......... .......... .......... .......... .......... 10%  190M 1s
12000K .......... .......... .......... .......... .......... 10%  203M 1s
12050K .......... .......... .......... .......... .......... 10%  181M 1s
12100K .......... .......... .......... .......... .......... 10%  227M 1s
12150K .......... .......... .......... .......... .......... 10%  185M 1s
12200K .......... .......... .......... .......... .......... 10% 55.1M 1s
12250K .......... .......... .......... .......... .......... 10% 66.8M 1s
12300K .......... .......... .......... .......... .......... 10% 81.6M 1s
12350K .......... .......... .......... .......... .......... 10% 85.7M 1s
12400K .......... .......... .......... .......... .......... 10%  211M 1s
12450K .......... .......... .......... .......... .......... 10%  192M 1s
12500K .......... .......... .......... .......... .......... 10% 75.5M 1s
12550K .......... .......... .......... .......... .......... 10% 97.6M 1s
12600K .......... .......... .......... .......... .......... 10%  104M 1s
12650K .......... .......... .......... .......... .......... 10% 75.9M 1s
12700K .......... .......... .......... .......... .......... 10% 32.8M 1s
12750K .......... .......... .......... .......... .......... 10% 26.5M 1s
12800K .......... .......... .......... .......... .......... 10% 39.7M 1s
12850K .......... .......... .......... .......... .......... 10% 35.3M 1s
12900K .......... .......... .......... .......... .......... 10% 10.7M 1s
12950K .......... .......... .......... .......... .......... 10%  144M 1s
13000K .......... .......... .......... .......... .......... 10%  135M 1s
13050K .......... .......... .......... .......... .......... 11%  134M 1s
13100K .......... .......... .......... .......... .......... 11%  144M 1s
13150K .......... .......... .......... .......... .......... 11%  118M 1s
13200K .......... .......... .......... .......... .......... 11%  131M 1s
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13250K .......... .......... .......... .......... .......... 11%  136M 1s
13300K .......... .......... .......... .......... .......... 11%  115M 1s
13350K .......... .......... .......... .......... .......... 11%  153M 1s
13400K .......... .......... .......... .......... .......... 11%  159M 1s
13450K .......... .......... .......... .......... .......... 11%  126M 1s
13500K .......... .......... .......... .......... .......... 11%  165M 1s
13550K .......... .......... .......... .......... .......... 11%  164M 1s
13600K .......... .......... .......... .......... .......... 11%  163M 1s
13650K .......... .......... .......... .......... .......... 11%  136M 1s
13700K .......... .......... .......... .......... .......... 11%  144M 1s
13750K .......... .......... .......... .......... .......... 11%  153M 1s
13800K .......... .......... .......... .......... .......... 11%  136M 1s
13850K .......... .......... .......... .......... .......... 11%  136M 1s
13900K .......... .......... .......... .......... .......... 11%  140M 1s
13950K .......... .......... .......... .......... .......... 11%  138M 1s
14000K .......... .......... .......... .......... .......... 11%  159M 1s
14050K .......... .......... .......... .......... .......... 11% 41.3M 1s
14100K .......... .......... .......... .......... .......... 11% 50.7M 1s
14150K .......... .......... .......... .......... .......... 11%  130M 1s
14200K .......... .......... .......... .......... .......... 11%  148M 1s
14250K .......... .......... .......... .......... .......... 12% 79.8M 1s
14300K .......... .......... .......... .......... .......... 12%  184M 1s
14350K .......... .......... .......... .......... .......... 12%  297M 1s
14400K .......... .......... .......... .......... .......... 12%  261M 1s
14450K .......... .......... .......... .......... .......... 12%  272M 1s
14500K .......... .......... .......... .......... .......... 12%  292M 1s
14550K .......... .......... .......... .......... .......... 12%  264M 1s
14600K .......... .......... .......... .......... .......... 12%  297M 1s
14650K .......... .......... .......... .......... .......... 12%  244M 1s
14700K .......... .......... .......... .......... .......... 12%  269M 1s
14750K .......... .......... .......... .......... .......... 12%  291M 1s
14800K .......... .......... .......... .......... .......... 12%  301M 1s
14850K .......... .......... .......... .......... .......... 12%  102M 1s
14900K .......... .......... .......... .......... .......... 12%  163M 1s
14950K .......... .......... .......... .......... .......... 12% 84.7M 1s
15000K .......... .......... .......... .......... .......... 12%  123M 1s
15050K .......... .......... .......... .......... .......... 12%  138M 1s
15100K .......... .......... .......... .......... .......... 12%  190M 1s
15150K .......... .......... .......... .......... .......... 12%  277M 1s
15200K .......... .......... .......... .......... .......... 12%  299M 1s
15250K .......... .......... .......... .......... .......... 12%  119M 1s
15300K .......... .......... .......... .......... .......... 12%  187M 1s
15350K .......... .......... .......... .......... .......... 12%  110M 1s
15400K .......... .......... .......... .......... .......... 12%  177M 1s
15450K .......... .......... .......... .......... .......... 13%  146M 1s
15500K .......... .......... .......... .......... .......... 13%  302M 1s
15550K .......... .......... .......... .......... .......... 13%  276M 1s
15600K .......... .......... .......... .......... .......... 13%  264M 1s
15650K .......... .......... .......... .......... .......... 13%  100M 1s
15700K .......... .......... .......... .......... .......... 13%  121M 1s
15750K .......... .......... .......... .......... .......... 13%  150M 1s
15800K .......... .......... .......... .......... .......... 13%  159M 1s
15850K .......... .......... .......... .......... .......... 13%  157M 1s
15900K .......... .......... .......... .......... .......... 13%  316M 1s
15950K .......... .......... .......... .......... .......... 13%  281M 1s
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 16000K .......... .......... .......... .......... .......... 13%  316M 1s
 16050K .......... .......... .......... .......... .......... 13%  287M 1s
 16100K .......... .......... .......... .......... .......... 13%  276M 1s
 16150K .......... .......... .......... .......... .......... 13%  134M 1s

*** WARNING: skipped 131252 bytes of output ***

102550K .......... .......... .......... .......... .......... 86% 88.1M 0s
102600K .......... .......... .......... .......... .......... 86%  128M 0s
102650K .......... .......... .......... .......... .......... 86%  133M 0s
102700K .......... .......... .......... .......... .......... 86%  119M 0s
102750K .......... .......... .......... .......... .......... 86%  293M 0s
102800K .......... .......... .......... .......... .......... 86%  253M 0s
102850K .......... .......... .......... .......... .......... 86%  255M 0s
102900K .......... .......... .......... .......... .......... 86%  234M 0s
102950K .......... .......... .......... .......... .......... 86%  283M 0s
103000K .......... .......... .......... .......... .......... 86%  293M 0s
103050K .......... .......... .......... .......... .......... 86%  301M 0s
103100K .......... .......... .......... .......... .......... 86%  137M 0s
103150K .......... .......... .......... .......... .......... 86%  254M 0s
103200K .......... .......... .......... .......... .......... 86%  178M 0s
103250K .......... .......... .......... .......... .......... 86%  209M 0s
103300K .......... .......... .......... .......... .......... 86%  102M 0s
103350K .......... .......... .......... .......... .......... 86%  238M 0s
103400K .......... .......... .......... .......... .......... 87%  172M 0s
103450K .......... .......... .......... .......... .......... 87%  145M 0s
103500K .......... .......... .......... .......... .......... 87%  165M 0s
103550K .......... .......... .......... .......... .......... 87%  190M 0s
103600K .......... .......... .......... .......... .......... 87%  178M 0s
103650K .......... .......... .......... .......... .......... 87%  265M 0s
103700K .......... .......... .......... .......... .......... 87%  178M 0s
103750K .......... .......... .......... .......... .......... 87%  300M 0s
103800K .......... .......... .......... .......... .......... 87%  297M 0s
103850K .......... .......... .......... .......... .......... 87%  305M 0s
103900K .......... .......... .......... .......... .......... 87%  185M 0s
103950K .......... .......... .......... .......... .......... 87%  186M 0s
104000K .......... .......... .......... .......... .......... 87%  297M 0s
104050K .......... .......... .......... .......... .......... 87%  298M 0s
104100K .......... .......... .......... .......... .......... 87%  204M 0s
104150K .......... .......... .......... .......... .......... 87%  106M 0s
104200K .......... .......... .......... .......... .......... 87%  278M 0s
104250K .......... .......... .......... .......... .......... 87%  300M 0s
104300K .......... .......... .......... .......... .......... 87%  180M 0s
104350K .......... .......... .......... .......... .......... 87%  254M 0s
104400K .......... .......... .......... .......... .......... 87%  266M 0s
104450K .......... .......... .......... .......... .......... 87%  260M 0s
104500K .......... .......... .......... .......... .......... 87%  269M 0s
104550K .......... .......... .......... .......... .......... 88%  297M 0s
104600K .......... .......... .......... .......... .......... 88%  306M 0s
104650K .......... .......... .......... .......... .......... 88%  243M 0s
104700K .......... .......... .......... .......... .......... 88%  211M 0s
104750K .......... .......... .......... .......... .......... 88%  171M 0s
104800K .......... .......... .......... .......... .......... 88% 55.2M 0s
104850K .......... .......... .......... .......... .......... 88%  127M 0s
104900K .......... .......... .......... .......... .......... 88%  134M 0s
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104950K ..... ..... ..... ..... ..... 88% 90.0M 0s
105000K ..... ..... ..... ..... ..... 88%  146M 0s
105050K ..... ..... ..... ..... ..... 88%  184M 0s
105100K ..... ..... ..... ..... ..... 88%  139M 0s
105150K ..... ..... ..... ..... ..... 88%  184M 0s
105200K ..... ..... ..... ..... ..... 88%  200M 0s
105250K ..... ..... ..... ..... ..... 88%  206M 0s
105300K ..... ..... ..... ..... ..... 88%  153M 0s
105350K ..... ..... ..... ..... ..... 88%  187M 0s
105400K ..... ..... ..... ..... ..... 88%  191M 0s
105450K ..... ..... ..... ..... ..... 88%  120M 0s
105500K ..... ..... ..... ..... ..... 88%  107M 0s
105550K ..... ..... ..... ..... ..... 88%  146M 0s
105600K ..... ..... ..... ..... ..... 88%  143M 0s
105650K ..... ..... ..... ..... ..... 88%  145M 0s
105700K ..... ..... ..... ..... ..... 88%  135M 0s
105750K ..... ..... ..... ..... ..... 89%  138M 0s
105800K ..... ..... ..... ..... ..... 89%  103M 0s
105850K ..... ..... ..... ..... ..... 89%  132M 0s
105900K ..... ..... ..... ..... ..... 89%  128M 0s
105950K ..... ..... ..... ..... ..... 89%  165M 0s
106000K ..... ..... ..... ..... ..... 89%  157M 0s
106050K ..... ..... ..... ..... ..... 89%  132M 0s
106100K ..... ..... ..... ..... ..... 89%  155M 0s
106150K ..... ..... ..... ..... ..... 89%  201M 0s
106200K ..... ..... ..... ..... ..... 89%  272M 0s
106250K ..... ..... ..... ..... ..... 89%  228M 0s
106300K ..... ..... ..... ..... ..... 89%  151M 0s
106350K ..... ..... ..... ..... ..... 89%  193M 0s
106400K ..... ..... ..... ..... ..... 89%  153M 0s
106450K ..... ..... ..... ..... ..... 89%  227M 0s
106500K ..... ..... ..... ..... ..... 89%  187M 0s
106550K ..... ..... ..... ..... ..... 89%  156M 0s
106600K ..... ..... ..... ..... ..... 89%  170M 0s
106650K ..... ..... ..... ..... ..... 89%  188M 0s
106700K ..... ..... ..... ..... ..... 89%  224M 0s
106750K ..... ..... ..... ..... ..... 89%  118M 0s
106800K ..... ..... ..... ..... ..... 89%  278M 0s
106850K ..... ..... ..... ..... ..... 89%  281M 0s
106900K ..... ..... ..... ..... ..... 89%  276M 0s
106950K ..... ..... ..... ..... ..... 90%  285M 0s
107000K ..... ..... ..... ..... ..... 90%  225M 0s
107050K ..... ..... ..... ..... ..... 90%  299M 0s
107100K ..... ..... ..... ..... ..... 90%  248M 0s
107150K ..... ..... ..... ..... ..... 90%  263M 0s
107200K ..... ..... ..... ..... ..... 90%  310M 0s
107250K ..... ..... ..... ..... ..... 90%  223M 0s
107300K ..... ..... ..... ..... ..... 90%  178M 0s
107350K ..... ..... ..... ..... ..... 90%  197M 0s
107400K ..... ..... ..... ..... ..... 90%  206M 0s
107450K ..... ..... ..... ..... ..... 90%  191M 0s
107500K ..... ..... ..... ..... ..... 90%  135M 0s
107550K ..... ..... ..... ..... ..... 90%  210M 0s
107600K ..... ..... ..... ..... ..... 90%  268M 0s
107650K ..... ..... ..... ..... ..... 90%  208M 0s
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107700K .......... .......... .......... .......... .......... 90% 96.6M 0s
107750K .......... .......... .......... .......... .......... 90%  140M 0s
107800K .......... .......... .......... .......... .......... 90%  170M 0s
107850K .......... .......... .......... .......... .......... 90%  175M 0s
107900K .......... .......... .......... .......... .......... 90%  212M 0s
107950K .......... .......... .......... .......... .......... 90%  214M 0s
108000K .......... .......... .......... .......... .......... 90%  278M 0s
108050K .......... .......... .......... .......... .......... 90%  220M 0s
108100K .......... .......... .......... .......... .......... 90%  198M 0s
108150K .......... .......... .......... .......... .......... 91%  295M 0s
108200K .......... .......... .......... .......... .......... 91%  294M 0s
108250K .......... .......... .......... .......... .......... 91%  239M 0s
108300K .......... .......... .......... .......... .......... 91%  185M 0s
108350K .......... .......... .......... .......... .......... 91%  302M 0s
108400K .......... .......... .......... .......... .......... 91%  179M 0s
108450K .......... .......... .......... .......... .......... 91%  134M 0s
108500K .......... .......... .......... .......... .......... 91%  242M 0s
108550K .......... .......... .......... .......... .......... 91%  307M 0s
108600K .......... .......... .......... .......... .......... 91%  293M 0s
108650K .......... .......... .......... .......... .......... 91%  270M 0s
108700K .......... .......... .......... .......... .......... 91%  156M 0s
108750K .......... .......... .......... .......... .......... 91%  200M 0s
108800K .......... .......... .......... .......... .......... 91%  202M 0s
108850K .......... .......... .......... .......... .......... 91%  193M 0s
108900K .......... .......... .......... .......... .......... 91%  173M 0s
108950K .......... .......... .......... .......... .......... 91%  182M 0s
109000K .......... .......... .......... .......... .......... 91%  191M 0s
109050K .......... .......... .......... .......... .......... 91% 38.1M 0s
109100K .......... .......... .......... .......... .......... 91% 35.3M 0s
109150K .......... .......... .......... .......... .......... 91% 39.3M 0s
109200K .......... .......... .......... .......... .......... 91% 41.0M 0s
109250K .......... .......... .......... .......... .......... 91% 44.6M 0s
109300K .......... .......... .......... .......... .......... 92% 36.5M 0s
109350K .......... .......... .......... .......... .......... 92% 38.6M 0s
109400K .......... .......... .......... .......... .......... 92% 19.4M 0s
109450K .......... .......... .......... .......... .......... 92% 41.2M 0s
109500K .......... .......... .......... .......... .......... 92% 30.5M 0s
109550K .......... .......... .......... .......... .......... 92% 41.0M 0s
109600K .......... .......... .......... .......... .......... 92% 37.2M 0s
109650K .......... .......... .......... .......... .......... 92% 37.6M 0s
109700K .......... .......... .......... .......... .......... 92% 34.0M 0s
109750K .......... .......... .......... .......... .......... 92% 23.5M 0s
109800K .......... .......... .......... .......... .......... 92% 26.6M 0s
109850K .......... .......... .......... .......... .......... 92% 19.6M 0s
109900K .......... .......... .......... .......... .......... 92% 34.6M 0s
109950K .......... .......... .......... .......... .......... 92% 21.2M 0s
110000K .......... .......... .......... .......... .......... 92%  200M 0s
110050K .......... .......... .......... .......... .......... 92%  143M 0s
110100K .......... .......... .......... .......... .......... 92%  168M 0s
110150K .......... .......... .......... .......... .......... 92%  188M 0s
110200K .......... .......... .......... .......... .......... 92%  187M 0s
110250K .......... .......... .......... .......... .......... 92%  147M 0s
110300K .......... .......... .......... .......... .......... 92%  152M 0s
110350K .......... .......... .......... .......... .......... 92%  188M 0s
110400K .......... .......... .......... .......... .......... 92%  188M 0s
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```
110450K ..... ..... ..... ..... ..... 92%  154M 0s
110500K ..... ..... ..... ..... ..... 93%  100M 0s
110550K ..... ..... ..... ..... ..... 93% 66.5M 0s
110600K ..... ..... ..... ..... ..... 93%  129M 0s
110650K ..... ..... ..... ..... ..... 93%  191M 0s
110700K ..... ..... ..... ..... ..... 93% 55.3M 0s
110750K ..... ..... ..... ..... ..... 93% 69.6M 0s
110800K ..... ..... ..... ..... ..... 93% 64.5M 0s
110850K ..... ..... ..... ..... ..... 93% 80.8M 0s
110900K ..... ..... ..... ..... ..... 93%  128M 0s
110950K ..... ..... ..... ..... ..... 93%  267M 0s
111000K ..... ..... ..... ..... ..... 93%  264M 0s
111050K ..... ..... ..... ..... ..... 93%  254M 0s
111100K ..... ..... ..... ..... ..... 93%  250M 0s
111150K ..... ..... ..... ..... ..... 93%  305M 0s
111200K ..... ..... ..... ..... ..... 93%  305M 0s
111250K ..... ..... ..... ..... ..... 93%  307M 0s
111300K ..... ..... ..... ..... ..... 93%  250M 0s
111350K ..... ..... ..... ..... ..... 93%  264M 0s
111400K ..... ..... ..... ..... ..... 93%  302M 0s
111450K ..... ..... ..... ..... ..... 93%  296M 0s
111500K ..... ..... ..... ..... ..... 93%  252M 0s
111550K ..... ..... ..... ..... ..... 93%  299M 0s
111600K ..... ..... ..... ..... ..... 93%  270M 0s
111650K ..... ..... ..... ..... ..... 93%  265M 0s
111700K ..... ..... ..... ..... ..... 94% 94.9M 0s
111750K ..... ..... ..... ..... ..... 94%  155M 0s
111800K ..... ..... ..... ..... ..... 94% 77.5M 0s
111850K ..... ..... ..... ..... ..... 94% 84.6M 0s
111900K ..... ..... ..... ..... ..... 94%  153M 0s
111950K ..... ..... ..... ..... ..... 94%  184M 0s
112000K ..... ..... ..... ..... ..... 94%  184M 0s
112050K ..... ..... ..... ..... ..... 94%  174M 0s
112100K ..... ..... ..... ..... ..... 94%  162M 0s
112150K ..... ..... ..... ..... ..... 94%  163M 0s
112200K ..... ..... ..... ..... ..... 94%  183M 0s
112250K ..... ..... ..... ..... ..... 94%  176M 0s
112300K ..... ..... ..... ..... ..... 94%  152M 0s
112350K ..... ..... ..... ..... ..... 94%  182M 0s
112400K ..... ..... ..... ..... ..... 94%  171M 0s
112450K ..... ..... ..... ..... ..... 94%  186M 0s
112500K ..... ..... ..... ..... ..... 94%  232M 0s
112550K ..... ..... ..... ..... ..... 94%  291M 0s
112600K ..... ..... ..... ..... ..... 94%  295M 0s
112650K ..... ..... ..... ..... ..... 94%  259M 0s
112700K ..... ..... ..... ..... ..... 94%  241M 0s
112750K ..... ..... ..... ..... ..... 94%  267M 0s
112800K ..... ..... ..... ..... ..... 94%  257M 0s
112850K ..... ..... ..... ..... ..... 94%  289M 0s
112900K ..... ..... ..... ..... ..... 95%  270M 0s
112950K ..... ..... ..... ..... ..... 95%  305M 0s
113000K ..... ..... ..... ..... ..... 95%  304M 0s
113050K ..... ..... ..... ..... ..... 95%  295M 0s
113100K ..... ..... ..... ..... ..... 95%  109M 0s
113150K ..... ..... ..... ..... ..... 95%  109M 0s
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113200K .......... .......... .......... .......... .......... 95%  164M 0s
113250K .......... .......... .......... .......... .......... 95% 79.0M 0s
113300K .......... .......... .......... .......... .......... 95%  127M 0s
113350K .......... .......... .......... .......... .......... 95%  176M 0s
113400K .......... .......... .......... .......... .......... 95%  181M 0s
113450K .......... .......... .......... .......... .......... 95%  178M 0s
113500K .......... .......... .......... .......... .......... 95%  153M 0s
113550K .......... .......... .......... .......... .......... 95%  179M 0s
113600K .......... .......... .......... .......... .......... 95% 55.3M 0s
113650K .......... .......... .......... .......... .......... 95% 67.1M 0s
113700K .......... .......... .......... .......... .......... 95%  171M 0s
113750K .......... .......... .......... .......... .......... 95%  158M 0s
113800K .......... .......... .......... .......... .......... 95%  202M 0s
113850K .......... .......... .......... .......... .......... 95%  208M 0s
113900K .......... .......... .......... .......... .......... 95%  171M 0s
113950K .......... .......... .......... .......... .......... 95%  214M 0s
114000K .......... .......... .......... .......... .......... 95%  200M 0s
114050K .......... .......... .......... .......... .......... 95%  210M 0s
114100K .......... .......... .......... .......... .......... 96%  193M 0s
114150K .......... .......... .......... .......... .......... 96%  115M 0s
114200K .......... .......... .......... .......... .......... 96% 23.7M 0s
114250K .......... .......... .......... .......... .......... 96% 19.7M 0s
114300K .......... .......... .......... .......... .......... 96% 32.9M 0s
114350K .......... .......... .......... .......... .......... 96% 42.0M 0s
114400K .......... .......... .......... .......... .......... 96% 48.2M 0s
114450K .......... .......... .......... .......... .......... 96% 88.5M 0s
114500K .......... .......... .......... .......... .......... 96% 88.0M 0s
114550K .......... .......... .......... .......... .......... 96% 29.4M 0s
114600K .......... .......... .......... .......... .......... 96%  148M 0s
114650K .......... .......... .......... .......... .......... 96%  153M 0s
114700K .......... .......... .......... .......... .......... 96%  103M 0s
114750K .......... .......... .......... .......... .......... 96%  165M 0s
114800K .......... .......... .......... .......... .......... 96%  150M 0s
114850K .......... .......... .......... .......... .......... 96%  168M 0s
114900K .......... .......... .......... .......... .......... 96%  138M 0s
114950K .......... .......... .......... .......... .......... 96%  147M 0s
115000K .......... .......... .......... .......... .......... 96%  147M 0s
115050K .......... .......... .......... .......... .......... 96%  154M 0s
115100K .......... .......... .......... .......... .......... 96%  138M 0s
115150K .......... .......... .......... .......... .......... 96%  130M 0s
115200K .......... .......... .......... .......... .......... 96%  158M 0s
115250K .......... .......... .......... .......... .......... 97%  153M 0s
115300K .......... .......... .......... .......... .......... 97%  136M 0s
115350K .......... .......... .......... .......... .......... 97% 52.5M 0s
115400K .......... .......... .......... .......... .......... 97% 39.0M 0s
115450K .......... .......... .......... .......... .......... 97% 24.2M 0s
115500K .......... .......... .......... .......... .......... 97% 34.4M 0s
115550K .......... .......... .......... .......... .......... 97% 42.2M 0s
115600K .......... .......... .......... .......... .......... 97% 39.8M 0s
115650K .......... .......... .......... .......... .......... 97% 42.6M 0s
115700K .......... .......... .......... .......... .......... 97% 23.4M 0s
115750K .......... .......... .......... .......... .......... 97% 19.2M 0s
115800K .......... .......... .......... .......... .......... 97% 39.8M 0s
115850K .......... .......... .......... .......... .......... 97% 41.7M 0s
115900K .......... .......... .......... .......... .......... 97% 32.0M 0s
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115950K ..... ..... ..... ..... ..... 97% 5.11M 0s
116000K ..... ..... ..... ..... ..... 97% 43.7M 0s
116050K ..... ..... ..... ..... ..... 97% 43.4M 0s
116100K ..... ..... ..... ..... ..... 97% 38.7M 0s
116150K ..... ..... ..... ..... ..... 97% 43.4M 0s
116200K ..... ..... ..... ..... ..... 97% 44.7M 0s
116250K ..... ..... ..... ..... ..... 97% 40.5M 0s
116300K ..... ..... ..... ..... ..... 97% 38.9M 0s
116350K ..... ..... ..... ..... ..... 97% 44.6M 0s
116400K ..... ..... ..... ..... ..... 97% 38.8M 0s
116450K ..... ..... ..... ..... ..... 98% 52.2M 0s
116500K ..... ..... ..... ..... ..... 98%  172M 0s
116550K ..... ..... ..... ..... ..... 98%  186M 0s
116600K ..... ..... ..... ..... ..... 98%  181M 0s
116650K ..... ..... ..... ..... ..... 98%  189M 0s
116700K ..... ..... ..... ..... ..... 98%  154M 0s
116750K ..... ..... ..... ..... ..... 98%  188M 0s
116800K ..... ..... ..... ..... ..... 98%  194M 0s
116850K ..... ..... ..... ..... ..... 98%  180M 0s
116900K ..... ..... ..... ..... ..... 98%  170M 0s
116950K ..... ..... ..... ..... ..... 98%  175M 0s
117000K ..... ..... ..... ..... ..... 98%  185M 0s
117050K ..... ..... ..... ..... ..... 98%  190M 0s
117100K ..... ..... ..... ..... ..... 98%  154M 0s
117150K ..... ..... ..... ..... ..... 98%  190M 0s
117200K ..... ..... ..... ..... ..... 98%  159M 0s
117250K ..... ..... ..... ..... ..... 98%  190M 0s
117300K ..... ..... ..... ..... ..... 98%  191M 0s
117350K ..... ..... ..... ..... ..... 98%  203M 0s
117400K ..... ..... ..... ..... ..... 98%  186M 0s
117450K ..... ..... ..... ..... ..... 98%  201M 0s
117500K ..... ..... ..... ..... ..... 98%  219M 0s
117550K ..... ..... ..... ..... ..... 98%  308M 0s
117600K ..... ..... ..... ..... ..... 98%  305M 0s
117650K ..... ..... ..... ..... ..... 99%  310M 0s
117700K ..... ..... ..... ..... ..... 99%  242M 0s
117750K ..... ..... ..... ..... ..... 99%  266M 0s
117800K ..... ..... ..... ..... ..... 99%  258M 0s
117850K ..... ..... ..... ..... ..... 99%  198M 0s
117900K ..... ..... ..... ..... ..... 99%  147M 0s
117950K ..... ..... ..... ..... ..... 99%  197M 0s
118000K ..... ..... ..... ..... ..... 99%  201M 0s
118050K ..... ..... ..... ..... ..... 99%  187M 0s
118100K ..... ..... ..... ..... ..... 99%  169M 0s
118150K ..... ..... ..... ..... ..... 99%  189M 0s
118200K ..... ..... ..... ..... ..... 99%  180M 0s
118250K ..... ..... ..... ..... ..... 99% 46.7M 0s
118300K ..... ..... ..... ..... ..... 99%  242M 0s
118350K ..... ..... ..... ..... ..... 99%  308M 0s
118400K ..... ..... ..... ..... ..... 99%  309M 0s
118450K ..... ..... ..... ..... ..... 99%  308M 0s
118500K ..... ..... ..... ..... ..... 99%  194M 0s
118550K ..... ..... ..... ..... ..... 99%  198M 0s
118600K ..... ..... ..... ..... ..... 99%  191M 0s
118650K ..... ..... ..... ..... ..... 99%  186M 0s
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118700K .......... .......... .......... .......... .......... 99%  150M 0s
118750K .......... .......... .......... .......... .......... 99%  189M 0s
118800K .......... .......... .......... .......... .......... 99%  175M 0s
118850K ........                                              100%  219M=1.0s

2020-05-30 13:05:04 (111 MB/s) - ‘title.basics.tsv.gz’ saved [121710643/12171064
3]

/bin/bash: line 2: fg: no job control
```

In [6]:

```
title_basics = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.basic
s.tsv', header=True, inferSchema = True)
title_basics.show(3)
```

```
+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
   tconst|titleType|        primaryTitle|       originalTitle|isAdult|startYear|
endYear|runtimeMinutes|              genres|
+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
tt0000001|    short|          Carmencita|          Carmencita|      0|     1894|
\N|             1|   Documentary,Short|
tt0000002|    short|Le clown et ses c...|Le clown et ses c...|      0|     1892|
\N|             5|     Animation,Short|
tt0000003|    short|      Pauvre Pierrot|      Pauvre Pierrot|      0|     1892|
\N|             4|Animation,Comedy,...|
+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
only showing top 3 rows
```

In [7]:

```
%sh wget https://datasets.imdbws.com/title.akas.tsv.gz

%sh
gunzip title.akas.tsv.gz
```

```
--2020-05-30 13:05:29--  https://datasets.imdbws.com/title.akas.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.37, 13.224.13.5
4, 13.224.13.26, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.37|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 192592731 (184M) [binary/octet-stream]
Saving to: ‘title.akas.tsv.gz’

     0K .......... .......... .......... .......... ..........  0% 4.02M 46s
    50K .......... .......... .......... .......... ..........  0% 7.79M 35s
   100K .......... .......... .......... .......... ..........  0% 16.6M 27s
   150K .......... .......... .......... .......... ..........  0% 12.7M 24s
   200K .......... .......... .......... .......... ..........  0% 19.5M 21s
   250K .......... .......... .......... .......... ..........  0% 27.4M 18s
   300K .......... .......... .......... .......... ..........  0% 23.2M 17s
   350K .......... .......... .......... .......... ..........  0% 39.4M 15s
   400K .......... .......... .......... .......... ..........  0% 25.9M 14s
   450K .......... .......... .......... .......... ..........  0% 33.6M 14s
   500K .......... .......... .......... .......... ..........  0% 45.1M 13s
   550K .......... .......... .......... .......... ..........  0% 39.6M 12s
   600K .......... .......... .......... .......... ..........  0% 62.8M 11s
   650K .......... .......... .......... .......... ..........  0% 45.7M 11s
   700K .......... .......... .......... .......... ..........  0% 75.0M 10s
   750K .......... .......... .......... .......... ..........  0% 67.8M 10s
   800K .......... .......... .......... .......... ..........  0% 46.1M 9s
   850K .......... .......... .......... .......... ..........  0% 86.1M 9s
   900K .......... .......... .......... .......... ..........  0% 70.6M 9s
   950K .......... .......... .......... .......... ..........  0% 68.7M 8s
  1000K .......... .......... .......... .......... ..........  0% 89.5M 8s
  1050K .......... .......... .......... .......... ..........  0% 63.2M 8s
  1100K .......... .......... .......... .......... ..........  0%  106M 8s
  1150K .......... .......... .......... .......... ..........  0% 70.4M 7s
  1200K .......... .......... .......... .......... ..........  0%  106M 7s
  1250K .......... .......... .......... .......... ..........  0%  201M 7s
  1300K .......... .......... .......... .......... ..........  0% 87.1M 7s
  1350K .......... .......... .......... .......... ..........  0% 85.1M 7s
  1400K .......... .......... .......... .......... ..........  0%  110M 6s
  1450K .......... .......... .......... .......... ..........  0%  151M 6s
  1500K .......... .......... .......... .......... ..........  0%  115M 6s
  1550K .......... .......... .......... .......... ..........  0%  110M 6s
  1600K .......... .......... .......... .......... ..........  0%  108M 6s
  1650K .......... .......... .......... .......... ..........  0%  113M 6s
  1700K .......... .......... .......... .......... ..........  0%  121M 6s
  1750K .......... .......... .......... .......... ..........  0%  111M 5s
  1800K .......... .......... .......... .......... ..........  0%  128M 5s
  1850K .......... .......... .......... .......... ..........  1%  292M 5s
  1900K .......... .......... .......... .......... ..........  1%  167M 5s
  1950K .......... .......... .......... .......... ..........  1%  270M 5s
  2000K .......... .......... .......... .......... ..........  1%  144M 5s
  2050K .......... .......... .......... .......... ..........  1%  175M 5s
  2100K .......... .......... .......... .......... ..........  1%  105M 5s
  2150K .......... .......... .......... .......... ..........  1% 92.5M 5s
  2200K .......... .......... .......... .......... ..........  1%  100M 5s
```

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2250K .......... .......... .......... .......... ..........  1% 89.1M 5s
2300K .......... .......... .......... .......... ..........  1%  112M 4s
2350K .......... .......... .......... .......... ..........  1% 88.2M 4s
2400K .......... .......... .......... .......... ..........  1% 87.1M 4s
2450K .......... .......... .......... .......... ..........  1%  126M 4s
2500K .......... .......... .......... .......... ..........  1%  161M 4s
2550K .......... .......... .......... .......... ..........  1%  178M 4s
2600K .......... .......... .......... .......... ..........  1%  138M 4s
2650K .......... .......... .......... .......... ..........  1%  179M 4s
2700K .......... .......... .......... .......... ..........  1%  266M 4s
2750K .......... .......... .......... .......... ..........  1%  182M 4s
2800K .......... .......... .......... .......... ..........  1%  220M 4s
2850K .......... .......... .......... .......... ..........  1%  106M 4s
2900K .......... .......... .......... .......... ..........  1%  108M 4s
2950K .......... .......... .......... .......... ..........  1%  106M 4s
3000K .......... .......... .......... .......... ..........  1%  118M 4s
3050K .......... .......... .......... .......... ..........  1%  177M 4s
3100K .......... .......... .......... .......... ..........  1%  164M 4s
3150K .......... .......... .......... .......... ..........  1%  278M 4s
3200K .......... .......... .......... .......... ..........  1%  143M 4s
3250K .......... .......... .......... .......... ..........  1%  296M 4s
3300K .......... .......... .......... .......... ..........  1%  191M 3s
3350K .......... .......... .......... .......... ..........  1%  166M 3s
3400K .......... .......... .......... .......... ..........  1%  150M 3s
3450K .......... .......... .......... .......... ..........  1%  110M 3s
3500K .......... .......... .......... .......... ..........  1% 59.4M 3s
3550K .......... .......... .......... .......... ..........  1%  111M 3s
3600K .......... .......... .......... .......... ..........  1% 60.4M 3s
3650K .......... .......... .......... .......... ..........  1% 91.4M 3s
3700K .......... .......... .......... .......... ..........  1% 90.3M 3s
3750K .......... .......... .......... .......... ..........  2%  115M 3s
3800K .......... .......... .......... .......... ..........  2%  103M 3s
3850K .......... .......... .......... .......... ..........  2%  156M 3s
3900K .......... .......... .......... .......... ..........  2%  118M 3s
3950K .......... .......... .......... .......... ..........  2%  123M 3s
4000K .......... .......... .......... .......... ..........  2%  113M 3s
4050K .......... .......... .......... .......... ..........  2%  113M 3s
4100K .......... .......... .......... .......... ..........  2%  168M 3s
4150K .......... .......... .......... .......... ..........  2%  172M 3s
4200K .......... .......... .......... .......... ..........  2%  262M 3s
4250K .......... .......... .......... .......... ..........  2%  152M 3s
4300K .......... .......... .......... .......... ..........  2%  283M 3s
4350K .......... .......... .......... .......... ..........  2%  186M 3s
4400K .......... .......... .......... .......... ..........  2%  119M 3s
4450K .......... .......... .......... .......... ..........  2% 80.2M 3s
4500K .......... .......... .......... .......... ..........  2%  116M 3s
4550K .......... .......... .......... .......... ..........  2% 83.0M 3s
4600K .......... .......... .......... .......... ..........  2% 65.1M 3s
4650K .......... .......... .......... .......... ..........  2%  119M 3s
4700K .......... .......... .......... .......... ..........  2% 91.3M 3s
4750K .......... .......... .......... .......... ..........  2% 93.1M 3s
4800K .......... .......... .......... .......... ..........  2% 96.7M 3s
4850K .......... .......... .......... .......... ..........  2%  110M 3s
4900K .......... .......... .......... .......... ..........  2%  159M 3s
4950K .......... .......... .......... .......... ..........  2%  109M 3s
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5000K .......... .......... .......... .......... ..........  2%  145M 3s
5050K .......... .......... .......... .......... ..........  2%  173M 3s
5100K .......... .......... .......... .......... ..........  2%  264M 3s
5150K .......... .......... .......... .......... ..........  2%  169M 3s
5200K .......... .......... .......... .......... ..........  2%  156M 3s
5250K .......... .......... .......... .......... ..........  2%  239M 3s
5300K .......... .......... .......... .......... ..........  2%  165M 3s
5350K .......... .......... .......... .......... ..........  2%  160M 3s
5400K .......... .......... .......... .......... ..........  2% 17.0M 3s
5450K .......... .......... .......... .......... ..........  2% 43.4M 3s
5500K .......... .......... .......... .......... ..........  2% 86.4M 3s
5550K .......... .......... .......... .......... ..........  2%  141M 3s
5600K .......... .......... .......... .......... ..........  3%  128M 3s
5650K .......... .......... .......... .......... ..........  3%  286M 3s
5700K .......... .......... .......... .......... ..........  3%  181M 3s
5750K .......... .......... .......... .......... ..........  3%  127M 3s
5800K .......... .......... .......... .......... ..........  3%  105M 3s
5850K .......... .......... .......... .......... ..........  3%  283M 3s
5900K .......... .......... .......... .......... ..........  3%  106M 3s
5950K .......... .......... .......... .......... ..........  3%  105M 3s
6000K .......... .......... .......... .......... ..........  3%  264M 3s
6050K .......... .......... .......... .......... ..........  3%  105M 3s
6100K .......... .......... .......... .......... ..........  3%  105M 3s
6150K .......... .......... .......... .......... ..........  3% 29.1M 3s
6200K .......... .......... .......... .......... ..........  3% 64.4M 3s
6250K .......... .......... .......... .......... ..........  3%  138M 3s
6300K .......... .......... .......... .......... ..........  3%  140M 3s
6350K .......... .......... .......... .......... ..........  3%  144M 3s
6400K .......... .......... .......... .......... ..........  3%  127M 3s
6450K .......... .......... .......... .......... ..........  3%  157M 3s
6500K .......... .......... .......... .......... ..........  3%  152M 3s
6550K .......... .......... .......... .......... ..........  3%  139M 3s
6600K .......... .......... .......... .......... ..........  3%  115M 3s
6650K .......... .......... .......... .......... ..........  3%  148M 3s
6700K .......... .......... .......... .......... ..........  3% 63.8M 3s
6750K .......... .......... .......... .......... ..........  3%  266M 3s
6800K .......... .......... .......... .......... ..........  3%  149M 3s
6850K .......... .......... .......... .......... ..........  3%  298M 3s
6900K .......... .......... .......... .......... ..........  3%  112M 3s
6950K .......... .......... .......... .......... ..........  3%  154M 2s
7000K .......... .......... .......... .......... ..........  3% 88.4M 2s
7050K .......... .......... .......... .......... ..........  3%  142M 2s
7100K .......... .......... .......... .......... ..........  3%  164M 2s
7150K .......... .......... .......... .......... ..........  3%  158M 2s
7200K .......... .......... .......... .......... ..........  3%  105M 2s
7250K .......... .......... .......... .......... ..........  3%  136M 2s
7300K .......... .......... .......... .......... ..........  3%  156M 2s
7350K .......... .......... .......... .......... ..........  3%  138M 2s
7400K .......... .......... .......... .......... ..........  3%  140M 2s
7450K .......... .......... .......... .......... ..........  3%  149M 2s
7500K .......... .......... .......... .......... ..........  4%  168M 2s
7550K .......... .......... .......... .......... ..........  4%  308M 2s
7600K .......... .......... .......... .......... ..........  4%  290M 2s
7650K .......... .......... .......... .......... ..........  4%  272M 2s
7700K .......... .......... .......... .......... ..........  4%  285M 2s
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 7750K ..... ..... ..... ..... .....  4%  312M 2s
 7800K ..... ..... ..... ..... .....  4%  257M 2s
 7850K ..... ..... ..... ..... .....  4%  273M 2s
 7900K ..... ..... ..... ..... .....  4%  311M 2s
 7950K ..... ..... ..... ..... .....  4%  161M 2s
 8000K ..... ..... ..... ..... .....  4%  156M 2s
 8050K ..... ..... ..... ..... .....  4%  168M 2s
 8100K ..... ..... ..... ..... .....  4%  173M 2s
 8150K ..... ..... ..... ..... .....  4%  155M 2s
 8200K ..... ..... ..... ..... .....  4%  159M 2s
 8250K ..... ..... ..... ..... .....  4%  168M 2s
 8300K ..... ..... ..... ..... .....  4% 42.9M 2s
 8350K ..... ..... ..... ..... .....  4% 85.7M 2s
 8400K ..... ..... ..... ..... .....  4% 80.8M 2s
 8450K ..... ..... ..... ..... .....  4%  155M 2s
 8500K ..... ..... ..... ..... .....  4% 87.9M 2s
 8550K ..... ..... ..... ..... .....  4% 75.0M 2s
 8600K ..... ..... ..... ..... .....  4%  130M 2s
 8650K ..... ..... ..... ..... .....  4%  162M 2s
 8700K ..... ..... ..... ..... .....  4%  161M 2s
 8750K ..... ..... ..... ..... .....  4%  155M 2s
 8800K ..... ..... ..... ..... .....  4%  144M 2s
 8850K ..... ..... ..... ..... .....  4%  163M 2s
 8900K ..... ..... ..... ..... .....  4%  158M 2s
 8950K ..... ..... ..... ..... .....  4%  159M 2s
 9000K ..... ..... ..... ..... .....  4% 79.8M 2s
 9050K ..... ..... ..... ..... .....  4% 85.4M 2s
 9100K ..... ..... ..... ..... .....  4% 89.5M 2s
 9150K ..... ..... ..... ..... .....  4% 89.8M 2s
 9200K ..... ..... ..... ..... .....  4%  141M 2s
 9250K ..... ..... ..... ..... .....  4%  158M 2s
 9300K ..... ..... ..... ..... .....  4%  151M 2s
 9350K ..... ..... ..... ..... .....  4%  114M 2s
 9400K ..... ..... ..... ..... .....  5%  142M 2s
 9450K ..... ..... ..... ..... .....  5%  164M 2s
 9500K ..... ..... ..... ..... .....  5%  161M 2s
 9550K ..... ..... ..... ..... .....  5%  171M 2s
 9600K ..... ..... ..... ..... .....  5%  160M 2s
 9650K ..... ..... ..... ..... .....  5%  155M 2s
 9700K ..... ..... ..... ..... .....  5% 53.5M 2s
 9750K ..... ..... ..... ..... .....  5%  153M 2s
 9800K ..... ..... ..... ..... .....  5%  131M 2s
 9850K ..... ..... ..... ..... .....  5%  161M 2s
 9900K ..... ..... ..... ..... .....  5%  160M 2s
 9950K ..... ..... ..... ..... .....  5%  157M 2s
10000K ..... ..... ..... ..... .....  5%  244M 2s
10050K ..... ..... ..... ..... .....  5%  306M 2s
10100K ..... ..... ..... ..... .....  5%  303M 2s
10150K ..... ..... ..... ..... .....  5%  264M 2s
10200K ..... ..... ..... ..... .....  5%  114M 2s
10250K ..... ..... ..... ..... .....  5%  151M 2s
10300K ..... ..... ..... ..... .....  5% 68.9M 2s
10350K ..... ..... ..... ..... .....  5%  100M 2s
10400K ..... ..... ..... ..... .....  5% 84.4M 2s
10450K ..... ..... ..... ..... .....  5% 85.3M 2s
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10500K .......... .......... .......... .......... ..........  5%  118M 2s
10550K .......... .......... .......... .......... ..........  5%  179M 2s
10600K .......... .......... .......... .......... ..........  5%  201M 2s
10650K .......... .......... .......... .......... ..........  5%  303M 2s
10700K .......... .......... .......... .......... ..........  5%  164M 2s
10750K .......... .......... .......... .......... ..........  5%  189M 2s
10800K .......... .......... .......... .......... ..........  5%  150M 2s
10850K .......... .......... .......... .......... ..........  5%  229M 2s
10900K .......... .......... .......... .......... ..........  5%  304M 2s
10950K .......... .......... .......... .......... ..........  5%  265M 2s
11000K .......... .......... .......... .......... ..........  5%  241M 2s
11050K .......... .......... .......... .......... ..........  5%  309M 2s
11100K .......... .......... .......... .......... ..........  5%  269M 2s
11150K .......... .......... .......... .......... ..........  5%  307M 2s
11200K .......... .......... .......... .......... ..........  5%  270M 2s
11250K .......... .......... .......... .......... ..........  6%  268M 2s
11300K .......... .......... .......... .......... ..........  6%  301M 2s
11350K .......... .......... .......... .......... ..........  6%  215M 2s
11400K .......... .......... .......... .......... ..........  6% 80.8M 2s
11450K .......... .......... .......... .......... ..........  6%  156M 2s
11500K .......... .......... .......... .......... ..........  6%  139M 2s
11550K .......... .......... .......... .......... ..........  6%  139M 2s
11600K .......... .......... .......... .......... ..........  6% 54.5M 2s
11650K .......... .......... .......... .......... ..........  6% 91.8M 2s
11700K .......... .......... .......... .......... ..........  6% 87.1M 2s
11750K .......... .......... .......... .......... ..........  6%  114M 2s
11800K .......... .......... .......... .......... ..........  6% 69.5M 2s
11850K .......... .......... .......... .......... ..........  6%  112M 2s
11900K .......... .......... .......... .......... ..........  6%  105M 2s
11950K .......... .......... .......... .......... ..........  6% 68.9M 2s
12000K .......... .......... .......... .......... ..........  6%  106M 2s
12050K .......... .......... .......... .......... ..........  6%  131M 2s
12100K .......... .......... .......... .......... ..........  6%  140M 2s
12150K .......... .......... .......... .......... ..........  6% 48.6M 2s
12200K .......... .......... .......... .......... ..........  6%  133M 2s
12250K .......... .......... .......... .......... ..........  6%  127M 2s
12300K .......... .......... .......... .......... ..........  6%  159M 2s
12350K .......... .......... .......... .......... ..........  6%  121M 2s
12400K .......... .......... .......... .......... ..........  6% 81.1M 2s
12450K .......... .......... .......... .......... ..........  6% 87.9M 2s
12500K .......... .......... .......... .......... ..........  6% 86.9M 2s
12550K .......... .......... .......... .......... ..........  6% 84.1M 2s
12600K .......... .......... .......... .......... ..........  6% 78.1M 2s
12650K .......... .......... .......... .......... ..........  6% 89.0M 2s
12700K .......... .......... .......... .......... ..........  6% 87.1M 2s
12750K .......... .......... .......... .......... ..........  6% 86.3M 2s
12800K .......... .......... .......... .......... ..........  6% 85.8M 2s
12850K .......... .......... .......... .......... ..........  6% 44.3M 2s
12900K .......... .......... .......... .......... ..........  6% 26.0M 2s
12950K .......... .......... .......... .......... ..........  6% 46.9M 2s
13000K .......... .......... .......... .......... ..........  6% 29.3M 2s
13050K .......... .......... .......... .......... ..........  6% 34.9M 2s
13100K .......... .......... .......... .......... ..........  6% 53.2M 2s
13150K .......... .......... .......... .......... ..........  7% 45.4M 2s
13200K .......... .......... .......... .......... ..........  7% 78.8M 2s
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13250K .......... .......... .......... .......... ..........  7% 44.5M 2s
13300K .......... .......... .......... .......... ..........  7% 36.9M 2s
13350K .......... .......... .......... .......... ..........  7% 41.7M 2s
13400K .......... .......... .......... .......... ..........  7%  117M 2s
13450K .......... .......... .......... .......... ..........  7%  150M 2s
13500K .......... .......... .......... .......... ..........  7%  143M 2s
13550K .......... .......... .......... .......... ..........  7%  135M 2s
13600K .......... .......... .......... .......... ..........  7%  127M 2s
13650K .......... .......... .......... .......... ..........  7%  139M 2s
13700K .......... .......... .......... .......... ..........  7%  152M 2s
13750K .......... .......... .......... .......... ..........  7%  139M 2s
13800K .......... .......... .......... .......... ..........  7%  121M 2s
13850K .......... .......... .......... .......... ..........  7%  198M 2s
13900K .......... .......... .......... .......... ..........  7%  299M 2s
13950K .......... .......... .......... .......... ..........  7%  161M 2s
14000K .......... .......... .......... .......... ..........  7%  164M 2s
14050K .......... .......... .......... .......... ..........  7%  159M 2s
14100K .......... .......... .......... .......... ..........  7%  185M 2s
14150K .......... .......... .......... .......... ..........  7%  169M 2s
14200K .......... .......... .......... .......... ..........  7%  132M 2s
14250K .......... .......... .......... .......... ..........  7%  188M 2s
14300K .......... .......... .......... .......... ..........  7%  166M 2s
14350K .......... .......... .......... .......... ..........  7%  182M 2s
14400K .......... .......... .......... .......... ..........  7%  140M 2s
14450K .......... .......... .......... .......... ..........  7%  164M 2s
14500K .......... .......... .......... .......... ..........  7%  160M 2s
14550K .......... .......... .......... .......... ..........  7%  195M 2s
14600K .......... .......... .......... .......... ..........  7%  144M 2s
14650K .......... .......... .......... .......... ..........  7%  188M 2s
14700K .......... .......... .......... .......... ..........  7%  159M 2s
14750K .......... .......... .......... .......... ..........  7%  188M 2s
14800K .......... .......... .......... .......... ..........  7%  170M 2s
14850K .......... .......... .......... .......... ..........  7%  188M 2s
14900K .......... .......... .......... .......... ..........  7%  145M 2s
14950K .......... .......... .......... .......... ..........  7%  184M 2s
15000K .......... .......... .......... .......... ..........  8%  152M 2s
15050K .......... .......... .......... .......... ..........  8%  185M 2s
15100K .......... .......... .......... .......... ..........  8%  167M 2s
15150K .......... .......... .......... .......... ..........  8%  175M 2s
15200K .......... .......... .......... .......... ..........  8%  186M 2s
15250K .......... .......... .......... .......... ..........  8%  160M 2s
15300K .......... .......... .......... .......... ..........  8%  169M 2s
15350K .......... .......... .......... .......... ..........  8%  193M 2s
15400K .......... .......... .......... .......... ..........  8%  161M 2s
15450K .......... .......... .......... .......... ..........  8%  194M 2s
15500K .......... .......... .......... .......... ..........  8%  173M 2s
15550K .......... .......... .......... .......... ..........  8%  194M 2s
15600K .......... .......... .......... .......... ..........  8%  163M 2s
15650K .......... .......... .......... .......... ..........  8%  193M 2s
15700K .......... .......... .......... .......... ..........  8%  169M 2s
15750K .......... .......... .......... .......... ..........  8%  175M 2s
15800K .......... .......... .......... .......... ..........  8%  146M 2s
15850K .......... .......... .......... .......... ..........  8%  191M 2s
15900K .......... .......... .......... .......... ..........  8%  170M 2s
15950K .......... .......... .......... .......... ..........  8%  195M 2s
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 16000K .......... .......... .......... .......... ..........  8%  147M 2s
 16050K .......... .......... .......... .......... ..........  8%  197M 2s
 16100K .......... .......... .......... .......... ..........  8%  163M 2s
 16150K .......... .......... .......... .......... ..........  8%  185M 2s

*** WARNING: skipped 236436 bytes of output ***

171750K .......... .......... .......... .......... .......... 91%  136M 0s
171800K .......... .......... .......... .......... .......... 91%  175M 0s
171850K .......... .......... .......... .......... .......... 91%  155M 0s
171900K .......... .......... .......... .......... .......... 91%  147M 0s
171950K .......... .......... .......... .......... .......... 91% 89.2M 0s
172000K .......... .......... .......... .......... .......... 91%  128M 0s
172050K .......... .......... .......... .......... .......... 91%  113M 0s
172100K .......... .......... .......... .......... .......... 91%  105M 0s
172150K .......... .......... .......... .......... .......... 91%  131M 0s
172200K .......... .......... .......... .......... .......... 91%  149M 0s
172250K .......... .......... .......... .......... .......... 91%  157M 0s
172300K .......... .......... .......... .......... .......... 91%  158M 0s
172350K .......... .......... .......... .......... .......... 91%  125M 0s
172400K .......... .......... .......... .......... .......... 91%  136M 0s
172450K .......... .......... .......... .......... .......... 91%  131M 0s
172500K .......... .......... .......... .......... .......... 91%  113M 0s
172550K .......... .......... .......... .......... .......... 91%  158M 0s
172600K .......... .......... .......... .......... .......... 91%  143M 0s
172650K .......... .......... .......... .......... .......... 91% 72.2M 0s
172700K .......... .......... .......... .......... .......... 91%  133M 0s
172750K .......... .......... .......... .......... .......... 91%  144M 0s
172800K .......... .......... .......... .......... .......... 91%  143M 0s
172850K .......... .......... .......... .......... .......... 91%  158M 0s
172900K .......... .......... .......... .......... .......... 91%  128M 0s
172950K .......... .......... .......... .......... .......... 91%  171M 0s
173000K .......... .......... .......... .......... .......... 92%  154M 0s
173050K .......... .......... .......... .......... .......... 92%  145M 0s
173100K .......... .......... .......... .......... .......... 92%  134M 0s
173150K .......... .......... .......... .......... .......... 92%  144M 0s
173200K .......... .......... .......... .......... .......... 92%  159M 0s
173250K .......... .......... .......... .......... .......... 92% 95.6M 0s
173300K .......... .......... .......... .......... .......... 92%  110M 0s
173350K .......... .......... .......... .......... .......... 92%  143M 0s
173400K .......... .......... .......... .......... .......... 92%  110M 0s
173450K .......... .......... .......... .......... .......... 92%  150M 0s
173500K .......... .......... .......... .......... .......... 92%  122M 0s
173550K .......... .......... .......... .......... .......... 92%  145M 0s
173600K .......... .......... .......... .......... .......... 92%  135M 0s
173650K .......... .......... .......... .......... .......... 92%  147M 0s
173700K .......... .......... .......... .......... .......... 92%  107M 0s
173750K .......... .......... .......... .......... .......... 92% 92.6M 0s
173800K .......... .......... .......... .......... .......... 92%  128M 0s
173850K .......... .......... .......... .......... .......... 92%  162M 0s
173900K .......... .......... .......... .......... .......... 92%  153M 0s
173950K .......... .......... .......... .......... .......... 92%  156M 0s
174000K .......... .......... .......... .......... .......... 92%  143M 0s
174050K .......... .......... .......... .......... .......... 92%  166M 0s
174100K .......... .......... .......... .......... .......... 92%  114M 0s
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174150K .......... .......... .......... .......... .......... 92%  136M 0s
174200K .......... .......... .......... .......... .......... 92%  114M 0s
174250K .......... .......... .......... .......... .......... 92%  130M 0s
174300K .......... .......... .......... .......... .......... 92% 88.4M 0s
174350K .......... .......... .......... .......... .......... 92%  131M 0s
174400K .......... .......... .......... .......... .......... 92% 87.2M 0s
174450K .......... .......... .......... .......... .......... 92%  105M 0s
174500K .......... .......... .......... .......... .......... 92%  113M 0s
174550K .......... .......... .......... .......... .......... 92%  154M 0s
174600K .......... .......... .......... .......... .......... 92%  104M 0s
174650K .......... .......... .......... .......... .......... 92%  165M 0s
174700K .......... .......... .......... .......... .......... 92% 83.2M 0s
174750K .......... .......... .......... .......... .......... 92%  136M 0s
174800K .......... .......... .......... .......... .......... 92% 96.7M 0s
174850K .......... .......... .......... .......... .......... 92%  144M 0s
174900K .......... .......... .......... .......... .......... 93%  131M 0s
174950K .......... .......... .......... .......... .......... 93%  153M 0s
175000K .......... .......... .......... .......... .......... 93%  160M 0s
175050K .......... .......... .......... .......... .......... 93%  161M 0s
175100K .......... .......... .......... .......... .......... 93%  150M 0s
175150K .......... .......... .......... .......... .......... 93%  145M 0s
175200K .......... .......... .......... .......... .......... 93%  146M 0s
175250K .......... .......... .......... .......... .......... 93%  129M 0s
175300K .......... .......... .......... .......... .......... 93%  108M 0s
175350K .......... .......... .......... .......... .......... 93% 97.9M 0s
175400K .......... .......... .......... .......... .......... 93%  152M 0s
175450K .......... .......... .......... .......... .......... 93%  130M 0s
175500K .......... .......... .......... .......... .......... 93%  122M 0s
175550K .......... .......... .......... .......... .......... 93% 87.8M 0s
175600K .......... .......... .......... .......... .......... 93%  130M 0s
175650K .......... .......... .......... .......... .......... 93%  143M 0s
175700K .......... .......... .......... .......... .......... 93%  123M 0s
175750K .......... .......... .......... .......... .......... 93%  167M 0s
175800K .......... .......... .......... .......... .......... 93%  170M 0s
175850K .......... .......... .......... .......... .......... 93%  127M 0s
175900K .......... .......... .......... .......... .......... 93%  155M 0s
175950K .......... .......... .......... .......... .......... 93%  154M 0s
176000K .......... .......... .......... .......... .......... 93%  149M 0s
176050K .......... .......... .......... .......... .......... 93%  160M 0s
176100K .......... .......... .......... .......... .......... 93%  124M 0s
176150K .......... .......... .......... .......... .......... 93% 46.5M 0s
176200K .......... .......... .......... .......... .......... 93% 42.7M 0s
176250K .......... .......... .......... .......... .......... 93% 40.8M 0s
176300K .......... .......... .......... .......... .......... 93% 28.9M 0s
176350K .......... .......... .......... .......... .......... 93% 38.5M 0s
176400K .......... .......... .......... .......... .......... 93% 37.7M 0s
176450K .......... .......... .......... .......... .......... 93% 38.4M 0s
176500K .......... .......... .......... .......... .......... 93% 33.4M 0s
176550K .......... .......... .......... .......... .......... 93% 37.4M 0s
176600K .......... .......... .......... .......... .......... 93% 24.3M 0s
176650K .......... .......... .......... .......... .......... 93% 38.1M 0s
176700K .......... .......... .......... .......... .......... 93% 34.8M 0s
176750K .......... .......... .......... .......... .......... 94% 39.4M 0s
176800K .......... .......... .......... .......... .......... 94% 38.3M 0s
176850K .......... .......... .......... .......... .......... 94% 38.8M 0s
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176900K .......... .......... .......... .......... .......... 94% 34.1M 0s
176950K .......... .......... .......... .......... .......... 94% 38.5M 0s
177000K .......... .......... .......... .......... .......... 94% 39.0M 0s
177050K .......... .......... .......... .......... .......... 94% 39.3M 0s
177100K .......... .......... .......... .......... .......... 94% 10.7M 0s
177150K .......... .......... .......... .......... .......... 94% 39.2M 0s
177200K .......... .......... .......... .......... .......... 94% 29.5M 0s
177250K .......... .......... .......... .......... .......... 94% 38.3M 0s
177300K .......... .......... .......... .......... .......... 94% 33.7M 0s
177350K .......... .......... .......... .......... .......... 94% 39.4M 0s
177400K .......... .......... .......... .......... .......... 94% 21.9M 0s
177450K .......... .......... .......... .......... .......... 94% 12.9M 0s
177500K .......... .......... .......... .......... .......... 94% 19.7M 0s
177550K .......... .......... .......... .......... .......... 94% 38.0M 0s
177600K .......... .......... .......... .......... .......... 94% 38.2M 0s
177650K .......... .......... .......... .......... .......... 94% 39.5M 0s
177700K .......... .......... .......... .......... .......... 94% 32.9M 0s
177750K .......... .......... .......... .......... .......... 94% 38.9M 0s
177800K .......... .......... .......... .......... .......... 94% 38.9M 0s
177850K .......... .......... .......... .......... .......... 94% 36.8M 0s
177900K .......... .......... .......... .......... .......... 94% 34.6M 0s
177950K .......... .......... .......... .......... .......... 94% 37.7M 0s
178000K .......... .......... .......... .......... .......... 94% 37.3M 0s
178050K .......... .......... .......... .......... .......... 94% 59.8M 0s
178100K .......... .......... .......... .......... .......... 94%  163M 0s
178150K .......... .......... .......... .......... .......... 94%  193M 0s
178200K .......... .......... .......... .......... .......... 94%  198M 0s
178250K .......... .......... .......... .......... .......... 94%  200M 0s
178300K .......... .......... .......... .......... .......... 94%  180M 0s
178350K .......... .......... .......... .......... .......... 94%  202M 0s
178400K .......... .......... .......... .......... .......... 94%  199M 0s
178450K .......... .......... .......... .......... .......... 94%  199M 0s
178500K .......... .......... .......... .......... .......... 94%  166M 0s
178550K .......... .......... .......... .......... .......... 94%  197M 0s
178600K .......... .......... .......... .......... .......... 94%  154M 0s
178650K .......... .......... .......... .......... .......... 95%  196M 0s
178700K .......... .......... .......... .......... .......... 95%  181M 0s
178750K .......... .......... .......... .......... .......... 95%  198M 0s
178800K .......... .......... .......... .......... .......... 95%  197M 0s
178850K .......... .......... .......... .......... .......... 95%  199M 0s
178900K .......... .......... .......... .......... .......... 95%  163M 0s
178950K .......... .......... .......... .......... .......... 95%  201M 0s
179000K .......... .......... .......... .......... .......... 95%  201M 0s
179050K .......... .......... .......... .......... .......... 95%  194M 0s
179100K .......... .......... .......... .......... .......... 95%  181M 0s
179150K .......... .......... .......... .......... .......... 95%  196M 0s
179200K .......... .......... .......... .......... .......... 95%  163M 0s
179250K .......... .......... .......... .......... .......... 95%  164M 0s
179300K .......... .......... .......... .......... .......... 95% 74.3M 0s
179350K .......... .......... .......... .......... .......... 95% 39.7M 0s
179400K .......... .......... .......... .......... .......... 95% 39.0M 0s
179450K .......... .......... .......... .......... .......... 95% 38.2M 0s
179500K .......... .......... .......... .......... .......... 95% 33.7M 0s
179550K .......... .......... .......... .......... .......... 95% 39.1M 0s
179600K .......... .......... .......... .......... .......... 95% 37.2M 0s
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179650K ..... ..... ..... ..... ..... 95% 56.7M 0s
179700K ..... ..... ..... ..... ..... 95% 33.0M 0s
179750K ..... ..... ..... ..... ..... 95% 39.3M 0s
179800K ..... ..... ..... ..... ..... 95% 38.6M 0s
179850K ..... ..... ..... ..... ..... 95% 38.6M 0s
179900K ..... ..... ..... ..... ..... 95% 34.2M 0s
179950K ..... ..... ..... ..... ..... 95% 37.7M 0s
180000K ..... ..... ..... ..... ..... 95% 38.7M 0s
180050K ..... ..... ..... ..... ..... 95% 39.1M 0s
180100K ..... ..... ..... ..... ..... 95% 33.2M 0s
180150K ..... ..... ..... ..... ..... 95% 39.5M 0s
180200K ..... ..... ..... ..... ..... 95% 39.1M 0s
180250K ..... ..... ..... ..... ..... 95% 39.5M 0s
180300K ..... ..... ..... ..... ..... 95% 63.6M 0s
180350K ..... ..... ..... ..... ..... 95%  152M 0s
180400K ..... ..... ..... ..... ..... 95%  157M 0s
180450K ..... ..... ..... ..... ..... 95%  124M 0s
180500K ..... ..... ..... ..... ..... 95%  104M 0s
180550K ..... ..... ..... ..... ..... 96%  171M 0s
180600K ..... ..... ..... ..... ..... 96%  131M 0s
180650K ..... ..... ..... ..... ..... 96%  161M 0s
180700K ..... ..... ..... ..... ..... 96%  140M 0s
180750K ..... ..... ..... ..... ..... 96%  152M 0s
180800K ..... ..... ..... ..... ..... 96%  123M 0s
180850K ..... ..... ..... ..... ..... 96%  143M 0s
180900K ..... ..... ..... ..... ..... 96%  135M 0s
180950K ..... ..... ..... ..... ..... 96%  143M 0s
181000K ..... ..... ..... ..... ..... 96%  161M 0s
181050K ..... ..... ..... ..... ..... 96%  164M 0s
181100K ..... ..... ..... ..... ..... 96%  134M 0s
181150K ..... ..... ..... ..... ..... 96%  160M 0s
181200K ..... ..... ..... ..... ..... 96%  158M 0s
181250K ..... ..... ..... ..... ..... 96%  143M 0s
181300K ..... ..... ..... ..... ..... 96%  108M 0s
181350K ..... ..... ..... ..... ..... 96%  149M 0s
181400K ..... ..... ..... ..... ..... 96%  162M 0s
181450K ..... ..... ..... ..... ..... 96%  177M 0s
181500K ..... ..... ..... ..... ..... 96%  134M 0s
181550K ..... ..... ..... ..... ..... 96%  157M 0s
181600K ..... ..... ..... ..... ..... 96%  136M 0s
181650K ..... ..... ..... ..... ..... 96%  156M 0s
181700K ..... ..... ..... ..... ..... 96%  139M 0s
181750K ..... ..... ..... ..... ..... 96%  168M 0s
181800K ..... ..... ..... ..... ..... 96%  157M 0s
181850K ..... ..... ..... ..... ..... 96%  149M 0s
181900K ..... ..... ..... ..... ..... 96%  144M 0s
181950K ..... ..... ..... ..... ..... 96%  143M 0s
182000K ..... ..... ..... ..... ..... 96%  151M 0s
182050K ..... ..... ..... ..... ..... 96%  130M 0s
182100K ..... ..... ..... ..... ..... 96% 92.1M 0s
182150K ..... ..... ..... ..... ..... 96%  142M 0s
182200K ..... ..... ..... ..... ..... 96%  141M 0s
182250K ..... ..... ..... ..... ..... 96% 93.1M 0s
182300K ..... ..... ..... ..... ..... 96%  135M 0s
182350K ..... ..... ..... ..... ..... 96%  148M 0s
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182400K ..... ..... ..... ..... ..... 97%  129M 0s
182450K ..... ..... ..... ..... ..... 97%  156M 0s
182500K ..... ..... ..... ..... ..... 97%  141M 0s
182550K ..... ..... ..... ..... ..... 97%  181M 0s
182600K ..... ..... ..... ..... ..... 97%  149M 0s
182650K ..... ..... ..... ..... ..... 97%  101M 0s
182700K ..... ..... ..... ..... ..... 97%  161M 0s
182750K ..... ..... ..... ..... ..... 97%  147M 0s
182800K ..... ..... ..... ..... ..... 97%  147M 0s
182850K ..... ..... ..... ..... ..... 97%  136M 0s
182900K ..... ..... ..... ..... ..... 97%  166M 0s
182950K ..... ..... ..... ..... ..... 97%  158M 0s
183000K ..... ..... ..... ..... ..... 97%  173M 0s
183050K ..... ..... ..... ..... ..... 97% 90.5M 0s
183100K ..... ..... ..... ..... ..... 97%  164M 0s
183150K ..... ..... ..... ..... ..... 97%  169M 0s
183200K ..... ..... ..... ..... ..... 97%  155M 0s
183250K ..... ..... ..... ..... ..... 97%  128M 0s
183300K ..... ..... ..... ..... ..... 97%  116M 0s
183350K ..... ..... ..... ..... ..... 97%  135M 0s
183400K ..... ..... ..... ..... ..... 97%  181M 0s
183450K ..... ..... ..... ..... ..... 97%  167M 0s
183500K ..... ..... ..... ..... ..... 97%  190M 0s
183550K ..... ..... ..... ..... ..... 97%  189M 0s
183600K ..... ..... ..... ..... ..... 97%  210M 0s
183650K ..... ..... ..... ..... ..... 97%  147M 0s
183700K ..... ..... ..... ..... ..... 97%  217M 0s
183750K ..... ..... ..... ..... ..... 97%  211M 0s
183800K ..... ..... ..... ..... ..... 97%  213M 0s
183850K ..... ..... ..... ..... ..... 97%  192M 0s
183900K ..... ..... ..... ..... ..... 97%  172M 0s
183950K ..... ..... ..... ..... ..... 97%  193M 0s
184000K ..... ..... ..... ..... ..... 97%  211M 0s
184050K ..... ..... ..... ..... ..... 97%  168M 0s
184100K ..... ..... ..... ..... ..... 97%  211M 0s
184150K ..... ..... ..... ..... ..... 97%  203M 0s
184200K ..... ..... ..... ..... ..... 97%  196M 0s
184250K ..... ..... ..... ..... ..... 97%  165M 0s
184300K ..... ..... ..... ..... ..... 98%  191M 0s
184350K ..... ..... ..... ..... ..... 98%  192M 0s
184400K ..... ..... ..... ..... ..... 98%  187M 0s
184450K ..... ..... ..... ..... ..... 98%  173M 0s
184500K ..... ..... ..... ..... ..... 98%  209M 0s
184550K ..... ..... ..... ..... ..... 98%  198M 0s
184600K ..... ..... ..... ..... ..... 98%  190M 0s
184650K ..... ..... ..... ..... ..... 98%  177M 0s
184700K ..... ..... ..... ..... ..... 98%  196M 0s
184750K ..... ..... ..... ..... ..... 98%  192M 0s
184800K ..... ..... ..... ..... ..... 98%  200M 0s
184850K ..... ..... ..... ..... ..... 98%  167M 0s
184900K ..... ..... ..... ..... ..... 98%  205M 0s
184950K ..... ..... ..... ..... ..... 98%  204M 0s
185000K ..... ..... ..... ..... ..... 98% 88.2M 0s
185050K ..... ..... ..... ..... ..... 98% 36.6M 0s
185100K ..... ..... ..... ..... ..... 98% 44.7M 0s
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185150K ..... ..... ..... ..... ..... 98% 42.6M 0s
185200K ..... ..... ..... ..... ..... 98% 40.2M 0s
185250K ..... ..... ..... ..... ..... 98% 35.8M 0s
185300K ..... ..... ..... ..... ..... 98% 41.1M 0s
185350K ..... ..... ..... ..... ..... 98% 41.5M 0s
185400K ..... ..... ..... ..... ..... 98% 21.2M 0s
185450K ..... ..... ..... ..... ..... 98% 40.4M 0s
185500K ..... ..... ..... ..... ..... 98% 45.4M 0s
185550K ..... ..... ..... ..... ..... 98% 46.8M 0s
185600K ..... ..... ..... ..... ..... 98% 44.3M 0s
185650K ..... ..... ..... ..... ..... 98% 47.3M 0s
185700K ..... ..... ..... ..... ..... 98% 49.6M 0s
185750K ..... ..... ..... ..... ..... 98%  165M 0s
185800K ..... ..... ..... ..... ..... 98%  169M 0s
185850K ..... ..... ..... ..... ..... 98%  152M 0s
185900K ..... ..... ..... ..... ..... 98%  140M 0s
185950K ..... ..... ..... ..... ..... 98%  157M 0s
186000K ..... ..... ..... ..... ..... 98%  156M 0s
186050K ..... ..... ..... ..... ..... 98%  193M 0s
186100K ..... ..... ..... ..... ..... 98% 90.7M 0s
186150K ..... ..... ..... ..... ..... 99%  111M 0s
186200K ..... ..... ..... ..... ..... 99%  169M 0s
186250K ..... ..... ..... ..... ..... 99%  165M 0s
186300K ..... ..... ..... ..... ..... 99%  155M 0s
186350K ..... ..... ..... ..... ..... 99%  161M 0s
186400K ..... ..... ..... ..... ..... 99%  134M 0s
186450K ..... ..... ..... ..... ..... 99%  152M 0s
186500K ..... ..... ..... ..... ..... 99%  138M 0s
186550K ..... ..... ..... ..... ..... 99%  151M 0s
186600K ..... ..... ..... ..... ..... 99%  164M 0s
186650K ..... ..... ..... ..... ..... 99%  168M 0s
186700K ..... ..... ..... ..... ..... 99%  154M 0s
186750K ..... ..... ..... ..... ..... 99%  136M 0s
186800K ..... ..... ..... ..... ..... 99%  149M 0s
186850K ..... ..... ..... ..... ..... 99%  141M 0s
186900K ..... ..... ..... ..... ..... 99%  137M 0s
186950K ..... ..... ..... ..... ..... 99%  171M 0s
187000K ..... ..... ..... ..... ..... 99%  151M 0s
187050K ..... ..... ..... ..... ..... 99%  148M 0s
187100K ..... ..... ..... ..... ..... 99%  122M 0s
187150K ..... ..... ..... ..... ..... 99%  156M 0s
187200K ..... ..... ..... ..... ..... 99% 46.0M 0s
187250K ..... ..... ..... ..... ..... 99%  151M 0s
187300K ..... ..... ..... ..... ..... 99%  128M 0s
187350K ..... ..... ..... ..... ..... 99%  128M 0s
187400K ..... ..... ..... ..... ..... 99%  167M 0s
187450K ..... ..... ..... ..... ..... 99%  135M 0s
187500K ..... ..... ..... ..... ..... 99% 51.7M 0s
187550K ..... ..... ..... ..... ..... 99% 31.2M 0s
187600K ..... ..... ..... ..... ..... 99% 39.4M 0s
187650K ..... ..... ..... ..... ..... 99% 68.3M 0s
187700K ..... ..... ..... ..... ..... 99%  132M 0s
187750K ..... ..... ..... ..... ..... 99%  164M 0s
187800K ..... ..... ..... ..... ..... 99%  165M 0s
187850K ..... ..... ..... ..... ..... 99%  120M 0s
```

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187900K .......... .......... .......... .......... .......... 99%  137M 0s
187950K .......... .......... .......... .......... .......... 99%  161M 0s
188000K .......... .......... .......... .......... .......... 99%  168M 0s
188050K .......... .......... ........                         100%  100M=1.8s

2020-05-30 13:05:31 (101 MB/s) - ‘title.akas.tsv.gz’ saved [192592731/192592731]

/bin/bash: line 2: fg: no job control
```

In [8]:

```
title_akas = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.akas.tsv', header=True, inferSchema = True)
title_akas.show(3)
```

```
+---------+--------+--------------------+------+--------+-----------+-----------
--+---------------+
  titleId|ordering|               title|region|language|      types|   attribute
s|isOriginalTitle|
+---------+--------+--------------------+------+--------+-----------+-----------
--+---------------+
tt0000001|       1|          Карменсіта|    UA|      \N|imdbDisplay|
\N|              0|
tt0000001|       2|          Carmencita|    DE|      \N|         \N|literal titl
e|             0|
tt0000001|       3|Carmencita - span...|    HU|      \N|imdbDisplay|
\N|              0|
+---------+--------+--------------------+------+--------+-----------+-----------
--+---------------+
only showing top 3 rows
```

In [9]:

```
%sh wget https://datasets.imdbws.com/title.crew.tsv.gz

%sh
gunzip title.crew.tsv.gz
```

```
--2020-05-30 13:06:31--  https://datasets.imdbws.com/title.crew.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.37, 13.224.13.5
4, 13.224.13.26, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.37|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 48399360 (46M) [binary/octet-stream]
Saving to: ‘title.crew.tsv.gz’

     0K .......... .......... .......... .......... ..........  0% 3.60M 13s
    50K .......... .......... .......... .......... ..........  0% 7.16M 10s
   100K .......... .......... .......... .......... ..........  0% 13.4M 8s
   150K .......... .......... .......... .......... ..........  0% 11.5M 7s
   200K .......... .......... .......... .......... ..........  0% 16.7M 6s
   250K .......... .......... .......... .......... ..........  0% 24.9M 5s
   300K .......... .......... .......... .......... ..........  0% 19.4M 5s
   350K .......... .......... .......... .......... ..........  0% 23.4M 4s
   400K .......... .......... .......... .......... ..........  0% 38.7M 4s
   450K .......... .......... .......... .......... ..........  1% 26.5M 4s
   500K .......... .......... .......... .......... ..........  1% 49.6M 4s
   550K .......... .......... .......... .......... ..........  1% 32.2M 3s
   600K .......... .......... .......... .......... ..........  1% 58.2M 3s
   650K .......... .......... .......... .......... ..........  1% 52.8M 3s
   700K .......... .......... .......... .......... ..........  1% 45.7M 3s
   750K .......... .......... .......... .......... ..........  1% 48.1M 3s
   800K .......... .......... .......... .......... ..........  1% 49.3M 3s
   850K .......... .......... .......... .......... ..........  1% 80.3M 3s
   900K .......... .......... .......... .......... ..........  2% 62.8M 2s
   950K .......... .......... .......... .......... ..........  2% 48.2M 2s
  1000K .......... .......... .......... .......... ..........  2%  129M 2s
  1050K .......... .......... .......... .......... ..........  2% 65.6M 2s
  1100K .......... .......... .......... .......... ..........  2% 83.8M 2s
  1150K .......... .......... .......... .......... ..........  2% 58.9M 2s
  1200K .......... .......... .......... .......... ..........  2% 98.5M 2s
  1250K .......... .......... .......... .......... ..........  2%  123M 2s
  1300K .......... .......... .......... .......... ..........  2% 98.1M 2s
  1350K .......... .......... .......... .......... ..........  2% 69.2M 2s
  1400K .......... .......... .......... .......... ..........  3% 96.3M 2s
  1450K .......... .......... .......... .......... ..........  3%  150M 2s
  1500K .......... .......... .......... .......... ..........  3%  101M 2s
  1550K .......... .......... .......... .......... ..........  3%  110M 2s
  1600K .......... .......... .......... .......... ..........  3%  100M 2s
  1650K .......... .......... .......... .......... ..........  3%  104M 2s
  1700K .......... .......... .......... .......... ..........  3%  156M 2s
  1750K .......... .......... .......... .......... ..........  3% 97.8M 1s
  1800K .......... .......... .......... .......... ..........  3%  104M 1s
  1850K .......... .......... .......... .......... ..........  4%  120M 1s
  1900K .......... .......... .......... .......... ..........  4%  169M 1s
  1950K .......... .......... .......... .......... ..........  4%  225M 1s
  2000K .......... .......... .......... .......... ..........  4%  174M 1s
  2050K .......... .......... .......... .......... ..........  4%  113M 1s
  2100K .......... .......... .......... .......... ..........  4%  133M 1s
  2150K .......... .......... .......... .......... ..........  4%  126M 1s
  2200K .......... .......... .......... .......... ..........  4%  132M 1s
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2250K ..... ..... ..... ..... .....  4%  129M 1s
2300K ..... ..... ..... ..... .....  4%  137M 1s
2350K ..... ..... ..... ..... .....  5%  116M 1s
2400K ..... ..... ..... ..... .....  5%  130M 1s
2450K ..... ..... ..... ..... .....  5%  148M 1s
2500K ..... ..... ..... ..... .....  5%  131M 1s
2550K ..... ..... ..... ..... .....  5%  129M 1s
2600K ..... ..... ..... ..... .....  5%  145M 1s
2650K ..... ..... ..... ..... .....  5%  141M 1s
2700K ..... ..... ..... ..... .....  5%  132M 1s
2750K ..... ..... ..... ..... .....  5%  124M 1s
2800K ..... ..... ..... ..... .....  6%  135M 1s
2850K ..... ..... ..... ..... .....  6%  142M 1s
2900K ..... ..... ..... ..... .....  6%  163M 1s
2950K ..... ..... ..... ..... .....  6%  200M 1s
3000K ..... ..... ..... ..... .....  6%  211M 1s
3050K ..... ..... ..... ..... .....  6%  208M 1s
3100K ..... ..... ..... ..... .....  6%  271M 1s
3150K ..... ..... ..... ..... .....  6%  171M 1s
3200K ..... ..... ..... ..... .....  6%  267M 1s
3250K ..... ..... ..... ..... .....  6%  202M 1s
3300K ..... ..... ..... ..... .....  7%  273M 1s
3350K ..... ..... ..... ..... .....  7%  251M 1s
3400K ..... ..... ..... ..... .....  7%  219M 1s
3450K ..... ..... ..... ..... .....  7% 99.5M 1s
3500K ..... ..... ..... ..... .....  7%  191M 1s
3550K ..... ..... ..... ..... .....  7% 97.3M 1s
3600K ..... ..... ..... ..... .....  7%  101M 1s
3650K ..... ..... ..... ..... .....  7%  133M 1s
3700K ..... ..... ..... ..... .....  7% 88.8M 1s
3750K ..... ..... ..... ..... .....  8% 82.0M 1s
3800K ..... ..... ..... ..... .....  8% 71.3M 1s
3850K ..... ..... ..... ..... .....  8% 63.6M 1s
3900K ..... ..... ..... ..... .....  8% 74.7M 1s
3950K ..... ..... ..... ..... .....  8% 29.9M 1s
4000K ..... ..... ..... ..... .....  8%  174M 1s
4050K ..... ..... ..... ..... .....  8%  118M 1s
4100K ..... ..... ..... ..... .....  8%  121M 1s
4150K ..... ..... ..... ..... .....  8%  106M 1s
4200K ..... ..... ..... ..... .....  8%  190M 1s
4250K ..... ..... ..... ..... .....  9% 80.9M 1s
4300K ..... ..... ..... ..... .....  9% 57.8M 1s
4350K ..... ..... ..... ..... .....  9%  101M 1s
4400K ..... ..... ..... ..... .....  9%  110M 1s
4450K ..... ..... ..... ..... .....  9% 87.8M 1s
4500K ..... ..... ..... ..... .....  9% 69.0M 1s
4550K ..... ..... ..... ..... .....  9% 93.7M 1s
4600K ..... ..... ..... ..... .....  9%  105M 1s
4650K ..... ..... ..... ..... .....  9% 78.8M 1s
4700K ..... ..... ..... ..... ..... 10% 78.2M 1s
4750K ..... ..... ..... ..... ..... 10% 74.4M 1s
4800K ..... ..... ..... ..... ..... 10% 81.3M 1s
4850K ..... ..... ..... ..... ..... 10% 94.1M 1s
4900K ..... ..... ..... ..... ..... 10%  109M 1s
4950K ..... ..... ..... ..... ..... 10%  102M 1s
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5000K ..... ..... ..... ..... ..... 10%  106M 1s
5050K ..... ..... ..... ..... ..... 10%  112M 1s
5100K ..... ..... ..... ..... ..... 10%  118M 1s
5150K ..... ..... ..... ..... ..... 11%  127M 1s
5200K ..... ..... ..... ..... ..... 11%  111M 1s
5250K ..... ..... ..... ..... ..... 11%  115M 1s
5300K ..... ..... ..... ..... ..... 11%  105M 1s
5350K ..... ..... ..... ..... ..... 11% 73.8M 1s
5400K ..... ..... ..... ..... ..... 11%  100M 1s
5450K ..... ..... ..... ..... ..... 11% 59.3M 1s
5500K ..... ..... ..... ..... ..... 11%  115M 1s
5550K ..... ..... ..... ..... ..... 11% 65.2M 1s
5600K ..... ..... ..... ..... ..... 11%  157M 1s
5650K ..... ..... ..... ..... ..... 12% 94.3M 1s
5700K ..... ..... ..... ..... ..... 12%  106M 1s
5750K ..... ..... ..... ..... ..... 12%  139M 1s
5800K ..... ..... ..... ..... ..... 12%  136M 1s
5850K ..... ..... ..... ..... ..... 12%  154M 1s
5900K ..... ..... ..... ..... ..... 12%  157M 1s
5950K ..... ..... ..... ..... ..... 12%  126M 1s
6000K ..... ..... ..... ..... ..... 12%  113M 1s
6050K ..... ..... ..... ..... ..... 12%  116M 1s
6100K ..... ..... ..... ..... ..... 13%  103M 1s
6150K ..... ..... ..... ..... ..... 13%  119M 1s
6200K ..... ..... ..... ..... ..... 13%  120M 1s
6250K ..... ..... ..... ..... ..... 13% 84.3M 1s
6300K ..... ..... ..... ..... ..... 13%  153M 1s
6350K ..... ..... ..... ..... ..... 13% 87.2M 1s
6400K ..... ..... ..... ..... ..... 13%  144M 1s
6450K ..... ..... ..... ..... ..... 13%  107M 1s
6500K ..... ..... ..... ..... ..... 13%  146M 1s
6550K ..... ..... ..... ..... ..... 13%  114M 1s
6600K ..... ..... ..... ..... ..... 14%  158M 1s
6650K ..... ..... ..... ..... ..... 14%  142M 1s
6700K ..... ..... ..... ..... ..... 14%  152M 1s
6750K ..... ..... ..... ..... ..... 14%  136M 1s
6800K ..... ..... ..... ..... ..... 14%  126M 1s
6850K ..... ..... ..... ..... ..... 14%  104M 1s
6900K ..... ..... ..... ..... ..... 14% 95.0M 1s
6950K ..... ..... ..... ..... ..... 14%  147M 1s
7000K ..... ..... ..... ..... ..... 14%  150M 1s
7050K ..... ..... ..... ..... ..... 15%  160M 1s
7100K ..... ..... ..... ..... ..... 15%  146M 1s
7150K ..... ..... ..... ..... ..... 15%  150M 1s
7200K ..... ..... ..... ..... ..... 15%  175M 1s
7250K ..... ..... ..... ..... ..... 15% 34.6M 1s
7300K ..... ..... ..... ..... ..... 15%  108M 1s
7350K ..... ..... ..... ..... ..... 15%  103M 1s
7400K ..... ..... ..... ..... ..... 15%  137M 1s
7450K ..... ..... ..... ..... ..... 15%  102M 1s
7500K ..... ..... ..... ..... ..... 15%  152M 1s
7550K ..... ..... ..... ..... ..... 16%  128M 1s
7600K ..... ..... ..... ..... ..... 16% 83.7M 1s
7650K ..... ..... ..... ..... ..... 16% 80.5M 1s
7700K ..... ..... ..... ..... ..... 16%  154M 1s
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 7750K ..... ..... ..... ..... ..... 16%  138M 1s
 7800K ..... ..... ..... ..... ..... 16%  142M 1s
 7850K ..... ..... ..... ..... ..... 16%  164M 1s
 7900K ..... ..... ..... ..... ..... 16%  155M 1s
 7950K ..... ..... ..... ..... ..... 16% 77.9M 1s
 8000K ..... ..... ..... ..... ..... 17%  107M 1s
 8050K ..... ..... ..... ..... ..... 17%  101M 1s
 8100K ..... ..... ..... ..... ..... 17%  118M 1s
 8150K ..... ..... ..... ..... ..... 17% 79.8M 1s
 8200K ..... ..... ..... ..... ..... 17%  108M 1s
 8250K ..... ..... ..... ..... ..... 17%  106M 1s
 8300K ..... ..... ..... ..... ..... 17%  109M 1s
 8350K ..... ..... ..... ..... ..... 17% 69.7M 1s
 8400K ..... ..... ..... ..... ..... 17% 46.2M 1s
 8450K ..... ..... ..... ..... ..... 17% 96.1M 1s
 8500K ..... ..... ..... ..... ..... 18%  153M 1s
 8550K ..... ..... ..... ..... ..... 18%  111M 1s
 8600K ..... ..... ..... ..... ..... 18%  108M 1s
 8650K ..... ..... ..... ..... ..... 18% 76.9M 1s
 8700K ..... ..... ..... ..... ..... 18%  167M 1s
 8750K ..... ..... ..... ..... ..... 18%  138M 1s
 8800K ..... ..... ..... ..... ..... 18%  139M 1s
 8850K ..... ..... ..... ..... ..... 18%  149M 1s
 8900K ..... ..... ..... ..... ..... 18%  147M 1s
 8950K ..... ..... ..... ..... ..... 19% 77.5M 1s
 9000K ..... ..... ..... ..... ..... 19%  113M 1s
 9050K ..... ..... ..... ..... ..... 19%  108M 1s
 9100K ..... ..... ..... ..... ..... 19%  122M 1s
 9150K ..... ..... ..... ..... ..... 19% 75.6M 1s
 9200K ..... ..... ..... ..... ..... 19% 93.3M 1s
 9250K ..... ..... ..... ..... ..... 19%  166M 1s
 9300K ..... ..... ..... ..... ..... 19%  105M 1s
 9350K ..... ..... ..... ..... ..... 19%  121M 1s
 9400K ..... ..... ..... ..... ..... 19% 96.2M 1s
 9450K ..... ..... ..... ..... ..... 20%  144M 1s
 9500K ..... ..... ..... ..... ..... 20%  141M 1s
 9550K ..... ..... ..... ..... ..... 20%  130M 1s
 9600K ..... ..... ..... ..... ..... 20%  140M 0s
 9650K ..... ..... ..... ..... ..... 20%  139M 0s
 9700K ..... ..... ..... ..... ..... 20%  100M 0s
 9750K ..... ..... ..... ..... ..... 20% 91.9M 0s
 9800K ..... ..... ..... ..... ..... 20%  108M 0s
 9850K ..... ..... ..... ..... ..... 20%  156M 0s
 9900K ..... ..... ..... ..... ..... 21%  141M 0s
 9950K ..... ..... ..... ..... ..... 21%  138M 0s
10000K ..... ..... ..... ..... ..... 21%  138M 0s
10050K ..... ..... ..... ..... ..... 21%  148M 0s
10100K ..... ..... ..... ..... ..... 21% 88.5M 0s
10150K ..... ..... ..... ..... ..... 21% 96.8M 0s
10200K ..... ..... ..... ..... ..... 21%  122M 0s
10250K ..... ..... ..... ..... ..... 21%  119M 0s
10300K ..... ..... ..... ..... ..... 21%  108M 0s
10350K ..... ..... ..... ..... ..... 22% 84.3M 0s
10400K ..... ..... ..... ..... ..... 22%  133M 0s
10450K ..... ..... ..... ..... ..... 22% 83.2M 0s
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```
10500K ..... ..... ..... ..... ..... 22%  174M 0s
10550K ..... ..... ..... ..... ..... 22% 93.7M 0s
10600K ..... ..... ..... ..... ..... 22%  152M 0s
10650K ..... ..... ..... ..... ..... 22%  158M 0s
10700K ..... ..... ..... ..... ..... 22%  138M 0s
10750K ..... ..... ..... ..... ..... 22%  129M 0s
10800K ..... ..... ..... ..... ..... 22%  162M 0s
10850K ..... ..... ..... ..... ..... 23%  164M 0s
10900K ..... ..... ..... ..... ..... 23% 85.7M 0s
10950K ..... ..... ..... ..... ..... 23% 93.1M 0s
11000K ..... ..... ..... ..... ..... 23% 98.0M 0s
11050K ..... ..... ..... ..... ..... 23% 84.4M 0s
11100K ..... ..... ..... ..... ..... 23%  120M 0s
11150K ..... ..... ..... ..... ..... 23%  139M 0s
11200K ..... ..... ..... ..... ..... 23% 85.1M 0s
11250K ..... ..... ..... ..... ..... 23%  111M 0s
11300K ..... ..... ..... ..... ..... 24% 64.6M 0s
11350K ..... ..... ..... ..... ..... 24%  103M 0s
11400K ..... ..... ..... ..... ..... 24% 88.3M 0s
11450K ..... ..... ..... ..... ..... 24% 96.9M 0s
11500K ..... ..... ..... ..... ..... 24%  159M 0s
11550K ..... ..... ..... ..... ..... 24% 82.1M 0s
11600K ..... ..... ..... ..... ..... 24% 76.8M 0s
11650K ..... ..... ..... ..... ..... 24%  141M 0s
11700K ..... ..... ..... ..... ..... 24%  159M 0s
11750K ..... ..... ..... ..... ..... 24%  135M 0s
11800K ..... ..... ..... ..... ..... 25%  152M 0s
11850K ..... ..... ..... ..... ..... 25%  150M 0s
11900K ..... ..... ..... ..... ..... 25%  163M 0s
11950K ..... ..... ..... ..... ..... 25% 65.5M 0s
12000K ..... ..... ..... ..... ..... 25% 89.8M 0s
12050K ..... ..... ..... ..... ..... 25%  109M 0s
12100K ..... ..... ..... ..... ..... 25% 86.4M 0s
12150K ..... ..... ..... ..... ..... 25%  127M 0s
12200K ..... ..... ..... ..... ..... 25%  141M 0s
12250K ..... ..... ..... ..... ..... 26% 92.2M 0s
12300K ..... ..... ..... ..... ..... 26%  162M 0s
12350K ..... ..... ..... ..... ..... 26%  111M 0s
12400K ..... ..... ..... ..... ..... 26%  124M 0s
12450K ..... ..... ..... ..... ..... 26%  142M 0s
12500K ..... ..... ..... ..... ..... 26%  105M 0s
12550K ..... ..... ..... ..... ..... 26%  105M 0s
12600K ..... ..... ..... ..... ..... 26%  146M 0s
12650K ..... ..... ..... ..... ..... 26%  106M 0s
12700K ..... ..... ..... ..... ..... 26%  155M 0s
12750K ..... ..... ..... ..... ..... 27% 72.3M 0s
12800K ..... ..... ..... ..... ..... 27%  147M 0s
12850K ..... ..... ..... ..... ..... 27%  154M 0s
12900K ..... ..... ..... ..... ..... 27%  138M 0s
12950K ..... ..... ..... ..... ..... 27%  136M 0s
13000K ..... ..... ..... ..... ..... 27%  157M 0s
13050K ..... ..... ..... ..... ..... 27% 88.4M 0s
13100K ..... ..... ..... ..... ..... 27%  112M 0s
13150K ..... ..... ..... ..... ..... 27%  101M 0s
13200K ..... ..... ..... ..... ..... 28%  111M 0s
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```
13250K ..... ..... ..... ..... ..... 28% 73.0M 0s
13300K ..... ..... ..... ..... ..... 28%  137M 0s
13350K ..... ..... ..... ..... ..... 28%  142M 0s
13400K ..... ..... ..... ..... ..... 28% 73.9M 0s
13450K ..... ..... ..... ..... ..... 28%  156M 0s
13500K ..... ..... ..... ..... ..... 28%  128M 0s
13550K ..... ..... ..... ..... ..... 28% 71.8M 0s
13600K ..... ..... ..... ..... ..... 28% 77.0M 0s
13650K ..... ..... ..... ..... ..... 28%  116M 0s
13700K ..... ..... ..... ..... ..... 29% 89.4M 0s
13750K ..... ..... ..... ..... ..... 29%  123M 0s
13800K ..... ..... ..... ..... ..... 29% 84.8M 0s
13850K ..... ..... ..... ..... ..... 29%  123M 0s
13900K ..... ..... ..... ..... ..... 29%  147M 0s
13950K ..... ..... ..... ..... ..... 29%  140M 0s
14000K ..... ..... ..... ..... ..... 29%  146M 0s
14050K ..... ..... ..... ..... ..... 29%  134M 0s
14100K ..... ..... ..... ..... ..... 29% 98.3M 0s
14150K ..... ..... ..... ..... ..... 30% 82.8M 0s
14200K ..... ..... ..... ..... ..... 30% 85.3M 0s
14250K ..... ..... ..... ..... ..... 30% 95.6M 0s
14300K ..... ..... ..... ..... ..... 30%  109M 0s
14350K ..... ..... ..... ..... ..... 30%  174M 0s
14400K ..... ..... ..... ..... ..... 30%  194M 0s
14450K ..... ..... ..... ..... ..... 30% 92.8M 0s
14500K ..... ..... ..... ..... ..... 30%  209M 0s
14550K ..... ..... ..... ..... ..... 30%  189M 0s
14600K ..... ..... ..... ..... ..... 30%  209M 0s
14650K ..... ..... ..... ..... ..... 31% 87.2M 0s
14700K ..... ..... ..... ..... ..... 31%  124M 0s
14750K ..... ..... ..... ..... ..... 31%  137M 0s
14800K ..... ..... ..... ..... ..... 31%  177M 0s
14850K ..... ..... ..... ..... ..... 31%  120M 0s
14900K ..... ..... ..... ..... ..... 31%  131M 0s
14950K ..... ..... ..... ..... ..... 31%  116M 0s
15000K ..... ..... ..... ..... ..... 31%  108M 0s
15050K ..... ..... ..... ..... ..... 31%  113M 0s
15100K ..... ..... ..... ..... ..... 32%  143M 0s
15150K ..... ..... ..... ..... ..... 32%  139M 0s
15200K ..... ..... ..... ..... ..... 32%  154M 0s
15250K ..... ..... ..... ..... ..... 32%  148M 0s
15300K ..... ..... ..... ..... ..... 32%  133M 0s
15350K ..... ..... ..... ..... ..... 32% 79.9M 0s
15400K ..... ..... ..... ..... ..... 32% 87.5M 0s
15450K ..... ..... ..... ..... ..... 32% 89.3M 0s
15500K ..... ..... ..... ..... ..... 32%  106M 0s
15550K ..... ..... ..... ..... ..... 33%  137M 0s
15600K ..... ..... ..... ..... ..... 33%  150M 0s
15650K ..... ..... ..... ..... ..... 33%  155M 0s
15700K ..... ..... ..... ..... ..... 33% 74.0M 0s
15750K ..... ..... ..... ..... ..... 33%  135M 0s
15800K ..... ..... ..... ..... ..... 33%  101M 0s
15850K ..... ..... ..... ..... ..... 33%  104M 0s
15900K ..... ..... ..... ..... ..... 33% 77.9M 0s
15950K ..... ..... ..... ..... ..... 33%  140M 0s
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```
16000K .......... .......... .......... .......... .......... 33%  151M 0s
16050K .......... .......... .......... .......... .......... 34% 96.0M 0s
16100K .......... .......... .......... .......... .......... 34%  119M 0s
16150K .......... .......... .......... .......... .......... 34% 72.7M 0s

*** WARNING: skipped 22420 bytes of output ***

30950K .......... .......... .......... .......... .......... 65% 87.1M 0s
31000K .......... .......... .......... .......... .......... 65% 81.0M 0s
31050K .......... .......... .......... .......... .......... 65% 91.5M 0s
31100K .......... .......... .......... .......... .......... 65%  159M 0s
31150K .......... .......... .......... .......... .......... 66%  103M 0s
31200K .......... .......... .......... .......... .......... 66%  131M 0s
31250K .......... .......... .......... .......... .......... 66%  150M 0s
31300K .......... .......... .......... .......... .......... 66%  158M 0s
31350K .......... .......... .......... .......... .......... 66%  141M 0s
31400K .......... .......... .......... .......... .......... 66%  155M 0s
31450K .......... .......... .......... .......... .......... 66%  109M 0s
31500K .......... .......... .......... .......... .......... 66% 89.1M 0s
31550K .......... .......... .......... .......... .......... 66% 89.5M 0s
31600K .......... .......... .......... .......... .......... 66%  166M 0s
31650K .......... .......... .......... .......... .......... 67%  155M 0s
31700K .......... .......... .......... .......... .......... 67%  153M 0s
31750K .......... .......... .......... .......... .......... 67%  138M 0s
31800K .......... .......... .......... .......... .......... 67% 63.0M 0s
31850K .......... .......... .......... .......... .......... 67% 98.3M 0s
31900K .......... .......... .......... .......... .......... 67%  152M 0s
31950K .......... .......... .......... .......... .......... 67%  125M 0s
32000K .......... .......... .......... .......... .......... 67%  165M 0s
32050K .......... .......... .......... .......... .......... 67%  154M 0s
32100K .......... .......... .......... .......... .......... 68% 72.7M 0s
32150K .......... .......... .......... .......... .......... 68% 74.8M 0s
32200K .......... .......... .......... .......... .......... 68% 79.2M 0s
32250K .......... .......... .......... .......... .......... 68% 90.3M 0s
32300K .......... .......... .......... .......... .......... 68%  117M 0s
32350K .......... .......... .......... .......... .......... 68%  124M 0s
32400K .......... .......... .......... .......... .......... 68%  167M 0s
32450K .......... .......... .......... .......... .......... 68%  159M 0s
32500K .......... .......... .......... .......... .......... 68%  164M 0s
32550K .......... .......... .......... .......... .......... 68% 92.8M 0s
32600K .......... .......... .......... .......... .......... 69%  112M 0s
32650K .......... .......... .......... .......... .......... 69% 89.2M 0s
32700K .......... .......... .......... .......... .......... 69%  107M 0s
32750K .......... .......... .......... .......... .......... 69%  102M 0s
32800K .......... .......... .......... .......... .......... 69%  157M 0s
32850K .......... .......... .......... .......... .......... 69% 88.4M 0s
32900K .......... .......... .......... .......... .......... 69%  109M 0s
32950K .......... .......... .......... .......... .......... 69% 88.8M 0s
33000K .......... .......... .......... .......... .......... 69%  154M 0s
33050K .......... .......... .......... .......... .......... 70%  155M 0s
33100K .......... .......... .......... .......... .......... 70%  150M 0s
33150K .......... .......... .......... .......... .......... 70%  138M 0s
33200K .......... .......... .......... .......... .......... 70% 69.2M 0s
33250K .......... .......... .......... .......... .......... 70%  106M 0s
33300K .......... .......... .......... .......... .......... 70% 79.8M 0s
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33350K ..... ..... ..... ..... ..... 70%  135M 0s
33400K ..... ..... ..... ..... ..... 70%  164M 0s
33450K ..... ..... ..... ..... ..... 70%  155M 0s
33500K ..... ..... ..... ..... ..... 70%  140M 0s
33550K ..... ..... ..... ..... ..... 71%  139M 0s
33600K ..... ..... ..... ..... ..... 71%  148M 0s
33650K ..... ..... ..... ..... ..... 71%  153M 0s
33700K ..... ..... ..... ..... ..... 71%  138M 0s
33750K ..... ..... ..... ..... ..... 71% 74.3M 0s
33800K ..... ..... ..... ..... ..... 71%  109M 0s
33850K ..... ..... ..... ..... ..... 71% 74.2M 0s
33900K ..... ..... ..... ..... ..... 71% 86.3M 0s
33950K ..... ..... ..... ..... ..... 71% 75.2M 0s
34000K ..... ..... ..... ..... ..... 72%  105M 0s
34050K ..... ..... ..... ..... ..... 72%  168M 0s
34100K ..... ..... ..... ..... ..... 72%  149M 0s
34150K ..... ..... ..... ..... ..... 72%  144M 0s
34200K ..... ..... ..... ..... ..... 72%  154M 0s
34250K ..... ..... ..... ..... ..... 72%  154M 0s
34300K ..... ..... ..... ..... ..... 72% 86.3M 0s
34350K ..... ..... ..... ..... ..... 72% 68.9M 0s
34400K ..... ..... ..... ..... ..... 72%  112M 0s
34450K ..... ..... ..... ..... ..... 72%  140M 0s
34500K ..... ..... ..... ..... ..... 73%  166M 0s
34550K ..... ..... ..... ..... ..... 73%  150M 0s
34600K ..... ..... ..... ..... ..... 73%  159M 0s
34650K ..... ..... ..... ..... ..... 73%  148M 0s
34700K ..... ..... ..... ..... ..... 73%  157M 0s
34750K ..... ..... ..... ..... ..... 73%  139M 0s
34800K ..... ..... ..... ..... ..... 73%  148M 0s
34850K ..... ..... ..... ..... ..... 73% 81.9M 0s
34900K ..... ..... ..... ..... ..... 73%  114M 0s
34950K ..... ..... ..... ..... ..... 74% 73.8M 0s
35000K ..... ..... ..... ..... ..... 74% 83.7M 0s
35050K ..... ..... ..... ..... ..... 74% 70.3M 0s
35100K ..... ..... ..... ..... ..... 74% 94.2M 0s
35150K ..... ..... ..... ..... ..... 74%  123M 0s
35200K ..... ..... ..... ..... ..... 74%  163M 0s
35250K ..... ..... ..... ..... ..... 74%  163M 0s
35300K ..... ..... ..... ..... ..... 74%  140M 0s
35350K ..... ..... ..... ..... ..... 74%  125M 0s
35400K ..... ..... ..... ..... ..... 75% 79.6M 0s
35450K ..... ..... ..... ..... ..... 75% 98.7M 0s
35500K ..... ..... ..... ..... ..... 75% 77.5M 0s
35550K ..... ..... ..... ..... ..... 75% 81.1M 0s
35600K ..... ..... ..... ..... ..... 75%  160M 0s
35650K ..... ..... ..... ..... ..... 75%  131M 0s
35700K ..... ..... ..... ..... ..... 75%  161M 0s
35750K ..... ..... ..... ..... ..... 75%  143M 0s
35800K ..... ..... ..... ..... ..... 75%  147M 0s
35850K ..... ..... ..... ..... ..... 75%  148M 0s
35900K ..... ..... ..... ..... ..... 76%  152M 0s
35950K ..... ..... ..... ..... ..... 76% 45.7M 0s
36000K ..... ..... ..... ..... ..... 76% 75.3M 0s
36050K ..... ..... ..... ..... ..... 76% 86.0M 0s
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```
36100K ..... ..... ..... ..... ..... 76%  108M 0s
36150K ..... ..... ..... ..... ..... 76% 83.6M 0s
36200K ..... ..... ..... ..... ..... 76%  152M 0s
36250K ..... ..... ..... ..... ..... 76%  138M 0s
36300K ..... ..... ..... ..... ..... 76%  144M 0s
36350K ..... ..... ..... ..... ..... 77%  138M 0s
36400K ..... ..... ..... ..... ..... 77%  142M 0s
36450K ..... ..... ..... ..... ..... 77% 85.1M 0s
36500K ..... ..... ..... ..... ..... 77%  102M 0s
36550K ..... ..... ..... ..... ..... 77% 60.6M 0s
36600K ..... ..... ..... ..... ..... 77%  107M 0s
36650K ..... ..... ..... ..... ..... 77%  149M 0s
36700K ..... ..... ..... ..... ..... 77%  150M 0s
36750K ..... ..... ..... ..... ..... 77%  122M 0s
36800K ..... ..... ..... ..... ..... 77%  129M 0s
36850K ..... ..... ..... ..... ..... 78%  146M 0s
36900K ..... ..... ..... ..... ..... 78%  160M 0s
36950K ..... ..... ..... ..... ..... 78% 81.0M 0s
37000K ..... ..... ..... ..... ..... 78% 82.8M 0s
37050K ..... ..... ..... ..... ..... 78%  109M 0s
37100K ..... ..... ..... ..... ..... 78%  110M 0s
37150K ..... ..... ..... ..... ..... 78% 79.8M 0s
37200K ..... ..... ..... ..... ..... 78%  122M 0s
37250K ..... ..... ..... ..... ..... 78%  149M 0s
37300K ..... ..... ..... ..... ..... 79%  162M 0s
37350K ..... ..... ..... ..... ..... 79%  137M 0s
37400K ..... ..... ..... ..... ..... 79%  164M 0s
37450K ..... ..... ..... ..... ..... 79%  162M 0s
37500K ..... ..... ..... ..... ..... 79%  148M 0s
37550K ..... ..... ..... ..... ..... 79%  138M 0s
37600K ..... ..... ..... ..... ..... 79% 80.1M 0s
37650K ..... ..... ..... ..... ..... 79% 88.3M 0s
37700K ..... ..... ..... ..... ..... 79%  102M 0s
37750K ..... ..... ..... ..... ..... 79% 84.5M 0s
37800K ..... ..... ..... ..... ..... 80%  154M 0s
37850K ..... ..... ..... ..... ..... 80%  144M 0s
37900K ..... ..... ..... ..... ..... 80%  162M 0s
37950K ..... ..... ..... ..... ..... 80%  139M 0s
38000K ..... ..... ..... ..... ..... 80%  124M 0s
38050K ..... ..... ..... ..... ..... 80%  169M 0s
38100K ..... ..... ..... ..... ..... 80%  149M 0s
38150K ..... ..... ..... ..... ..... 80% 65.2M 0s
38200K ..... ..... ..... ..... ..... 80% 85.7M 0s
38250K ..... ..... ..... ..... ..... 81% 73.0M 0s
38300K ..... ..... ..... ..... ..... 81%  108M 0s
38350K ..... ..... ..... ..... ..... 81% 93.7M 0s
38400K ..... ..... ..... ..... ..... 81%  165M 0s
38450K ..... ..... ..... ..... ..... 81%  166M 0s
38500K ..... ..... ..... ..... ..... 81%  132M 0s
38550K ..... ..... ..... ..... ..... 81%  138M 0s
38600K ..... ..... ..... ..... ..... 81%  160M 0s
38650K ..... ..... ..... ..... ..... 81%  143M 0s
38700K ..... ..... ..... ..... ..... 81%  136M 0s
38750K ..... ..... ..... ..... ..... 82% 66.2M 0s
38800K ..... ..... ..... ..... ..... 82%  100M 0s
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38850K ..... ..... ..... ..... ..... 82%  101M 0s
38900K ..... ..... ..... ..... ..... 82%  114M 0s
38950K ..... ..... ..... ..... ..... 82% 83.9M 0s
39000K ..... ..... ..... ..... ..... 82%  106M 0s
39050K ..... ..... ..... ..... ..... 82%  148M 0s
39100K ..... ..... ..... ..... ..... 82%  155M 0s
39150K ..... ..... ..... ..... ..... 82%  118M 0s
39200K ..... ..... ..... ..... ..... 83% 91.7M 0s
39250K ..... ..... ..... ..... ..... 83% 76.4M 0s
39300K ..... ..... ..... ..... ..... 83%  109M 0s
39350K ..... ..... ..... ..... ..... 83% 80.8M 0s
39400K ..... ..... ..... ..... ..... 83% 99.4M 0s
39450K ..... ..... ..... ..... ..... 83% 96.6M 0s
39500K ..... ..... ..... ..... ..... 83%  161M 0s
39550K ..... ..... ..... ..... ..... 83%  140M 0s
39600K ..... ..... ..... ..... ..... 83%  143M 0s
39650K ..... ..... ..... ..... ..... 83%  152M 0s
39700K ..... ..... ..... ..... ..... 84%  165M 0s
39750K ..... ..... ..... ..... ..... 84%  141M 0s
39800K ..... ..... ..... ..... ..... 84% 87.3M 0s
39850K ..... ..... ..... ..... ..... 84%  119M 0s
39900K ..... ..... ..... ..... ..... 84%  114M 0s
39950K ..... ..... ..... ..... ..... 84%  101M 0s
40000K ..... ..... ..... ..... ..... 84%  168M 0s
40050K ..... ..... ..... ..... ..... 84%  132M 0s
40100K ..... ..... ..... ..... ..... 84%  122M 0s
40150K ..... ..... ..... ..... ..... 85%  158M 0s
40200K ..... ..... ..... ..... ..... 85%  180M 0s
40250K ..... ..... ..... ..... ..... 85%  129M 0s
40300K ..... ..... ..... ..... ..... 85%  151M 0s
40350K ..... ..... ..... ..... ..... 85%  132M 0s
40400K ..... ..... ..... ..... ..... 85%  113M 0s
40450K ..... ..... ..... ..... ..... 85%  130M 0s
40500K ..... ..... ..... ..... ..... 85%  146M 0s
40550K ..... ..... ..... ..... ..... 85%  110M 0s
40600K ..... ..... ..... ..... ..... 86%  146M 0s
40650K ..... ..... ..... ..... ..... 86%  147M 0s
40700K ..... ..... ..... ..... ..... 86%  123M 0s
40750K ..... ..... ..... ..... ..... 86%  129M 0s
40800K ..... ..... ..... ..... ..... 86%  155M 0s
40850K ..... ..... ..... ..... ..... 86%  131M 0s
40900K ..... ..... ..... ..... ..... 86%  152M 0s
40950K ..... ..... ..... ..... ..... 86%  143M 0s
41000K ..... ..... ..... ..... ..... 86%  127M 0s
41050K ..... ..... ..... ..... ..... 86%  155M 0s
41100K ..... ..... ..... ..... ..... 87%  145M 0s
41150K ..... ..... ..... ..... ..... 87%  112M 0s
41200K ..... ..... ..... ..... ..... 87%  147M 0s
41250K ..... ..... ..... ..... ..... 87%  151M 0s
41300K ..... ..... ..... ..... ..... 87%  156M 0s
41350K ..... ..... ..... ..... ..... 87%  115M 0s
41400K ..... ..... ..... ..... ..... 87%  146M 0s
41450K ..... ..... ..... ..... ..... 87%  150M 0s
41500K ..... ..... ..... ..... ..... 87%  147M 0s
41550K ..... ..... ..... ..... ..... 88%  121M 0s
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41600K .......... .......... .......... .......... .......... 88%  155M 0s
41650K .......... .......... .......... .......... .......... 88%  138M 0s
41700K .......... .......... .......... .......... .......... 88%  156M 0s
41750K .......... .......... .......... .......... .......... 88%  164M 0s
41800K .......... .......... .......... .......... .......... 88%  146M 0s
41850K .......... .......... .......... .......... .......... 88%  141M 0s
41900K .......... .......... .......... .......... .......... 88%  149M 0s
41950K .......... .......... .......... .......... .......... 88%  131M 0s
42000K .......... .......... .......... .......... .......... 88%  141M 0s
42050K .......... .......... .......... .......... .......... 89%  150M 0s
42100K .......... .......... .......... .......... .......... 89%  153M 0s
42150K .......... .......... .......... .......... .......... 89%  122M 0s
42200K .......... .......... .......... .......... .......... 89%  154M 0s
42250K .......... .......... .......... .......... .......... 89%  152M 0s
42300K .......... .......... .......... .......... .......... 89%  144M 0s
42350K .......... .......... .......... .......... .......... 89%  133M 0s
42400K .......... .......... .......... .......... .......... 89%  152M 0s
42450K .......... .......... .......... .......... .......... 89%  158M 0s
42500K .......... .......... .......... .......... .......... 90%  155M 0s
42550K .......... .......... .......... .......... .......... 90%  137M 0s
42600K .......... .......... .......... .......... .......... 90%  148M 0s
42650K .......... .......... .......... .......... .......... 90%  152M 0s
42700K .......... .......... .......... .......... .......... 90%  155M 0s
42750K .......... .......... .......... .......... .......... 90%  119M 0s
42800K .......... .......... .......... .......... .......... 90%  147M 0s
42850K .......... .......... .......... .......... .......... 90%  122M 0s
42900K .......... .......... .......... .......... .......... 90%  150M 0s
42950K .......... .......... .......... .......... .......... 90%  135M 0s
43000K .......... .......... .......... .......... .......... 91%  148M 0s
43050K .......... .......... .......... .......... .......... 91%  149M 0s
43100K .......... .......... .......... .......... .......... 91%  156M 0s
43150K .......... .......... .......... .......... .......... 91%  134M 0s
43200K .......... .......... .......... .......... .......... 91%  150M 0s
43250K .......... .......... .......... .......... .......... 91%  156M 0s
43300K .......... .......... .......... .......... .......... 91%  155M 0s
43350K .......... .......... .......... .......... .......... 91%  131M 0s
43400K .......... .......... .......... .......... .......... 91%  161M 0s
43450K .......... .......... .......... .......... .......... 92%  149M 0s
43500K .......... .......... .......... .......... .......... 92%  155M 0s
43550K .......... .......... .......... .......... .......... 92%  129M 0s
43600K .......... .......... .......... .......... .......... 92%  157M 0s
43650K .......... .......... .......... .......... .......... 92%  153M 0s
43700K .......... .......... .......... .......... .......... 92%  150M 0s
43750K .......... .......... .......... .......... .......... 92%  145M 0s
43800K .......... .......... .......... .......... .......... 92%  152M 0s
43850K .......... .......... .......... .......... .......... 92%  150M 0s
43900K .......... .......... .......... .......... .......... 92%  153M 0s
43950K .......... .......... .......... .......... .......... 93%  121M 0s
44000K .......... .......... .......... .......... .......... 93%  157M 0s
44050K .......... .......... .......... .......... .......... 93%  152M 0s
44100K .......... .......... .......... .......... .......... 93%  150M 0s
44150K .......... .......... .......... .......... .......... 93%  137M 0s
44200K .......... .......... .......... .......... .......... 93%  152M 0s
44250K .......... .......... .......... .......... .......... 93%  164M 0s
44300K .......... .......... .......... .......... .......... 93%  144M 0s
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44350K .......... .......... .......... .......... .......... 93% 98.7M 0s
44400K .......... .......... .......... .......... .......... 94%  154M 0s
44450K .......... .......... .......... .......... .......... 94% 38.2M 0s
44500K .......... .......... .......... .......... .......... 94%  177M 0s
44550K .......... .......... .......... .......... .......... 94%  165M 0s
44600K .......... .......... .......... .......... .......... 94%  133M 0s
44650K .......... .......... .......... .......... .......... 94%  130M 0s
44700K .......... .......... .......... .......... .......... 94%  143M 0s
44750K .......... .......... .......... .......... .......... 94%  142M 0s
44800K .......... .......... .......... .......... .......... 94%  230M 0s
44850K .......... .......... .......... .......... .......... 94%  213M 0s
44900K .......... .......... .......... .......... .......... 95%  192M 0s
44950K .......... .......... .......... .......... .......... 95%  206M 0s
45000K .......... .......... .......... .......... .......... 95%  215M 0s
45050K .......... .......... .......... .......... .......... 95%  121M 0s
45100K .......... .......... .......... .......... .......... 95%  178M 0s
45150K .......... .......... .......... .......... .......... 95%  231M 0s
45200K .......... .......... .......... .......... .......... 95%  265M 0s
45250K .......... .......... .......... .......... .......... 95%  286M 0s
45300K .......... .......... .......... .......... .......... 95%  278M 0s
45350K .......... .......... .......... .......... .......... 96%  278M 0s
45400K .......... .......... .......... .......... .......... 96%  300M 0s
45450K .......... .......... .......... .......... .......... 96%  316M 0s
45500K .......... .......... .......... .......... .......... 96%  237M 0s
45550K .......... .......... .......... .......... .......... 96%  146M 0s
45600K .......... .......... .......... .......... .......... 96%  295M 0s
45650K .......... .......... .......... .......... .......... 96%  190M 0s
45700K .......... .......... .......... .......... .......... 96%  216M 0s
45750K .......... .......... .......... .......... .......... 96%  207M 0s
45800K .......... .......... .......... .......... .......... 97%  197M 0s
45850K .......... .......... .......... .......... .......... 97%  185M 0s
45900K .......... .......... .......... .......... .......... 97%  305M 0s
45950K .......... .......... .......... .......... .......... 97%  101M 0s
46000K .......... .......... .......... .......... .......... 97%  142M 0s
46050K .......... .......... .......... .......... .......... 97%  174M 0s
46100K .......... .......... .......... .......... .......... 97%  219M 0s
46150K .......... .......... .......... .......... .......... 97%  214M 0s
46200K .......... .......... .......... .......... .......... 97%  239M 0s
46250K .......... .......... .......... .......... .......... 97%  193M 0s
46300K .......... .......... .......... .......... .......... 98%  299M 0s
46350K .......... .......... .......... .......... .......... 98%  252M 0s
46400K .......... .......... .......... .......... .......... 98%  309M 0s
46450K .......... .......... .......... .......... .......... 98%  290M 0s
46500K .......... .......... .......... .......... .......... 98%  206M 0s
46550K .......... .......... .......... .......... .......... 98%  234M 0s
46600K .......... .......... .......... .......... .......... 98%  215M 0s
46650K .......... .......... .......... .......... .......... 98%  224M 0s
46700K .......... .......... .......... .......... .......... 98%  303M 0s
46750K .......... .......... .......... .......... .......... 99%  175M 0s
46800K .......... .......... .......... .......... .......... 99%  184M 0s
46850K .......... .......... .......... .......... .......... 99%  184M 0s
46900K .......... .......... .......... .......... .......... 99%  200M 0s
46950K .......... .......... .......... .......... .......... 99%  180M 0s
47000K .......... .......... .......... .......... .......... 99%  202M 0s
47050K .......... .......... .......... .......... .......... 99%  204M 0s
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 47100K .......... .......... .......... .......... .......... 99%  199M 0s
 47150K .......... .......... .......... .......... .......... 99%  157M 0s
 47200K .......... .......... .......... .......... .......... 99%  187M 0s
 47250K .......... .....                                      100%  164M=0.5s

2020-05-30 13:06:32 (101 MB/s) - ‘title.crew.tsv.gz’ saved [48399360/48399360]

/bin/bash: line 2: fg: no job control
```

In [10]:

```
title_crew = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.crew.tsv', header=True, inferSchema = True)
title_crew.show(3)
```

```
+---------+---------+-------+
   tconst|directors|writers|
+---------+---------+-------+
tt0000001|nm0005690|     \N|
tt0000002|nm0721526|     \N|
tt0000003|nm0721526|     \N|
+---------+---------+-------+
only showing top 3 rows
```

In [11]:

```
%sh wget https://datasets.imdbws.com/title.episode.tsv.gz

%sh
gunzip title.episode.tsv.gz
```

```
--2020-05-30 13:06:45--  https://datasets.imdbws.com/title.episode.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.32, 13.224.13.3
7, 13.224.13.54, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.32|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 26570485 (25M) [binary/octet-stream]
Saving to: ‘title.episode.tsv.gz’

     0K .......... .......... .......... .......... ..........  0% 4.76M 5s
    50K .......... .......... .......... .......... ..........  0% 8.62M 4s
   100K .......... .......... .......... .......... ..........  0% 14.0M 3s
   150K .......... .......... .......... .......... ..........  0% 19.6M 3s
   200K .......... .......... .......... .......... ..........  0% 16.1M 3s
   250K .......... .......... .......... .......... ..........  1% 21.7M 2s
   300K .......... .......... .......... .......... ..........  1% 39.0M 2s
   350K .......... .......... .......... .......... ..........  1% 27.9M 2s
   400K .......... .......... .......... .......... ..........  1% 47.1M 2s
   450K .......... .......... .......... .......... ..........  1% 31.6M 2s
   500K .......... .......... .......... .......... ..........  2% 59.9M 2s
   550K .......... .......... .......... .......... ..........  2% 57.2M 1s
   600K .......... .......... .......... .......... ..........  2% 52.3M 1s
   650K .......... .......... .......... .......... ..........  2% 52.7M 1s
   700K .......... .......... .......... .......... ..........  2% 53.3M 1s
   750K .......... .......... .......... .......... ..........  3% 86.6M 1s
   800K .......... .......... .......... .......... ..........  3% 79.0M 1s
   850K .......... .......... .......... .......... ..........  3% 66.5M 1s
   900K .......... .......... .......... .......... ..........  3% 93.0M 1s
   950K .......... .......... .......... .......... ..........  3%  184M 1s
  1000K .......... .......... .......... .......... ..........  4% 66.0M 1s
  1050K .......... .......... .......... .......... ..........  4% 59.8M 1s
  1100K .......... .......... .......... .......... ..........  4%  108M 1s
  1150K .......... .......... .......... .......... ..........  4% 80.2M 1s
  1200K .......... .......... .......... .......... ..........  4%  117M 1s
  1250K .......... .......... .......... .......... ..........  5%  139M 1s
  1300K .......... .......... .......... .......... ..........  5%  113M 1s
  1350K .......... .......... .......... .......... ..........  5%  116M 1s
  1400K .......... .......... .......... .......... ..........  5%  121M 1s
  1450K .......... .......... .......... .......... ..........  5% 81.0M 1s
  1500K .......... .......... .......... .......... ..........  5%  105M 1s
  1550K .......... .......... .......... .......... ..........  6%  115M 1s
  1600K .......... .......... .......... .......... ..........  6%  121M 1s
  1650K .......... .......... .......... .......... ..........  6%  146M 1s
  1700K .......... .......... .......... .......... ..........  6%  106M 1s
  1750K .......... .......... .......... .......... ..........  6%  152M 1s
  1800K .......... .......... .......... .......... ..........  7% 61.3M 1s
  1850K .......... .......... .......... .......... ..........  7% 57.1M 1s
  1900K .......... .......... .......... .......... ..........  7% 86.3M 1s
  1950K .......... .......... .......... .......... ..........  7%  124M 1s
  2000K .......... .......... .......... .......... ..........  7%  185M 1s
  2050K .......... .......... .......... .......... ..........  8%  175M 1s
  2100K .......... .......... .......... .......... ..........  8%  162M 1s
  2150K .......... .......... .......... .......... ..........  8%  166M 1s
  2200K .......... .......... .......... .......... ..........  8%  177M 1s
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2250K .......... .......... .......... .......... ..........  8%  115M 1s
2300K .......... .......... .......... .......... ..........  9%  181M 1s
2350K .......... .......... .......... .......... ..........  9%  123M 1s
2400K .......... .......... .......... .......... ..........  9%  138M 1s
2450K .......... .......... .......... .......... ..........  9%  104M 1s
2500K .......... .......... .......... .......... ..........  9%  122M 0s
2550K .......... .......... .......... .......... .......... 10%  124M 0s
2600K .......... .......... .......... .......... .......... 10%  272M 0s
2650K .......... .......... .......... .......... .......... 10%  143M 0s
2700K .......... .......... .......... .......... .......... 10%  302M 0s
2750K .......... .......... .......... .......... .......... 10%  314M 0s
2800K .......... .......... .......... .......... .......... 10%  310M 0s
2850K .......... .......... .......... .......... .......... 11%  257M 0s
2900K .......... .......... .......... .......... .......... 11%  280M 0s
2950K .......... .......... .......... .......... .......... 11%  163M 0s
3000K .......... .......... .......... .......... .......... 11%  287M 0s
3050K .......... .......... .......... .......... .......... 11%  253M 0s
3100K .......... .......... .......... .......... .......... 12%  288M 0s
3150K .......... .......... .......... .......... .......... 12% 46.6M 0s
3200K .......... .......... .......... .......... .......... 12% 67.5M 0s
3250K .......... .......... .......... .......... .......... 12%  144M 0s
3300K .......... .......... .......... .......... .......... 12% 50.9M 0s
3350K .......... .......... .......... .......... .......... 13% 92.6M 0s
3400K .......... .......... .......... .......... .......... 13% 68.2M 0s
3450K .......... .......... .......... .......... .......... 13% 49.7M 0s
3500K .......... .......... .......... .......... .......... 13% 98.0M 0s
3550K .......... .......... .......... .......... .......... 13%  116M 0s
3600K .......... .......... .......... .......... .......... 14%  160M 0s
3650K .......... .......... .......... .......... .......... 14%  142M 0s
3700K .......... .......... .......... .......... .......... 14%  103M 0s
3750K .......... .......... .......... .......... .......... 14%  157M 0s
3800K .......... .......... .......... .......... .......... 14% 86.6M 0s
3850K .......... .......... .......... .......... .......... 15%  101M 0s
3900K .......... .......... .......... .......... .......... 15%  293M 0s
3950K .......... .......... .......... .......... .......... 15%  119M 0s
4000K .......... .......... .......... .......... .......... 15%  263M 0s
4050K .......... .......... .......... .......... .......... 15%  249M 0s
4100K .......... .......... .......... .......... .......... 15%  306M 0s
4150K .......... .......... .......... .......... .......... 16% 87.9M 0s
4200K .......... .......... .......... .......... .......... 16%  128M 0s
4250K .......... .......... .......... .......... .......... 16%  115M 0s
4300K .......... .......... .......... .......... .......... 16%  277M 0s
4350K .......... .......... .......... .......... .......... 16%  118M 0s
4400K .......... .......... .......... .......... .......... 17%  116M 0s
4450K .......... .......... .......... .......... .......... 17% 83.7M 0s
4500K .......... .......... .......... .......... .......... 17%  111M 0s
4550K .......... .......... .......... .......... .......... 17%  151M 0s
4600K .......... .......... .......... .......... .......... 17%  159M 0s
4650K .......... .......... .......... .......... .......... 18%  138M 0s
4700K .......... .......... .......... .......... .......... 18%  159M 0s
4750K .......... .......... .......... .......... .......... 18% 68.5M 0s
4800K .......... .......... .......... .......... .......... 18%  102M 0s
4850K .......... .......... .......... .......... .......... 18%  146M 0s
4900K .......... .......... .......... .......... .......... 19%  150M 0s
4950K .......... .......... .......... .......... .......... 19% 96.3M 0s
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5000K ..... ..... ..... ..... ..... 19%  159M 0s
5050K ..... ..... ..... ..... ..... 19%  101M 0s
5100K ..... ..... ..... ..... ..... 19%  104M 0s
5150K ..... ..... ..... ..... ..... 20%  150M 0s
5200K ..... ..... ..... ..... ..... 20%  158M 0s
5250K ..... ..... ..... ..... ..... 20%  145M 0s
5300K ..... ..... ..... ..... ..... 20%  110M 0s
5350K ..... ..... ..... ..... ..... 20%  269M 0s
5400K ..... ..... ..... ..... ..... 21%  299M 0s
5450K ..... ..... ..... ..... ..... 21%  255M 0s
5500K ..... ..... ..... ..... ..... 21%  241M 0s
5550K ..... ..... ..... ..... ..... 21%  108M 0s
5600K ..... ..... ..... ..... ..... 21%  156M 0s
5650K ..... ..... ..... ..... ..... 21%  153M 0s
5700K ..... ..... ..... ..... ..... 22%  278M 0s
5750K ..... ..... ..... ..... ..... 22%  303M 0s
5800K ..... ..... ..... ..... ..... 22%  274M 0s
5850K ..... ..... ..... ..... ..... 22%  222M 0s
5900K ..... ..... ..... ..... ..... 22%  304M 0s
5950K ..... ..... ..... ..... ..... 23%  105M 0s
6000K ..... ..... ..... ..... ..... 23% 77.6M 0s
6050K ..... ..... ..... ..... ..... 23%  292M 0s
6100K ..... ..... ..... ..... ..... 23%  286M 0s
6150K ..... ..... ..... ..... ..... 23%  290M 0s
6200K ..... ..... ..... ..... ..... 24%  287M 0s
6250K ..... ..... ..... ..... ..... 24% 70.5M 0s
6300K ..... ..... ..... ..... ..... 24%  127M 0s
6350K ..... ..... ..... ..... ..... 24%  134M 0s
6400K ..... ..... ..... ..... ..... 24%  230M 0s
6450K ..... ..... ..... ..... ..... 25%  252M 0s
6500K ..... ..... ..... ..... ..... 25%  284M 0s
6550K ..... ..... ..... ..... ..... 25%  302M 0s
6600K ..... ..... ..... ..... ..... 25%  268M 0s
6650K ..... ..... ..... ..... ..... 25%  235M 0s
6700K ..... ..... ..... ..... ..... 26%  279M 0s
6750K ..... ..... ..... ..... ..... 26%  115M 0s
6800K ..... ..... ..... ..... ..... 26%  302M 0s
6850K ..... ..... ..... ..... ..... 26%  237M 0s
6900K ..... ..... ..... ..... ..... 26%  293M 0s
6950K ..... ..... ..... ..... ..... 26%  306M 0s
7000K ..... ..... ..... ..... ..... 27%  311M 0s
7050K ..... ..... ..... ..... ..... 27%  204M 0s
7100K ..... ..... ..... ..... ..... 27%  259M 0s
7150K ..... ..... ..... ..... ..... 27%  281M 0s
7200K ..... ..... ..... ..... ..... 27%  273M 0s
7250K ..... ..... ..... ..... ..... 28%  274M 0s
7300K ..... ..... ..... ..... ..... 28%  310M 0s
7350K ..... ..... ..... ..... ..... 28%  285M 0s
7400K ..... ..... ..... ..... ..... 28%  276M 0s
7450K ..... ..... ..... ..... ..... 28%  234M 0s
7500K ..... ..... ..... ..... ..... 29%  267M 0s
7550K ..... ..... ..... ..... ..... 29%  316M 0s
7600K ..... ..... ..... ..... ..... 29% 34.2M 0s
7650K ..... ..... ..... ..... ..... 29%  240M 0s
7700K ..... ..... ..... ..... ..... 29%  306M 0s
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 7750K ..... ..... ..... ..... ..... 30%  110M 0s
 7800K ..... ..... ..... ..... ..... 30% 34.9M 0s
 7850K ..... ..... ..... ..... ..... 30%  133M 0s
 7900K ..... ..... ..... ..... ..... 30%  162M 0s
 7950K ..... ..... ..... ..... ..... 30% 96.1M 0s
 8000K ..... ..... ..... ..... ..... 31%  119M 0s
 8050K ..... ..... ..... ..... ..... 31%  164M 0s
 8100K ..... ..... ..... ..... ..... 31%  304M 0s
 8150K ..... ..... ..... ..... ..... 31%  312M 0s
 8200K ..... ..... ..... ..... ..... 31%  267M 0s
 8250K ..... ..... ..... ..... ..... 31%  197M 0s
 8300K ..... ..... ..... ..... ..... 32%  115M 0s
 8350K ..... ..... ..... ..... ..... 32%  206M 0s
 8400K ..... ..... ..... ..... ..... 32%  208M 0s
 8450K ..... ..... ..... ..... ..... 32%  177M 0s
 8500K ..... ..... ..... ..... ..... 32% 56.5M 0s
 8550K ..... ..... ..... ..... ..... 33% 83.0M 0s
 8600K ..... ..... ..... ..... ..... 33% 94.8M 0s
 8650K ..... ..... ..... ..... ..... 33% 65.0M 0s
 8700K ..... ..... ..... ..... ..... 33% 91.3M 0s
 8750K ..... ..... ..... ..... ..... 33%  181M 0s
 8800K ..... ..... ..... ..... ..... 34%  173M 0s
 8850K ..... ..... ..... ..... ..... 34%  124M 0s
 8900K ..... ..... ..... ..... ..... 34%  153M 0s
 8950K ..... ..... ..... ..... ..... 34%  284M 0s
 9000K ..... ..... ..... ..... ..... 34%  291M 0s
 9050K ..... ..... ..... ..... ..... 35% 55.2M 0s
 9100K ..... ..... ..... ..... ..... 35% 36.4M 0s
 9150K ..... ..... ..... ..... ..... 35% 25.0M 0s
 9200K ..... ..... ..... ..... ..... 35% 16.2M 0s
 9250K ..... ..... ..... ..... ..... 35% 15.1M 0s
 9300K ..... ..... ..... ..... ..... 36% 30.9M 0s
 9350K ..... ..... ..... ..... ..... 36% 73.3M 0s
 9400K ..... ..... ..... ..... ..... 36%  154M 0s
 9450K ..... ..... ..... ..... ..... 36%  164M 0s
 9500K ..... ..... ..... ..... ..... 36%  206M 0s
 9550K ..... ..... ..... ..... ..... 36%  154M 0s
 9600K ..... ..... ..... ..... ..... 37%  179M 0s
 9650K ..... ..... ..... ..... ..... 37%  168M 0s
 9700K ..... ..... ..... ..... ..... 37%  201M 0s
 9750K ..... ..... ..... ..... ..... 37%  201M 0s
 9800K ..... ..... ..... ..... ..... 37%  203M 0s
 9850K ..... ..... ..... ..... ..... 38%  182M 0s
 9900K ..... ..... ..... ..... ..... 38%  197M 0s
 9950K ..... ..... ..... ..... ..... 38%  201M 0s
10000K ..... ..... ..... ..... ..... 38%  204M 0s
10050K ..... ..... ..... ..... ..... 38%  171M 0s
10100K ..... ..... ..... ..... ..... 39%  203M 0s
10150K ..... ..... ..... ..... ..... 39%  207M 0s
10200K ..... ..... ..... ..... ..... 39% 77.5M 0s
10250K ..... ..... ..... ..... ..... 39%  183M 0s
10300K ..... ..... ..... ..... ..... 39% 21.1M 0s
10350K ..... ..... ..... ..... ..... 40% 40.1M 0s
10400K ..... ..... ..... ..... ..... 40% 35.2M 0s
10450K ..... ..... ..... ..... ..... 40% 35.5M 0s
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10500K .......... .......... .......... .......... .......... 40% 22.0M 0s
10550K .......... .......... .......... .......... .......... 40% 19.6M 0s
10600K .......... .......... .......... .......... .......... 41% 19.1M 0s
10650K .......... .......... .......... .......... .......... 41% 26.2M 0s
10700K .......... .......... .......... .......... .......... 41% 33.7M 0s
10750K .......... .......... .......... .......... .......... 41% 44.6M 0s
10800K .......... .......... .......... .......... .......... 41%  153M 0s
10850K .......... .......... .......... .......... .......... 42%  115M 0s
10900K .......... .......... .......... .......... .......... 42%  209M 0s
10950K .......... .......... .......... .......... .......... 42%  210M 0s
11000K .......... .......... .......... .......... .......... 42%  206M 0s
11050K .......... .......... .......... .......... .......... 42%  175M 0s
11100K .......... .......... .......... .......... .......... 42%  109M 0s
11150K .......... .......... .......... .......... .......... 43%  155M 0s
11200K .......... .......... .......... .......... .......... 43% 49.4M 0s
11250K .......... .......... .......... .......... .......... 43%  120M 0s
11300K .......... .......... .......... .......... .......... 43%  126M 0s
11350K .......... .......... .......... .......... .......... 43% 80.9M 0s
11400K .......... .......... .......... .......... .......... 44% 76.9M 0s
11450K .......... .......... .......... .......... .......... 44% 85.2M 0s
11500K .......... .......... .......... .......... .......... 44% 68.1M 0s
11550K .......... .......... .......... .......... .......... 44% 89.5M 0s
11600K .......... .......... .......... .......... .......... 44%  108M 0s
11650K .......... .......... .......... .......... .......... 45% 46.4M 0s
11700K .......... .......... .......... .......... .......... 45%  220M 0s
11750K .......... .......... .......... .......... .......... 45% 21.6M 0s
11800K .......... .......... .......... .......... .......... 45% 36.2M 0s
11850K .......... .......... .......... .......... .......... 45% 67.9M 0s
11900K .......... .......... .......... .......... .......... 46% 33.2M 0s
11950K .......... .......... .......... .......... .......... 46%  119M 0s
12000K .......... .......... .......... .......... .......... 46%  158M 0s
12050K .......... .......... .......... .......... .......... 46%  133M 0s
12100K .......... .......... .......... .......... .......... 46%  151M 0s
12150K .......... .......... .......... .......... .......... 47%  144M 0s
12200K .......... .......... .......... .......... .......... 47%  158M 0s
12250K .......... .......... .......... .......... .......... 47%  137M 0s
12300K .......... .......... .......... .......... .......... 47%  162M 0s
12350K .......... .......... .......... .......... .......... 47%  188M 0s
12400K .......... .......... .......... .......... .......... 47%  305M 0s
12450K .......... .......... .......... .......... .......... 48%  169M 0s
12500K .......... .......... .......... .......... .......... 48%  200M 0s
12550K .......... .......... .......... .......... .......... 48%  290M 0s
12600K .......... .......... .......... .......... .......... 48%  279M 0s
12650K .......... .......... .......... .......... .......... 48%  258M 0s
12700K .......... .......... .......... .......... .......... 49%  318M 0s
12750K .......... .......... .......... .......... .......... 49%  315M 0s
12800K .......... .......... .......... .......... .......... 49%  322M 0s
12850K .......... .......... .......... .......... .......... 49%  245M 0s
12900K .......... .......... .......... .......... .......... 49%  281M 0s
12950K .......... .......... .......... .......... .......... 50%  285M 0s
13000K .......... .......... .......... .......... .......... 50%  311M 0s
13050K .......... .......... .......... .......... .......... 50%  290M 0s
13100K .......... .......... .......... .......... .......... 50%  322M 0s
13150K .......... .......... .......... .......... .......... 50%  313M 0s
13200K .......... .......... .......... .......... .......... 51%  292M 0s
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13250K ..... ..... ..... ..... ..... 51%  237M 0s
13300K ..... ..... ..... ..... ..... 51%  289M 0s
13350K ..... ..... ..... ..... ..... 51%  319M 0s
13400K ..... ..... ..... ..... ..... 51%  309M 0s
13450K ..... ..... ..... ..... ..... 52%  291M 0s
13500K ..... ..... ..... ..... ..... 52%  315M 0s
13550K ..... ..... ..... ..... ..... 52%  293M 0s
13600K ..... ..... ..... ..... ..... 52%  244M 0s
13650K ..... ..... ..... ..... ..... 52%  114M 0s
13700K ..... ..... ..... ..... ..... 52%  150M 0s
13750K ..... ..... ..... ..... ..... 53%  158M 0s
13800K ..... ..... ..... ..... ..... 53%  220M 0s
13850K ..... ..... ..... ..... ..... 53%  246M 0s
13900K ..... ..... ..... ..... ..... 53%  307M 0s
13950K ..... ..... ..... ..... ..... 53%  321M 0s
14000K ..... ..... ..... ..... ..... 54%  286M 0s
14050K ..... ..... ..... ..... ..... 54%  231M 0s
14100K ..... ..... ..... ..... ..... 54%  281M 0s
14150K ..... ..... ..... ..... ..... 54%  303M 0s
14200K ..... ..... ..... ..... ..... 54%  323M 0s
14250K ..... ..... ..... ..... ..... 55%  283M 0s
14300K ..... ..... ..... ..... ..... 55%  320M 0s
14350K ..... ..... ..... ..... ..... 55%  292M 0s
14400K ..... ..... ..... ..... ..... 55%  275M 0s
14450K ..... ..... ..... ..... ..... 55%  238M 0s
14500K ..... ..... ..... ..... ..... 56%  307M 0s
14550K ..... ..... ..... ..... ..... 56%  320M 0s
14600K ..... ..... ..... ..... ..... 56% 74.9M 0s
14650K ..... ..... ..... ..... ..... 56%  139M 0s
14700K ..... ..... ..... ..... ..... 56%  159M 0s
14750K ..... ..... ..... ..... ..... 57%  166M 0s
14800K ..... ..... ..... ..... ..... 57%  142M 0s
14850K ..... ..... ..... ..... ..... 57%  137M 0s
14900K ..... ..... ..... ..... ..... 57%  153M 0s
14950K ..... ..... ..... ..... ..... 57%  166M 0s
15000K ..... ..... ..... ..... ..... 58%  158M 0s
15050K ..... ..... ..... ..... ..... 58%  139M 0s
15100K ..... ..... ..... ..... ..... 58%  165M 0s
15150K ..... ..... ..... ..... ..... 58% 81.5M 0s
15200K ..... ..... ..... ..... ..... 58%  146M 0s
15250K ..... ..... ..... ..... ..... 58% 98.6M 0s
15300K ..... ..... ..... ..... ..... 59%  151M 0s
15350K ..... ..... ..... ..... ..... 59%  167M 0s
15400K ..... ..... ..... ..... ..... 59%  127M 0s
15450K ..... ..... ..... ..... ..... 59%  121M 0s
15500K ..... ..... ..... ..... ..... 59%  152M 0s
15550K ..... ..... ..... ..... ..... 60%  132M 0s
15600K ..... ..... ..... ..... ..... 60%  150M 0s
15650K ..... ..... ..... ..... ..... 60%  133M 0s
15700K ..... ..... ..... ..... ..... 60%  140M 0s
15750K ..... ..... ..... ..... ..... 60%  143M 0s
15800K ..... ..... ..... ..... ..... 61%  165M 0s
15850K ..... ..... ..... ..... ..... 61%  149M 0s
15900K ..... ..... ..... ..... ..... 61%  143M 0s
15950K ..... ..... ..... ..... ..... 61%  160M 0s
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16000K .......... .......... .......... .......... .......... 61%  160M 0s
16050K .......... .......... .......... .......... .......... 62%  129M 0s
16100K .......... .......... .......... .......... .......... 62%  160M 0s
16150K .......... .......... .......... .......... .......... 62% 44.3M 0s
16200K .......... .......... .......... .......... .......... 62% 95.9M 0s
16250K .......... .......... .......... .......... .......... 62% 66.5M 0s
16300K .......... .......... .......... .......... .......... 63% 99.9M 0s
16350K .......... .......... .......... .......... .......... 63% 86.3M 0s
16400K .......... .......... .......... .......... .......... 63%  101M 0s
16450K .......... .......... .......... .......... .......... 63% 72.9M 0s
16500K .......... .......... .......... .......... .......... 63%  191M 0s
16550K .......... .......... .......... .......... .......... 63%  159M 0s
16600K .......... .......... .......... .......... .......... 64% 89.3M 0s
16650K .......... .......... .......... .......... .......... 64% 91.1M 0s
16700K .......... .......... .......... .......... .......... 64%  108M 0s
16750K .......... .......... .......... .......... .......... 64%  168M 0s
16800K .......... .......... .......... .......... .......... 64%  158M 0s
16850K .......... .......... .......... .......... .......... 65%  117M 0s
16900K .......... .......... .......... .......... .......... 65%  152M 0s
16950K .......... .......... .......... .......... .......... 65%  167M 0s
17000K .......... .......... .......... .......... .......... 65% 80.3M 0s
17050K .......... .......... .......... .......... .......... 65% 95.2M 0s
17100K .......... .......... .......... .......... .......... 66% 98.4M 0s
17150K .......... .......... .......... .......... .......... 66% 93.0M 0s
17200K .......... .......... .......... .......... .......... 66% 68.2M 0s
17250K .......... .......... .......... .......... .......... 66% 80.1M 0s
17300K .......... .......... .......... .......... .......... 66% 94.9M 0s
17350K .......... .......... .......... .......... .......... 67% 70.8M 0s
17400K .......... .......... .......... .......... .......... 67% 89.9M 0s
17450K .......... .......... .......... .......... .......... 67% 93.2M 0s
17500K .......... .......... .......... .......... .......... 67%  136M 0s
17550K .......... .......... .......... .......... .......... 67%  140M 0s
17600K .......... .......... .......... .......... .......... 68%  159M 0s
17650K .......... .......... .......... .......... .......... 68%  145M 0s
17700K .......... .......... .......... .......... .......... 68% 21.2M 0s
17750K .......... .......... .......... .......... .......... 68% 40.1M 0s
17800K .......... .......... .......... .......... .......... 68%  137M 0s
17850K .......... .......... .......... .......... .......... 68% 43.8M 0s
17900K .......... .......... .......... .......... .......... 69%  156M 0s
17950K .......... .......... .......... .......... .......... 69%  156M 0s
18000K .......... .......... .......... .......... .......... 69%  117M 0s
18050K .......... .......... .......... .......... .......... 69%  125M 0s
18100K .......... .......... .......... .......... .......... 69%  161M 0s
18150K .......... .......... .......... .......... .......... 70%  169M 0s
18200K .......... .......... .......... .......... .......... 70% 50.4M 0s
18250K .......... .......... .......... .......... .......... 70% 76.4M 0s
18300K .......... .......... .......... .......... .......... 70% 87.9M 0s
18350K .......... .......... .......... .......... .......... 70%  138M 0s
18400K .......... .......... .......... .......... .......... 71%  152M 0s
18450K .......... .......... .......... .......... .......... 71%  138M 0s
18500K .......... .......... .......... .......... .......... 71%  152M 0s
18550K .......... .......... .......... .......... .......... 71%  151M 0s
18600K .......... .......... .......... .......... .......... 71%  167M 0s
18650K .......... .......... .......... .......... .......... 72% 66.9M 0s
18700K .......... .......... .......... .......... .......... 72% 73.1M 0s
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18750K ..... ..... ..... ..... ..... 72%  139M 0s
18800K ..... ..... ..... ..... ..... 72%  151M 0s
18850K ..... ..... ..... ..... ..... 72% 35.4M 0s
18900K ..... ..... ..... ..... ..... 73% 22.2M 0s
18950K ..... ..... ..... ..... ..... 73% 76.0M 0s
19000K ..... ..... ..... ..... ..... 73%  156M 0s
19050K ..... ..... ..... ..... ..... 73%  149M 0s
19100K ..... ..... ..... ..... ..... 73%  145M 0s
19150K ..... ..... ..... ..... ..... 73%  162M 0s
19200K ..... ..... ..... ..... ..... 74%  155M 0s
19250K ..... ..... ..... ..... ..... 74%  132M 0s
19300K ..... ..... ..... ..... ..... 74%  159M 0s
19350K ..... ..... ..... ..... ..... 74%  148M 0s
19400K ..... ..... ..... ..... ..... 74%  111M 0s
19450K ..... ..... ..... ..... ..... 75% 89.7M 0s
19500K ..... ..... ..... ..... ..... 75% 63.2M 0s
19550K ..... ..... ..... ..... ..... 75% 52.9M 0s
19600K ..... ..... ..... ..... ..... 75% 59.8M 0s
19650K ..... ..... ..... ..... ..... 75%  127M 0s
19700K ..... ..... ..... ..... ..... 76%  159M 0s
19750K ..... ..... ..... ..... ..... 76%  143M 0s
19800K ..... ..... ..... ..... ..... 76%  152M 0s
19850K ..... ..... ..... ..... ..... 76% 88.6M 0s
19900K ..... ..... ..... ..... ..... 76%  145M 0s
19950K ..... ..... ..... ..... ..... 77%  149M 0s
20000K ..... ..... ..... ..... ..... 77%  134M 0s
20050K ..... ..... ..... ..... ..... 77%  132M 0s
20100K ..... ..... ..... ..... ..... 77%  143M 0s
20150K ..... ..... ..... ..... ..... 77%  147M 0s
20200K ..... ..... ..... ..... ..... 78%  147M 0s
20250K ..... ..... ..... ..... ..... 78% 89.1M 0s
20300K ..... ..... ..... ..... ..... 78% 69.0M 0s
20350K ..... ..... ..... ..... ..... 78% 74.4M 0s
20400K ..... ..... ..... ..... ..... 78%  127M 0s
20450K ..... ..... ..... ..... ..... 79%  120M 0s
20500K ..... ..... ..... ..... ..... 79%  127M 0s
20550K ..... ..... ..... ..... ..... 79%  165M 0s
20600K ..... ..... ..... ..... ..... 79%  150M 0s
20650K ..... ..... ..... ..... ..... 79%  126M 0s
20700K ..... ..... ..... ..... ..... 79%  162M 0s
20750K ..... ..... ..... ..... ..... 80%  144M 0s
20800K ..... ..... ..... ..... ..... 80% 74.4M 0s
20850K ..... ..... ..... ..... ..... 80% 91.6M 0s
20900K ..... ..... ..... ..... ..... 80%  161M 0s
20950K ..... ..... ..... ..... ..... 80%  166M 0s
21000K ..... ..... ..... ..... ..... 81%  164M 0s
21050K ..... ..... ..... ..... ..... 81%  152M 0s
21100K ..... ..... ..... ..... ..... 81%  136M 0s
21150K ..... ..... ..... ..... ..... 81%  124M 0s
21200K ..... ..... ..... ..... ..... 81% 93.3M 0s
21250K ..... ..... ..... ..... ..... 82% 68.5M 0s
21300K ..... ..... ..... ..... ..... 82%  109M 0s
21350K ..... ..... ..... ..... ..... 82% 83.8M 0s
21400K ..... ..... ..... ..... ..... 82%  165M 0s
21450K ..... ..... ..... ..... ..... 82%  154M 0s
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21500K .......... .......... .......... .......... .......... 83%  171M 0s
21550K .......... .......... .......... .......... .......... 83%  166M 0s
21600K .......... .......... .......... .......... .......... 83%  169M 0s
21650K .......... .......... .......... .......... .......... 83%  121M 0s
21700K .......... .......... .......... .......... .......... 83%  150M 0s
21750K .......... .......... .......... .......... .......... 84% 91.3M 0s
21800K .......... .......... .......... .......... .......... 84% 98.1M 0s
21850K .......... .......... .......... .......... .......... 84% 85.2M 0s
21900K .......... .......... .......... .......... .......... 84% 37.1M 0s
21950K .......... .......... .......... .......... .......... 84% 20.1M 0s
22000K .......... .......... .......... .......... .......... 84% 24.4M 0s
22050K .......... .......... .......... .......... .......... 85% 32.9M 0s
22100K .......... .......... .......... .......... .......... 85% 23.5M 0s
22150K .......... .......... .......... .......... .......... 85%  136M 0s
22200K .......... .......... .......... .......... .......... 85%  144M 0s
22250K .......... .......... .......... .......... .......... 85%  131M 0s
22300K .......... .......... .......... .......... .......... 86%  158M 0s
22350K .......... .......... .......... .......... .......... 86%  140M 0s
22400K .......... .......... .......... .......... .......... 86%  154M 0s
22450K .......... .......... .......... .......... .......... 86%  133M 0s
22500K .......... .......... .......... .......... .......... 86%  135M 0s
22550K .......... .......... .......... .......... .......... 87%  164M 0s
22600K .......... .......... .......... .......... .......... 87%  148M 0s
22650K .......... .......... .......... .......... .......... 87%  132M 0s
22700K .......... .......... .......... .......... .......... 87%  160M 0s
22750K .......... .......... .......... .......... .......... 87%  158M 0s
22800K .......... .......... .......... .......... .......... 88%  138M 0s
22850K .......... .......... .......... .......... .......... 88%  122M 0s
22900K .......... .......... .......... .......... .......... 88%  115M 0s
22950K .......... .......... .......... .......... .......... 88%  140M 0s
23000K .......... .......... .......... .......... .......... 88%  144M 0s
23050K .......... .......... .......... .......... .......... 89%  108M 0s
23100K .......... .......... .......... .......... .......... 89%  142M 0s
23150K .......... .......... .......... .......... .......... 89%  160M 0s
23200K .......... .......... .......... .......... .......... 89%  156M 0s
23250K .......... .......... .......... .......... .......... 89%  260M 0s
23300K .......... .......... .......... .......... .......... 89%  283M 0s
23350K .......... .......... .......... .......... .......... 90%  283M 0s
23400K .......... .......... .......... .......... .......... 90%  317M 0s
23450K .......... .......... .......... .......... .......... 90%  259M 0s
23500K .......... .......... .......... .......... .......... 90%  287M 0s
23550K .......... .......... .......... .......... .......... 90%  313M 0s
23600K .......... .......... .......... .......... .......... 91%  294M 0s
23650K .......... .......... .......... .......... .......... 91%  251M 0s
23700K .......... .......... .......... .......... .......... 91%  290M 0s
23750K .......... .......... .......... .......... .......... 91%  291M 0s
23800K .......... .......... .......... .......... .......... 91%  315M 0s
23850K .......... .......... .......... .......... .......... 92%  244M 0s
23900K .......... .......... .......... .......... .......... 92%  317M 0s
23950K .......... .......... .......... .......... .......... 92%  280M 0s
24000K .......... .......... .......... .......... .......... 92%  290M 0s
24050K .......... .......... .......... .......... .......... 92%  222M 0s
24100K .......... .......... .......... .......... .......... 93%  281M 0s
24150K .......... .......... .......... .......... .......... 93%  277M 0s
24200K .......... .......... .......... .......... .......... 93%  304M 0s
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 24250K .......... .......... .......... .......... .......... 93%  255M 0s
 24300K .......... .......... .......... .......... .......... 93%  300M 0s
 24350K .......... .......... .......... .......... .......... 94% 28.3M 0s
 24400K .......... .......... .......... .......... .......... 94% 44.0M 0s
 24450K .......... .......... .......... .......... .......... 94% 40.9M 0s
 24500K .......... .......... .......... .......... .......... 94%  125M 0s
 24550K .......... .......... .......... .......... .......... 94%  278M 0s
 24600K .......... .......... .......... .......... .......... 94% 10.2M 0s
 24650K .......... .......... .......... .......... .......... 95%  135M 0s
 24700K .......... .......... .......... .......... .......... 95% 53.4M 0s
 24750K .......... .......... .......... .......... .......... 95%  110M 0s
 24800K .......... .......... .......... .......... .......... 95% 91.6M 0s
 24850K .......... .......... .......... .......... .......... 95% 75.4M 0s
 24900K .......... .......... .......... .......... .......... 96%  109M 0s
 24950K .......... .......... .......... .......... .......... 96% 83.3M 0s
 25000K .......... .......... .......... .......... .......... 96%  185M 0s
 25050K .......... .......... .......... .......... .......... 96%  259M 0s
 25100K .......... .......... .......... .......... .......... 96%  299M 0s
 25150K .......... .......... .......... .......... .......... 97%  289M 0s
 25200K .......... .......... .......... .......... .......... 97%  311M 0s
 25250K .......... .......... .......... .......... .......... 97%  229M 0s
 25300K .......... .......... .......... .......... .......... 97%  319M 0s
 25350K .......... .......... .......... .......... .......... 97% 20.9M 0s
 25400K .......... .......... .......... .......... .......... 98%  108M 0s
 25450K .......... .......... .......... .......... .......... 98%  164M 0s
 25500K .......... .......... .......... .......... .......... 98%  259M 0s
 25550K .......... .......... .......... .......... .......... 98%  107M 0s
 25600K .......... .......... .......... .......... .......... 98%  160M 0s
 25650K .......... .......... .......... .......... .......... 99%  134M 0s
 25700K .......... .......... .......... .......... .......... 99% 73.1M 0s
 25750K .......... .......... .......... .......... .......... 99%  161M 0s
 25800K .......... .......... .......... .......... .......... 99%  263M 0s
 25850K .......... .......... .......... .......... .......... 99%  279M 0s
 25900K .......... .......... .......... .......... .......   100%  264M=0.3s

2020-05-30 13:06:45 (93.7 MB/s) - ‘title.episode.tsv.gz’ saved [26570485/2657048
5]

/bin/bash: line 2: fg: no job control
```

In [12]:

```
title_episode = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.episo
de.tsv', header=True, inferSchema = True)
title_episode.show(3)
```

```
+---------+------------+------------+-------------+
   tconst|parentTconst|seasonNumber|episodeNumber|
+---------+------------+------------+-------------+
tt0041951|   tt0041038|           1|            9|
tt0042816|   tt0989125|           1|           17|
tt0042889|   tt0989125|          \N|           \N|
+---------+------------+------------+-------------+
only showing top 3 rows
```

In [13]:

```
%sh wget https://datasets.imdbws.com/title.principals.tsv.gz

%sh
gunzip title.principals.tsv.gz
```

```
--2020-05-30 13:06:54--  https://datasets.imdbws.com/title.principals.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.26, 13.224.13.3
2, 13.224.13.37, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.26|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 323355058 (308M) [binary/octet-stream]
Saving to: ‘title.principals.tsv.gz’

     0K .......... .......... .......... .......... ..........  0% 3.85M 80s
    50K .......... .......... .......... .......... ..........  0% 6.93M 62s
   100K .......... .......... .......... .......... ..........  0% 12.7M 50s
   150K .......... .......... .......... .......... ..........  0% 11.2M 44s
   200K .......... .......... .......... .......... ..........  0% 16.6M 39s
   250K .......... .......... .......... .......... ..........  0% 25.2M 35s
   300K .......... .......... .......... .......... ..........  0% 19.1M 32s
   350K .......... .......... .......... .......... ..........  0% 22.0M 30s
   400K .......... .......... .......... .......... ..........  0% 33.5M 27s
   450K .......... .......... .......... .......... ..........  0% 26.9M 26s
   500K .......... .......... .......... .......... ..........  0% 46.3M 24s
   550K .......... .......... .......... .......... ..........  0% 33.6M 23s
   600K .......... .......... .......... .......... ..........  0% 55.3M 21s
   650K .......... .......... .......... .......... ..........  0% 38.5M 20s
   700K .......... .......... .......... .......... ..........  0% 64.8M 19s
   750K .......... .......... .......... .......... ..........  0% 45.8M 19s
   800K .......... .......... .......... .......... ..........  0% 47.8M 18s
   850K .......... .......... .......... .......... ..........  0% 74.0M 17s
   900K .......... .......... .......... .......... ..........  0% 37.0M 17s
   950K .......... .......... .......... .......... ..........  0% 88.8M 16s
  1000K .......... .......... .......... .......... ..........  0%  179M 15s
  1050K .......... .......... .......... .......... ..........  0% 45.8M 15s
  1100K .......... .......... .......... .......... ..........  0% 61.1M 15s
  1150K .......... .......... .......... .......... ..........  0% 43.4M 14s
  1200K .......... .......... .......... .......... ..........  0%  178M 14s
  1250K .......... .......... .......... .......... ..........  0%  180M 13s
  1300K .......... .......... .......... .......... ..........  0%  161M 13s
  1350K .......... .......... .......... .......... ..........  0% 37.7M 13s
  1400K .......... .......... .......... .......... ..........  0%  191M 12s
  1450K .......... .......... .......... .......... ..........  0%  188M 12s
  1500K .......... .......... .......... .......... ..........  0%  173M 12s
  1550K .......... .......... .......... .......... ..........  0%  105M 11s
  1600K .......... .......... .......... .......... ..........  0% 94.9M 11s
  1650K .......... .......... .......... .......... ..........  0%  101M 11s
  1700K .......... .......... .......... .......... ..........  0%  157M 11s
  1750K .......... .......... .......... .......... ..........  0%  134M 10s
  1800K .......... .......... .......... .......... ..........  0% 96.7M 10s
  1850K .......... .......... .......... .......... ..........  0% 81.8M 10s
  1900K .......... .......... .......... .......... ..........  0%  169M 10s
  1950K .......... .......... .......... .......... ..........  0%  147M 10s
  2000K .......... .......... .......... .......... ..........  0%  152M 9s
  2050K .......... .......... .......... .......... ..........  0%  183M 9s
  2100K .......... .......... .......... .......... ..........  0%  109M 9s
  2150K .......... .......... .......... .......... ..........  0%  134M 9s
  2200K .......... .......... .......... .......... ..........  0%  163M 9s
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2250K .......... .......... .......... .......... ..........  0%  162M 9s
2300K .......... .......... .......... .......... ..........  0%  181M 8s
2350K .......... .......... .......... .......... ..........  0%  132M 8s
2400K .......... .......... .......... .......... ..........  0%  162M 8s
2450K .......... .......... .......... .......... ..........  0%  185M 8s
2500K .......... .......... .......... .......... ..........  0%  161M 8s
2550K .......... .......... .......... .......... ..........  0%  146M 8s
2600K .......... .......... .......... .......... ..........  0%  165M 8s
2650K .......... .......... .......... .......... ..........  0%  173M 8s
2700K .......... .......... .......... .......... ..........  0%  157M 7s
2750K .......... .......... .......... .......... ..........  0% 76.7M 7s
2800K .......... .......... .......... .......... ..........  0%  253M 7s
2850K .......... .......... .......... .......... ..........  0%  175M 7s
2900K .......... .......... .......... .......... ..........  0%  197M 7s
2950K .......... .......... .......... .......... ..........  0%  175M 7s
3000K .......... .......... .......... .......... ..........  0%  219M 7s
3050K .......... .......... .......... .......... ..........  0%  281M 7s
3100K .......... .......... .......... .......... ..........  0%  295M 7s
3150K .......... .......... .......... .......... ..........  1% 86.5M 7s
3200K .......... .......... .......... .......... ..........  1%  155M 7s
3250K .......... .......... .......... .......... ..........  1%  141M 7s
3300K .......... .......... .......... .......... ..........  1% 93.6M 6s
3350K .......... .......... .......... .......... ..........  1%  125M 6s
3400K .......... .......... .......... .......... ..........  1% 96.9M 6s
3450K .......... .......... .......... .......... ..........  1%  121M 6s
3500K .......... .......... .......... .......... ..........  1%  159M 6s
3550K .......... .......... .......... .......... ..........  1%  135M 6s
3600K .......... .......... .......... .......... ..........  1%  146M 6s
3650K .......... .......... .......... .......... ..........  1%  153M 6s
3700K .......... .......... .......... .......... ..........  1%  152M 6s
3750K .......... .......... .......... .......... ..........  1%  141M 6s
3800K .......... .......... .......... .......... ..........  1%  153M 6s
3850K .......... .......... .......... .......... ..........  1%  153M 6s
3900K .......... .......... .......... .......... ..........  1%  158M 6s
3950K .......... .......... .......... .......... ..........  1%  117M 6s
4000K .......... .......... .......... .......... ..........  1%  143M 6s
4050K .......... .......... .......... .......... ..........  1%  142M 6s
4100K .......... .......... .......... .......... ..........  1%  136M 6s
4150K .......... .......... .......... .......... ..........  1%  144M 6s
4200K .......... .......... .......... .......... ..........  1%  155M 6s
4250K .......... .......... .......... .......... ..........  1%  146M 6s
4300K .......... .......... .......... .......... ..........  1%  240M 5s
4350K .......... .......... .......... .......... ..........  1%  178M 5s
4400K .......... .......... .......... .......... ..........  1%  297M 5s
4450K .......... .......... .......... .......... ..........  1%  189M 5s
4500K .......... .......... .......... .......... ..........  1%  209M 5s
4550K .......... .......... .......... .......... ..........  1%  184M 5s
4600K .......... .......... .......... .......... ..........  1%  266M 5s
4650K .......... .......... .......... .......... ..........  1%  200M 5s
4700K .......... .......... .......... .......... ..........  1% 84.3M 5s
4750K .......... .......... .......... .......... ..........  1%  121M 5s
4800K .......... .......... .......... .......... ..........  1%  158M 5s
4850K .......... .......... .......... .......... ..........  1%  114M 5s
4900K .......... .......... .......... .......... ..........  1% 77.1M 5s
4950K .......... .......... .......... .......... ..........  1%  129M 5s
```

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5000K ..... ..... ..... ..... .....  1%  154M 5s
5050K ..... ..... ..... ..... .....  1%  157M 5s
5100K ..... ..... ..... ..... .....  1%  155M 5s
5150K ..... ..... ..... ..... .....  1%  111M 5s
5200K ..... ..... ..... ..... .....  1%  209M 5s
5250K ..... ..... ..... ..... .....  1%  207M 5s
5300K ..... ..... ..... ..... .....  1%  116M 5s
5350K ..... ..... ..... ..... .....  1%  151M 5s
5400K ..... ..... ..... ..... .....  1%  195M 5s
5450K ..... ..... ..... ..... .....  1%  233M 5s
5500K ..... ..... ..... ..... .....  1%  140M 5s
5550K ..... ..... ..... ..... .....  1%  119M 5s
5600K ..... ..... ..... ..... .....  1%  157M 5s
5650K ..... ..... ..... ..... .....  1%  137M 5s
5700K ..... ..... ..... ..... .....  1%  157M 5s
5750K ..... ..... ..... ..... .....  1%  143M 5s
5800K ..... ..... ..... ..... .....  1% 75.3M 5s
5850K ..... ..... ..... ..... .....  1%  256M 5s
5900K ..... ..... ..... ..... .....  1%  286M 5s
5950K ..... ..... ..... ..... .....  1%  149M 5s
6000K ..... ..... ..... ..... .....  1%  172M 4s
6050K ..... ..... ..... ..... .....  1%  254M 4s
6100K ..... ..... ..... ..... .....  1%  264M 4s
6150K ..... ..... ..... ..... .....  1%  187M 4s
6200K ..... ..... ..... ..... .....  1%  304M 4s
6250K ..... ..... ..... ..... .....  1% 86.6M 4s
6300K ..... ..... ..... ..... .....  2%  109M 4s
6350K ..... ..... ..... ..... .....  2%  113M 4s
6400K ..... ..... ..... ..... .....  2% 73.7M 4s
6450K ..... ..... ..... ..... .....  2%  127M 4s
6500K ..... ..... ..... ..... .....  2%  122M 4s
6550K ..... ..... ..... ..... .....  2%  108M 4s
6600K ..... ..... ..... ..... .....  2%  127M 4s
6650K ..... ..... ..... ..... .....  2%  119M 4s
6700K ..... ..... ..... ..... .....  2%  120M 4s
6750K ..... ..... ..... ..... .....  2%  108M 4s
6800K ..... ..... ..... ..... .....  2%  131M 4s
6850K ..... ..... ..... ..... .....  2% 80.9M 4s
6900K ..... ..... ..... ..... .....  2%  120M 4s
6950K ..... ..... ..... ..... .....  2% 89.2M 4s
7000K ..... ..... ..... ..... .....  2%  178M 4s
7050K ..... ..... ..... ..... .....  2%  186M 4s
7100K ..... ..... ..... ..... .....  2%  182M 4s
7150K ..... ..... ..... ..... .....  2% 76.1M 4s
7200K ..... ..... ..... ..... .....  2%  132M 4s
7250K ..... ..... ..... ..... .....  2% 97.4M 4s
7300K ..... ..... ..... ..... .....  2%  108M 4s
7350K ..... ..... ..... ..... .....  2%  165M 4s
7400K ..... ..... ..... ..... .....  2%  105M 4s
7450K ..... ..... ..... ..... .....  2%  131M 4s
7500K ..... ..... ..... ..... .....  2%  186M 4s
7550K ..... ..... ..... ..... .....  2%  113M 4s
7600K ..... ..... ..... ..... .....  2%  170M 4s
7650K ..... ..... ..... ..... .....  2% 99.2M 4s
7700K ..... ..... ..... ..... .....  2%  183M 4s
```

```
 7750K ..... ..... ..... ..... .....  2% 82.8M 4s
 7800K ..... ..... ..... ..... .....  2%  181M 4s
 7850K ..... ..... ..... ..... .....  2%  122M 4s
 7900K ..... ..... ..... ..... .....  2% 84.5M 4s
 7950K ..... ..... ..... ..... .....  2%  113M 4s
 8000K ..... ..... ..... ..... .....  2%  188M 4s
 8050K ..... ..... ..... ..... .....  2%  101M 4s
 8100K ..... ..... ..... ..... .....  2%  177M 4s
 8150K ..... ..... ..... ..... .....  2% 87.7M 4s
 8200K ..... ..... ..... ..... .....  2%  171M 4s
 8250K ..... ..... ..... ..... .....  2%  181M 4s
 8300K ..... ..... ..... ..... .....  2%  284M 4s
 8350K ..... ..... ..... ..... .....  2%  216M 4s
 8400K ..... ..... ..... ..... .....  2%  275M 4s
 8450K ..... ..... ..... ..... .....  2%  247M 4s
 8500K ..... ..... ..... ..... .....  2%  303M 4s
 8550K ..... ..... ..... ..... .....  2% 70.4M 4s
 8600K ..... ..... ..... ..... .....  2% 76.1M 4s
 8650K ..... ..... ..... ..... .....  2%  174M 4s
 8700K ..... ..... ..... ..... .....  2%  125M 4s
 8750K ..... ..... ..... ..... .....  2%  151M 4s
 8800K ..... ..... ..... ..... .....  2% 89.6M 4s
 8850K ..... ..... ..... ..... .....  2%  178M 4s
 8900K ..... ..... ..... ..... .....  2%  128M 4s
 8950K ..... ..... ..... ..... .....  2%  160M 4s
 9000K ..... ..... ..... ..... .....  2% 93.7M 4s
 9050K ..... ..... ..... ..... .....  2%  182M 4s
 9100K ..... ..... ..... ..... .....  2%  123M 4s
 9150K ..... ..... ..... ..... .....  2%  101M 4s
 9200K ..... ..... ..... ..... .....  2%  115M 4s
 9250K ..... ..... ..... ..... .....  2%  130M 4s
 9300K ..... ..... ..... ..... .....  2%  114M 4s
 9350K ..... ..... ..... ..... .....  2%  115M 4s
 9400K ..... ..... ..... ..... .....  2%  110M 4s
 9450K ..... ..... ..... ..... .....  3%  132M 4s
 9500K ..... ..... ..... ..... .....  3%  120M 4s
 9550K ..... ..... ..... ..... .....  3% 81.8M 4s
 9600K ..... ..... ..... ..... .....  3%  123M 4s
 9650K ..... ..... ..... ..... .....  3%  182M 4s
 9700K ..... ..... ..... ..... .....  3%  181M 4s
 9750K ..... ..... ..... ..... .....  3% 92.1M 4s
 9800K ..... ..... ..... ..... .....  3%  130M 4s
 9850K ..... ..... ..... ..... .....  3%  176M 4s
 9900K ..... ..... ..... ..... .....  3%  135M 4s
 9950K ..... ..... ..... ..... .....  3%  113M 4s
10000K ..... ..... ..... ..... .....  3% 85.1M 4s
10050K ..... ..... ..... ..... .....  3%  173M 4s
10100K ..... ..... ..... ..... .....  3%  118M 4s
10150K ..... ..... ..... ..... .....  3%  123M 4s
10200K ..... ..... ..... ..... .....  3%  120M 4s
10250K ..... ..... ..... ..... .....  3%  152M 4s
10300K ..... ..... ..... ..... .....  3%  178M 4s
10350K ..... ..... ..... ..... .....  3%  249M 4s
10400K ..... ..... ..... ..... .....  3%  176M 4s
10450K ..... ..... ..... ..... .....  3%  228M 4s
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10500K .......... .......... .......... .......... ..........  3%  170M 4s
10550K .......... .......... .......... .......... ..........  3%  179M 4s
10600K .......... .......... .......... .......... ..........  3%  302M 4s
10650K .......... .......... .......... .......... ..........  3% 78.5M 4s
10700K .......... .......... .......... .......... ..........  3%  120M 4s
10750K .......... .......... .......... .......... ..........  3%  129M 3s
10800K .......... .......... .......... .......... ..........  3%  110M 3s
10850K .......... .......... .......... .......... ..........  3%  175M 3s
10900K .......... .......... .......... .......... ..........  3%  135M 3s
10950K .......... .......... .......... .......... ..........  3%  113M 3s
11000K .......... .......... .......... .......... ..........  3%  113M 3s
11050K .......... .......... .......... .......... ..........  3%  122M 3s
11100K .......... .......... .......... .......... ..........  3%  178M 3s
11150K .......... .......... .......... .......... ..........  3% 84.6M 3s
11200K .......... .......... .......... .......... ..........  3%  111M 3s
11250K .......... .......... .......... .......... ..........  3%  130M 3s
11300K .......... .......... .......... .......... ..........  3%  104M 3s
11350K .......... .......... .......... .......... ..........  3%  117M 3s
11400K .......... .......... .......... .......... ..........  3%  131M 3s
11450K .......... .......... .......... .......... ..........  3%  114M 3s
11500K .......... .......... .......... .......... ..........  3%  122M 3s
11550K .......... .......... .......... .......... ..........  3%  107M 3s
11600K .......... .......... .......... .......... ..........  3%  116M 3s
11650K .......... .......... .......... .......... ..........  3%  125M 3s
11700K .......... .......... .......... .......... ..........  3%  135M 3s
11750K .......... .......... .......... .......... ..........  3%  103M 3s
11800K .......... .......... .......... .......... ..........  3%  124M 3s
11850K .......... .......... .......... .......... ..........  3%  129M 3s
11900K .......... .......... .......... .......... ..........  3%  114M 3s
11950K .......... .......... .......... .......... ..........  3% 99.1M 3s
12000K .......... .......... .......... .......... ..........  3% 93.9M 3s
12050K .......... .......... .......... .......... ..........  3%  122M 3s
12100K .......... .......... .......... .......... ..........  3%  105M 3s
12150K .......... .......... .......... .......... ..........  3%  115M 3s
12200K .......... .......... .......... .......... ..........  3%  118M 3s
12250K .......... .......... .......... .......... ..........  3%  157M 3s
12300K .......... .......... .......... .......... ..........  3%  132M 3s
12350K .......... .......... .......... .......... ..........  3%  100M 3s
12400K .......... .......... .......... .......... ..........  3%  120M 3s
12450K .......... .......... .......... .......... ..........  3%  122M 3s
12500K .......... .......... .......... .......... ..........  3%  110M 3s
12550K .......... .......... .......... .......... ..........  3% 87.4M 3s
12600K .......... .......... .......... .......... ..........  4%  177M 3s
12650K .......... .......... .......... .......... ..........  4% 90.0M 3s
12700K .......... .......... .......... .......... ..........  4%  123M 3s
12750K .......... .......... .......... .......... ..........  4%  135M 3s
12800K .......... .......... .......... .......... ..........  4% 83.8M 3s
12850K .......... .......... .......... .......... ..........  4%  134M 3s
12900K .......... .......... .......... .......... ..........  4%  114M 3s
12950K .......... .......... .......... .......... ..........  4%  116M 3s
13000K .......... .......... .......... .......... ..........  4%  135M 3s
13050K .......... .......... .......... .......... ..........  4%  167M 3s
13100K .......... .......... .......... .......... ..........  4%  266M 3s
13150K .......... .......... .......... .......... ..........  4%  137M 3s
13200K .......... .......... .......... .......... ..........  4%  290M 3s
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13250K .......... .......... .......... .......... ..........  4%  177M 3s
13300K .......... .......... .......... .......... ..........  4%  260M 3s
13350K .......... .......... .......... .......... ..........  4%  236M 3s
13400K .......... .......... .......... .......... ..........  4%  217M 3s
13450K .......... .......... .......... .......... ..........  4%  224M 3s
13500K .......... .......... .......... .......... ..........  4%  301M 3s
13550K .......... .......... .......... .......... ..........  4%  218M 3s
13600K .......... .......... .......... .......... ..........  4%  277M 3s
13650K .......... .......... .......... .......... ..........  4%  124M 3s
13700K .......... .......... .......... .......... ..........  4%  288M 3s
13750K .......... .......... .......... .......... ..........  4%  274M 3s
13800K .......... .......... .......... .......... ..........  4%  277M 3s
13850K .......... .......... .......... .......... ..........  4% 74.1M 3s
13900K .......... .......... .......... .......... ..........  4%  182M 3s
13950K .......... .......... .......... .......... ..........  4%  156M 3s
14000K .......... .......... .......... .......... ..........  4%  130M 3s
14050K .......... .......... .......... .......... ..........  4%  125M 3s
14100K .......... .......... .......... .......... ..........  4%  164M 3s
14150K .......... .......... .......... .......... ..........  4%  117M 3s
14200K .......... .......... .......... .......... ..........  4%  185M 3s
14250K .......... .......... .......... .......... ..........  4%  185M 3s
14300K .......... .......... .......... .......... ..........  4%  124M 3s
14350K .......... .......... .......... .......... ..........  4%  111M 3s
14400K .......... .......... .......... .......... ..........  4%  118M 3s
14450K .......... .......... .......... .......... ..........  4%  199M 3s
14500K .......... .......... .......... .......... ..........  4%  266M 3s
14550K .......... .......... .......... .......... ..........  4%  173M 3s
14600K .......... .......... .......... .......... ..........  4%  299M 3s
14650K .......... .......... .......... .......... ..........  4%  176M 3s
14700K .......... .......... .......... .......... ..........  4%  263M 3s
14750K .......... .......... .......... .......... ..........  4%  223M 3s
14800K .......... .......... .......... .......... ..........  4%  293M 3s
14850K .......... .......... .......... .......... ..........  4%  295M 3s
14900K .......... .......... .......... .......... ..........  4%  308M 3s
14950K .......... .......... .......... .......... ..........  4%  253M 3s
15000K .......... .......... .......... .......... ..........  4% 20.9M 3s
15050K .......... .......... .......... .......... ..........  4% 96.0M 3s
15100K .......... .......... .......... .......... ..........  4%  111M 3s
15150K .......... .......... .......... .......... ..........  4% 88.7M 3s
15200K .......... .......... .......... .......... ..........  4%  120M 3s
15250K .......... .......... .......... .......... ..........  4%  124M 3s
15300K .......... .......... .......... .......... ..........  4%  121M 3s
15350K .......... .......... .......... .......... ..........  4% 89.3M 3s
15400K .......... .......... .......... .......... ..........  4% 25.4M 3s
15450K .......... .......... .......... .......... ..........  4% 79.2M 3s
15500K .......... .......... .......... .......... ..........  4%  109M 3s
15550K .......... .......... .......... .......... ..........  4% 82.6M 3s
15600K .......... .......... .......... .......... ..........  4%  162M 3s
15650K .......... .......... .......... .......... ..........  4%  134M 3s
15700K .......... .......... .......... .......... ..........  4%  146M 3s
15750K .......... .......... .......... .......... ..........  5% 88.8M 3s
15800K .......... .......... .......... .......... ..........  5%  126M 3s
15850K .......... .......... .......... .......... ..........  5% 86.7M 3s
15900K .......... .......... .......... .......... ..........  5%  102M 3s
15950K .......... .......... .......... .......... ..........  5% 82.7M 3s
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 16000K .......... .......... .......... .......... ..........  5%  119M 3s
 16050K .......... .......... .......... .......... ..........  5% 68.4M 3s
 16100K .......... .......... .......... .......... ..........  5% 98.7M 3s
 16150K .......... .......... .......... .......... ..........  5% 90.6M 3s

*** WARNING: skipped 430540 bytes of output ***

299450K .......... .......... .......... .......... .......... 94%  211M 0s
299500K .......... .......... .......... .......... .......... 94%  164M 0s
299550K .......... .......... .......... .......... .......... 94% 82.5M 0s
299600K .......... .......... .......... .......... .......... 94%  122M 0s
299650K .......... .......... .......... .......... .......... 94% 84.4M 0s
299700K .......... .......... .......... .......... .......... 94%  205M 0s
299750K .......... .......... .......... .......... .......... 94%  106M 0s
299800K .......... .......... .......... .......... .......... 94% 97.9M 0s
299850K .......... .......... .......... .......... .......... 94%  207M 0s
299900K .......... .......... .......... .......... .......... 94%  211M 0s
299950K .......... .......... .......... .......... .......... 95% 61.4M 0s
300000K .......... .......... .......... .......... .......... 95% 50.1M 0s
300050K .......... .......... .......... .......... .......... 95% 84.7M 0s
300100K .......... .......... .......... .......... .......... 95% 55.0M 0s
300150K .......... .......... .......... .......... .......... 95% 66.1M 0s
300200K .......... .......... .......... .......... .......... 95% 73.7M 0s
300250K .......... .......... .......... .......... .......... 95% 86.7M 0s
300300K .......... .......... .......... .......... .......... 95% 86.4M 0s
300350K .......... .......... .......... .......... .......... 95%  114M 0s
300400K .......... .......... .......... .......... .......... 95%  144M 0s
300450K .......... .......... .......... .......... .......... 95%  146M 0s
300500K .......... .......... .......... .......... .......... 95%  122M 0s
300550K .......... .......... .......... .......... .......... 95%  132M 0s
300600K .......... .......... .......... .......... .......... 95% 46.9M 0s
300650K .......... .......... .......... .......... .......... 95% 74.3M 0s
300700K .......... .......... .......... .......... .......... 95%  135M 0s
300750K .......... .......... .......... .......... .......... 95%  128M 0s
300800K .......... .......... .......... .......... .......... 95%  139M 0s
300850K .......... .......... .......... .......... .......... 95% 60.8M 0s
300900K .......... .......... .......... .......... .......... 95%  125M 0s
300950K .......... .......... .......... .......... .......... 95%  148M 0s
301000K .......... .......... .......... .......... .......... 95%  161M 0s
301050K .......... .......... .......... .......... .......... 95%  261M 0s
301100K .......... .......... .......... .......... .......... 95%  204M 0s
301150K .......... .......... .......... .......... .......... 95%  199M 0s
301200K .......... .......... .......... .......... .......... 95%  279M 0s
301250K .......... .......... .......... .......... .......... 95%  296M 0s
301300K .......... .......... .......... .......... .......... 95%  210M 0s
301350K .......... .......... .......... .......... .......... 95%  241M 0s
301400K .......... .......... .......... .......... .......... 95%  286M 0s
301450K .......... .......... .......... .......... .......... 95%  272M 0s
301500K .......... .......... .......... .......... .......... 95%  307M 0s
301550K .......... .......... .......... .......... .......... 95%  242M 0s
301600K .......... .......... .......... .......... .......... 95%  223M 0s
301650K .......... .......... .......... .......... .......... 95%  267M 0s
301700K .......... .......... .......... .......... .......... 95%  233M 0s
301750K .......... .......... .......... .......... .......... 95%  262M 0s
301800K .......... .......... .......... .......... .......... 95%  287M 0s
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301850K ..... ..... ..... ..... ..... 95%  307M 0s
301900K ..... ..... ..... ..... ..... 95%  288M 0s
301950K ..... ..... ..... ..... ..... 95%  212M 0s
302000K ..... ..... ..... ..... ..... 95%  298M 0s
302050K ..... ..... ..... ..... ..... 95%  268M 0s
302100K ..... ..... ..... ..... ..... 95%  298M 0s
302150K ..... ..... ..... ..... ..... 95%  271M 0s
302200K ..... ..... ..... ..... ..... 95%  295M 0s
302250K ..... ..... ..... ..... ..... 95%  263M 0s
302300K ..... ..... ..... ..... ..... 95%  269M 0s
302350K ..... ..... ..... ..... ..... 95%  227M 0s
302400K ..... ..... ..... ..... ..... 95% 97.8M 0s
302450K ..... ..... ..... ..... ..... 95%  261M 0s
302500K ..... ..... ..... ..... ..... 95%  278M 0s
302550K ..... ..... ..... ..... ..... 95%  260M 0s
302600K ..... ..... ..... ..... ..... 95%  289M 0s
302650K ..... ..... ..... ..... ..... 95%  298M 0s
302700K ..... ..... ..... ..... ..... 95%  309M 0s
302750K ..... ..... ..... ..... ..... 95%  217M 0s
302800K ..... ..... ..... ..... ..... 95%  249M 0s
302850K ..... ..... ..... ..... ..... 95%  294M 0s
302900K ..... ..... ..... ..... ..... 95%  279M 0s
302950K ..... ..... ..... ..... ..... 95%  273M 0s
303000K ..... ..... ..... ..... ..... 95%  295M 0s
303050K ..... ..... ..... ..... ..... 95%  256M 0s
303100K ..... ..... ..... ..... ..... 96% 82.6M 0s
303150K ..... ..... ..... ..... ..... 96% 35.5M 0s
303200K ..... ..... ..... ..... ..... 96% 60.4M 0s
303250K ..... ..... ..... ..... ..... 96%  209M 0s
303300K ..... ..... ..... ..... ..... 96%  140M 0s
303350K ..... ..... ..... ..... ..... 96%  127M 0s
303400K ..... ..... ..... ..... ..... 96%  173M 0s
303450K ..... ..... ..... ..... ..... 96%  303M 0s
303500K ..... ..... ..... ..... ..... 96%  167M 0s
303550K ..... ..... ..... ..... ..... 96%  140M 0s
303600K ..... ..... ..... ..... ..... 96%  171M 0s
303650K ..... ..... ..... ..... ..... 96% 71.4M 0s
303700K ..... ..... ..... ..... ..... 96%  169M 0s
303750K ..... ..... ..... ..... ..... 96%  174M 0s
303800K ..... ..... ..... ..... ..... 96%  309M 0s
303850K ..... ..... ..... ..... ..... 96%  299M 0s
303900K ..... ..... ..... ..... ..... 96%  311M 0s
303950K ..... ..... ..... ..... ..... 96% 13.2M 0s
304000K ..... ..... ..... ..... ..... 96% 96.7M 0s
304050K ..... ..... ..... ..... ..... 96% 98.9M 0s
304100K ..... ..... ..... ..... ..... 96% 23.7M 0s
304150K ..... ..... ..... ..... ..... 96% 42.6M 0s
304200K ..... ..... ..... ..... ..... 96% 98.0M 0s
304250K ..... ..... ..... ..... ..... 96%  153M 0s
304300K ..... ..... ..... ..... ..... 96%  134M 0s
304350K ..... ..... ..... ..... ..... 96%  179M 0s
304400K ..... ..... ..... ..... ..... 96%  222M 0s
304450K ..... ..... ..... ..... ..... 96%  190M 0s
304500K ..... ..... ..... ..... ..... 96%  233M 0s
304550K ..... ..... ..... ..... ..... 96%  103M 0s
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304600K .......... .......... .......... .......... .......... 96%  185M 0s
304650K .......... .......... .......... .......... .......... 96%  144M 0s
304700K .......... .......... .......... .......... .......... 96%  150M 0s
304750K .......... .......... .......... .......... .......... 96%  149M 0s
304800K .......... .......... .......... .......... .......... 96%  183M 0s
304850K .......... .......... .......... .......... .......... 96%  185M 0s
304900K .......... .......... .......... .......... .......... 96% 20.4M 0s
304950K .......... .......... .......... .......... .......... 96%  176M 0s
305000K .......... .......... .......... .......... .......... 96%  197M 0s
305050K .......... .......... .......... .......... .......... 96%  204M 0s
305100K .......... .......... .......... .......... .......... 96%  174M 0s
305150K .......... .......... .......... .......... .......... 96%  140M 0s
305200K .......... .......... .......... .......... .......... 96% 58.0M 0s
305250K .......... .......... .......... .......... .......... 96% 50.7M 0s
305300K .......... .......... .......... .......... .......... 96% 35.3M 0s
305350K .......... .......... .......... .......... .......... 96% 56.3M 0s
305400K .......... .......... .......... .......... .......... 96% 68.4M 0s
305450K .......... .......... .......... .......... .......... 96%  161M 0s
305500K .......... .......... .......... .......... .......... 96%  150M 0s
305550K .......... .......... .......... .......... .......... 96% 79.1M 0s
305600K .......... .......... .......... .......... .......... 96% 13.8M 0s
305650K .......... .......... .......... .......... .......... 96% 36.9M 0s
305700K .......... .......... .......... .......... .......... 96% 38.6M 0s
305750K .......... .......... .......... .......... .......... 96% 53.7M 0s
305800K .......... .......... .......... .......... .......... 96%  151M 0s
305850K .......... .......... .......... .......... .......... 96%  134M 0s
305900K .......... .......... .......... .......... .......... 96%  154M 0s
305950K .......... .......... .......... .......... .......... 96%  114M 0s
306000K .......... .......... .......... .......... .......... 96%  116M 0s
306050K .......... .......... .......... .......... .......... 96%  171M 0s
306100K .......... .......... .......... .......... .......... 96%  147M 0s
306150K .......... .......... .......... .......... .......... 96%  136M 0s
306200K .......... .......... .......... .......... .......... 96%  145M 0s
306250K .......... .......... .......... .......... .......... 96%  160M 0s
306300K .......... .......... .......... .......... .......... 97%  141M 0s
306350K .......... .......... .......... .......... .......... 97%  126M 0s
306400K .......... .......... .......... .......... .......... 97%  160M 0s
306450K .......... .......... .......... .......... .......... 97% 82.2M 0s
306500K .......... .......... .......... .......... .......... 97%  118M 0s
306550K .......... .......... .......... .......... .......... 97%  153M 0s
306600K .......... .......... .......... .......... .......... 97%  137M 0s
306650K .......... .......... .......... .......... .......... 97%  136M 0s
306700K .......... .......... .......... .......... .......... 97%  157M 0s
306750K .......... .......... .......... .......... .......... 97%  131M 0s
306800K .......... .......... .......... .......... .......... 97%  148M 0s
306850K .......... .......... .......... .......... .......... 97%  164M 0s
306900K .......... .......... .......... .......... .......... 97%  146M 0s
306950K .......... .......... .......... .......... .......... 97%  131M 0s
307000K .......... .......... .......... .......... .......... 97%  155M 0s
307050K .......... .......... .......... .......... .......... 97%  156M 0s
307100K .......... .......... .......... .......... .......... 97%  144M 0s
307150K .......... .......... .......... .......... .......... 97%  127M 0s
307200K .......... .......... .......... .......... .......... 97%  158M 0s
307250K .......... .......... .......... .......... .......... 97%  163M 0s
307300K .......... .......... .......... .......... .......... 97%  169M 0s
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307350K .......... .......... .......... .......... .......... 97%  147M 0s
307400K .......... .......... .......... .......... .......... 97%  145M 0s
307450K .......... .......... .......... .......... .......... 97%  107M 0s
307500K .......... .......... .......... .......... .......... 97%  149M 0s
307550K .......... .......... .......... .......... .......... 97%  132M 0s
307600K .......... .......... .......... .......... .......... 97%  151M 0s
307650K .......... .......... .......... .......... .......... 97%  130M 0s
307700K .......... .......... .......... .......... .......... 97%  157M 0s
307750K .......... .......... .......... .......... .......... 97%  145M 0s
307800K .......... .......... .......... .......... .......... 97% 96.0M 0s
307850K .......... .......... .......... .......... .......... 97%  152M 0s
307900K .......... .......... .......... .......... .......... 97%  127M 0s
307950K .......... .......... .......... .......... .......... 97%  105M 0s
308000K .......... .......... .......... .......... .......... 97%  126M 0s
308050K .......... .......... .......... .......... .......... 97%  145M 0s
308100K .......... .......... .......... .......... .......... 97%  159M 0s
308150K .......... .......... .......... .......... .......... 97%  142M 0s
308200K .......... .......... .......... .......... .......... 97%  153M 0s
308250K .......... .......... .......... .......... .......... 97%  147M 0s
308300K .......... .......... .......... .......... .......... 97%  161M 0s
308350K .......... .......... .......... .......... .......... 97%  134M 0s
308400K .......... .......... .......... .......... .......... 97%  159M 0s
308450K .......... .......... .......... .......... .......... 97%  158M 0s
308500K .......... .......... .......... .......... .......... 97%  152M 0s
308550K .......... .......... .......... .......... .......... 97%  161M 0s
308600K .......... .......... .......... .......... .......... 97%  147M 0s
308650K .......... .......... .......... .......... .......... 97%  155M 0s
308700K .......... .......... .......... .......... .......... 97%  159M 0s
308750K .......... .......... .......... .......... .......... 97%  129M 0s
308800K .......... .......... .......... .......... .......... 97%  141M 0s
308850K .......... .......... .......... .......... .......... 97% 95.7M 0s
308900K .......... .......... .......... .......... .......... 97%  141M 0s
308950K .......... .......... .......... .......... .......... 97%  114M 0s
309000K .......... .......... .......... .......... .......... 97%  142M 0s
309050K .......... .......... .......... .......... .......... 97%  131M 0s
309100K .......... .......... .......... .......... .......... 97%  145M 0s
309150K .......... .......... .......... .......... .......... 97%  131M 0s
309200K .......... .......... .......... .......... .......... 97%  169M 0s
309250K .......... .......... .......... .......... .......... 97%  161M 0s
309300K .......... .......... .......... .......... .......... 97%  133M 0s
309350K .......... .......... .......... .......... .......... 97%  119M 0s
309400K .......... .......... .......... .......... .......... 97% 89.5M 0s
309450K .......... .......... .......... .......... .......... 98%  147M 0s
309500K .......... .......... .......... .......... .......... 98%  146M 0s
309550K .......... .......... .......... .......... .......... 98%  138M 0s
309600K .......... .......... .......... .......... .......... 98%  137M 0s
309650K .......... .......... .......... .......... .......... 98%  158M 0s
309700K .......... .......... .......... .......... .......... 98%  129M 0s
309750K .......... .......... .......... .......... .......... 98%  132M 0s
309800K .......... .......... .......... .......... .......... 98%  165M 0s
309850K .......... .......... .......... .......... .......... 98%  114M 0s
309900K .......... .......... .......... .......... .......... 98%  149M 0s
309950K .......... .......... .......... .......... .......... 98%  132M 0s
310000K .......... .......... .......... .......... .......... 98%  168M 0s
310050K .......... .......... .......... .......... .......... 98%  155M 0s
```

```
310100K .......... .......... .......... .......... .......... 98%  173M 0s
310150K .......... .......... .......... .......... .......... 98%  134M 0s
310200K .......... .......... .......... .......... .......... 98%  140M 0s
310250K .......... .......... .......... .......... .......... 98%  162M 0s
310300K .......... .......... .......... .......... .......... 98%  118M 0s
310350K .......... .......... .......... .......... .......... 98% 92.5M 0s
310400K .......... .......... .......... .......... .......... 98%  150M 0s
310450K .......... .......... .......... .......... .......... 98%  119M 0s
310500K .......... .......... .......... .......... .......... 98%  134M 0s
310550K .......... .......... .......... .......... .......... 98%  141M 0s
310600K .......... .......... .......... .......... .......... 98%  137M 0s
310650K .......... .......... .......... .......... .......... 98%  161M 0s
310700K .......... .......... .......... .......... .......... 98%  135M 0s
310750K .......... .......... .......... .......... .......... 98%  130M 0s
310800K .......... .......... .......... .......... .......... 98%  113M 0s
310850K .......... .......... .......... .......... .......... 98%  136M 0s
310900K .......... .......... .......... .......... .......... 98%  139M 0s
310950K .......... .......... .......... .......... .......... 98%  123M 0s
311000K .......... .......... .......... .......... .......... 98%  122M 0s
311050K .......... .......... .......... .......... .......... 98%  141M 0s
311100K .......... .......... .......... .......... .......... 98%  112M 0s
311150K .......... .......... .......... .......... .......... 98%  116M 0s
311200K .......... .......... .......... .......... .......... 98%  152M 0s
311250K .......... .......... .......... .......... .......... 98%  146M 0s
311300K .......... .......... .......... .......... .......... 98%  148M 0s
311350K .......... .......... .......... .......... .......... 98%  152M 0s
311400K .......... .......... .......... .......... .......... 98%  160M 0s
311450K .......... .......... .......... .......... .......... 98%  158M 0s
311500K .......... .......... .......... .......... .......... 98%  128M 0s
311550K .......... .......... .......... .......... .......... 98%  129M 0s
311600K .......... .......... .......... .......... .......... 98%  159M 0s
311650K .......... .......... .......... .......... .......... 98% 82.3M 0s
311700K .......... .......... .......... .......... .......... 98%  118M 0s
311750K .......... .......... .......... .......... .......... 98% 84.3M 0s
311800K .......... .......... .......... .......... .......... 98%  150M 0s
311850K .......... .......... .......... .......... .......... 98%  127M 0s
311900K .......... .......... .......... .......... .......... 98%  141M 0s
311950K .......... .......... .......... .......... .......... 98%  121M 0s
312000K .......... .......... .......... .......... .......... 98%  139M 0s
312050K .......... .......... .......... .......... .......... 98%  115M 0s
312100K .......... .......... .......... .......... .......... 98%  149M 0s
312150K .......... .......... .......... .......... .......... 98%  128M 0s
312200K .......... .......... .......... .......... .......... 98%  114M 0s
312250K .......... .......... .......... .......... .......... 98%  106M 0s
312300K .......... .......... .......... .......... .......... 98%  123M 0s
312350K .......... .......... .......... .......... .......... 98% 76.0M 0s
312400K .......... .......... .......... .......... .......... 98%  142M 0s
312450K .......... .......... .......... .......... .......... 98%  138M 0s
312500K .......... .......... .......... .......... .......... 98%  109M 0s
312550K .......... .......... .......... .......... .......... 98%  132M 0s
312600K .......... .......... .......... .......... .......... 99%  142M 0s
312650K .......... .......... .......... .......... .......... 99%  154M 0s
312700K .......... .......... .......... .......... .......... 99%  155M 0s
312750K .......... .......... .......... .......... .......... 99%  117M 0s
312800K .......... .......... .......... .......... .......... 99%  165M 0s
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312850K ..... ..... ..... ..... ..... 99%  165M 0s
312900K ..... ..... ..... ..... ..... 99%  136M 0s
312950K ..... ..... ..... ..... ..... 99%  138M 0s
313000K ..... ..... ..... ..... ..... 99%  140M 0s
313050K ..... ..... ..... ..... ..... 99%  123M 0s
313100K ..... ..... ..... ..... ..... 99%  150M 0s
313150K ..... ..... ..... ..... ..... 99%  108M 0s
313200K ..... ..... ..... ..... ..... 99%  129M 0s
313250K ..... ..... ..... ..... ..... 99%  112M 0s
313300K ..... ..... ..... ..... ..... 99%  103M 0s
313350K ..... ..... ..... ..... ..... 99%  141M 0s
313400K ..... ..... ..... ..... ..... 99%  149M 0s
313450K ..... ..... ..... ..... ..... 99%  115M 0s
313500K ..... ..... ..... ..... ..... 99%  141M 0s
313550K ..... ..... ..... ..... ..... 99%  151M 0s
313600K ..... ..... ..... ..... ..... 99% 93.3M 0s
313650K ..... ..... ..... ..... ..... 99%  138M 0s
313700K ..... ..... ..... ..... ..... 99%  145M 0s
313750K ..... ..... ..... ..... ..... 99%  126M 0s
313800K ..... ..... ..... ..... ..... 99%  145M 0s
313850K ..... ..... ..... ..... ..... 99% 99.9M 0s
313900K ..... ..... ..... ..... ..... 99%  129M 0s
313950K ..... ..... ..... ..... ..... 99%  135M 0s
314000K ..... ..... ..... ..... ..... 99%  147M 0s
314050K ..... ..... ..... ..... ..... 99%  160M 0s
314100K ..... ..... ..... ..... ..... 99%  163M 0s
314150K ..... ..... ..... ..... ..... 99%  146M 0s
314200K ..... ..... ..... ..... ..... 99%  153M 0s
314250K ..... ..... ..... ..... ..... 99%  139M 0s
314300K ..... ..... ..... ..... ..... 99%  186M 0s
314350K ..... ..... ..... ..... ..... 99% 89.9M 0s
314400K ..... ..... ..... ..... ..... 99%  187M 0s
314450K ..... ..... ..... ..... ..... 99% 75.6M 0s
314500K ..... ..... ..... ..... ..... 99%  162M 0s
314550K ..... ..... ..... ..... ..... 99%  116M 0s
314600K ..... ..... ..... ..... ..... 99%  162M 0s
314650K ..... ..... ..... ..... ..... 99%  161M 0s
314700K ..... ..... ..... ..... ..... 99%  101M 0s
314750K ..... ..... ..... ..... ..... 99% 95.5M 0s
314800K ..... ..... ..... ..... ..... 99%  143M 0s
314850K ..... ..... ..... ..... ..... 99%  162M 0s
314900K ..... ..... ..... ..... ..... 99%  148M 0s
314950K ..... ..... ..... ..... ..... 99%  148M 0s
315000K ..... ..... ..... ..... ..... 99%  161M 0s
315050K ..... ..... ..... ..... ..... 99%  158M 0s
315100K ..... ..... ..... ..... ..... 99%  159M 0s
315150K ..... ..... ..... ..... ..... 99%  119M 0s
315200K ..... ..... ..... ..... ..... 99%  164M 0s
315250K ..... ..... ..... ..... ..... 99%  155M 0s
315300K ..... ..... ..... ..... ..... 99%  155M 0s
315350K ..... ..... ..... ..... ..... 99%  135M 0s
315400K ..... ..... ..... ..... ..... 99%  152M 0s
315450K ..... ..... ..... ..... ..... 99%  146M 0s
315500K ..... ..... ..... ..... ..... 99%  160M 0s
315550K ..... ..... ..... ..... ..... 99%  134M 0s
```

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315600K .......... .......... .......... .......... .......... 99%  159M 0s
315650K .......... .......... .......... .......... .......... 99%  161M 0s
315700K .......... .......... .......... .......... .......... 99%  146M 0s
315750K .......... .......... ......                          100%  147M=3.4s

2020-05-30 13:06:58 (92.0 MB/s) - ‘title.principals.tsv.gz’ saved [323355058/323
355058]

/bin/bash: line 2: fg: no job control
```

In [14]:

```
title_principals = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.principals.tsv', header=True, inferSchema = True)
title_principals.show(3)
```

```
+---------+--------+---------+---------------+--------------------+----------+
   tconst|ordering|   nconst|       category|                 job|characters|
+---------+--------+---------+---------------+--------------------+----------+
tt0000001|       1|nm1588970|           self|                  \N|  ["Self"]|
tt0000001|       2|nm0005690|       director|                  \N|        \N|
tt0000001|       3|nm0374658|cinematographer|director of photo...|        \N|
+---------+--------+---------+---------------+--------------------+----------+
only showing top 3 rows
```

In [15]:

```
%sh wget https://datasets.imdbws.com/title.ratings.tsv.gz

%sh
gunzip title.ratings.tsv.gz
```

```
--2020-05-30 13:08:31--  https://datasets.imdbws.com/title.ratings.tsv.gz
Resolving datasets.imdbws.com (datasets.imdbws.com)... 13.224.13.32, 13.224.13.3
7, 13.224.13.54, ...
Connecting to datasets.imdbws.com (datasets.imdbws.com)|13.224.13.32|:443... con
nected.
HTTP request sent, awaiting response... 200 OK
Length: 5165953 (4.9M) [binary/octet-stream]
Saving to: ‘title.ratings.tsv.gz’

     0K ..........  ..........  ..........  ..........  ..........   0% 4.23M 1s
    50K ..........  ..........  ..........  ..........  ..........   1% 7.61M 1s
   100K ..........  ..........  ..........  ..........  ..........   2% 12.5M 1s
   150K ..........  ..........  ..........  ..........  ..........   3% 15.8M 1s
   200K ..........  ..........  ..........  ..........  ..........   4% 13.2M 1s
   250K ..........  ..........  ..........  ..........  ..........   5% 28.9M 0s
   300K ..........  ..........  ..........  ..........  ..........   6% 31.0M 0s
   350K ..........  ..........  ..........  ..........  ..........   7% 17.9M 0s
   400K ..........  ..........  ..........  ..........  ..........   8% 42.1M 0s
   450K ..........  ..........  ..........  ..........  ..........   9% 27.1M 0s
   500K ..........  ..........  ..........  ..........  ..........  10% 49.4M 0s
   550K ..........  ..........  ..........  ..........  ..........  11% 44.9M 0s
   600K ..........  ..........  ..........  ..........  ..........  12% 42.7M 0s
   650K ..........  ..........  ..........  ..........  ..........  13% 61.2M 0s
   700K ..........  ..........  ..........  ..........  ..........  14% 45.3M 0s
   750K ..........  ..........  ..........  ..........  ..........  15% 51.6M 0s
   800K ..........  ..........  ..........  ..........  ..........  16% 64.7M 0s
   850K ..........  ..........  ..........  ..........  ..........  17% 59.7M 0s
   900K ..........  ..........  ..........  ..........  ..........  18% 83.0M 0s
   950K ..........  ..........  ..........  ..........  ..........  19%  142M 0s
  1000K ..........  ..........  ..........  ..........  ..........  20% 52.1M 0s
  1050K ..........  ..........  ..........  ..........  ..........  21% 75.1M 0s
  1100K ..........  ..........  ..........  ..........  ..........  22% 76.0M 0s
  1150K ..........  ..........  ..........  ..........  ..........  23% 68.6M 0s
  1200K ..........  ..........  ..........  ..........  ..........  24% 83.0M 0s
  1250K ..........  ..........  ..........  ..........  ..........  25%  232M 0s
  1300K ..........  ..........  ..........  ..........  ..........  26% 71.8M 0s
  1350K ..........  ..........  ..........  ..........  ..........  27% 78.9M 0s
  1400K ..........  ..........  ..........  ..........  ..........  28% 88.1M 0s
  1450K ..........  ..........  ..........  ..........  ..........  29%  148M 0s
  1500K ..........  ..........  ..........  ..........  ..........  30%  109M 0s
  1550K ..........  ..........  ..........  ..........  ..........  31% 96.6M 0s
  1600K ..........  ..........  ..........  ..........  ..........  32% 41.0M 0s
  1650K ..........  ..........  ..........  ..........  ..........  33%  122M 0s
  1700K ..........  ..........  ..........  ..........  ..........  34%  177M 0s
  1750K ..........  ..........  ..........  ..........  ..........  35%  224M 0s
  1800K ..........  ..........  ..........  ..........  ..........  36%  119M 0s
  1850K ..........  ..........  ..........  ..........  ..........  37%  152M 0s
  1900K ..........  ..........  ..........  ..........  ..........  38%  291M 0s
  1950K ..........  ..........  ..........  ..........  ..........  39% 81.2M 0s
  2000K ..........  ..........  ..........  ..........  ..........  40%  270M 0s
  2050K ..........  ..........  ..........  ..........  ..........  41%  135M 0s
  2100K ..........  ..........  ..........  ..........  ..........  42%  164M 0s
  2150K ..........  ..........  ..........  ..........  ..........  43%  158M 0s
  2200K ..........  ..........  ..........  ..........  ..........  44%  241M 0s
```

```
2250K .......... .......... .......... .......... .......... 45%  188M 0s
2300K .......... .......... .......... .......... .......... 46%  151M 0s
2350K .......... .......... .......... .......... .......... 47%  157M 0s
2400K .......... .......... .......... .......... .......... 48%  162M 0s
2450K .......... .......... .......... .......... .......... 49%  153M 0s
2500K .......... .......... .......... .......... .......... 50%  158M 0s
2550K .......... .......... .......... .......... .......... 51%  155M 0s
2600K .......... .......... .......... .......... .......... 52%  237M 0s
2650K .......... .......... .......... .......... .......... 53%  124M 0s
2700K .......... .......... .......... .......... .......... 54%  251M 0s
2750K .......... .......... .......... .......... .......... 55%  106M 0s
2800K .......... .......... .......... .......... .......... 56%  187M 0s
2850K .......... .......... .......... .......... .......... 57%  170M 0s
2900K .......... .......... .......... .......... .......... 58%  143M 0s
2950K .......... .......... .......... .......... .......... 59%  247M 0s
3000K .......... .......... .......... .......... .......... 60%  271M 0s
3050K .......... .......... .......... .......... .......... 61%  306M 0s
3100K .......... .......... .......... .......... .......... 62%  286M 0s
3150K .......... .......... .......... .......... .......... 63% 48.3M 0s
3200K .......... .......... .......... .......... .......... 64%  151M 0s
3250K .......... .......... .......... .......... .......... 65% 87.1M 0s
3300K .......... .......... .......... .......... .......... 66%  156M 0s
3350K .......... .......... .......... .......... .......... 67% 81.3M 0s
3400K .......... .......... .......... .......... .......... 68%  107M 0s
3450K .......... .......... .......... .......... .......... 69% 75.1M 0s
3500K .......... .......... .......... .......... .......... 70%  110M 0s
3550K .......... .......... .......... .......... .......... 71% 82.3M 0s
3600K .......... .......... .......... .......... .......... 72%  106M 0s
3650K .......... .......... .......... .......... .......... 73% 90.5M 0s
3700K .......... .......... .......... .......... .......... 74%  109M 0s
3750K .......... .......... .......... .......... .......... 75% 80.4M 0s
3800K .......... .......... .......... .......... .......... 76% 67.7M 0s
3850K .......... .......... .......... .......... .......... 77% 76.3M 0s
3900K .......... .......... .......... .......... .......... 78%  148M 0s
3950K .......... .......... .......... .......... .......... 79%  139M 0s
4000K .......... .......... .......... .......... .......... 80%  103M 0s
4050K .......... .......... .......... .......... .......... 81%  141M 0s
4100K .......... .......... .......... .......... .......... 82%  104M 0s
4150K .......... .......... .......... .......... .......... 83%  112M 0s
4200K .......... .......... .......... .......... .......... 84%  118M 0s
4250K .......... .......... .......... .......... .......... 85%  114M 0s
4300K .......... .......... .......... .......... .......... 86%  153M 0s
4350K .......... .......... .......... .......... .......... 87%  125M 0s
4400K .......... .......... .......... .......... .......... 88%  149M 0s
4450K .......... .......... .......... .......... .......... 89%  152M 0s
4500K .......... .......... .......... .......... .......... 90%  143M 0s
4550K .......... .......... .......... .......... .......... 91%  145M 0s
4600K .......... .......... .......... .......... .......... 92%  155M 0s
4650K .......... .......... .......... .......... .......... 93%  145M 0s
4700K .......... .......... .......... .......... .......... 94%  158M 0s
4750K .......... .......... .......... .......... .......... 95%  142M 0s
4800K .......... .......... .......... .......... .......... 96%  156M 0s
4850K .......... .......... .......... .......... .......... 97%  147M 0s
4900K .......... .......... .......... .......... .......... 98%  170M 0s
4950K .......... .......... .......... .......... .......... 99%  139M 0s
```

```
  5000K ..........  .......... .......... .......... ....      100%  159M=0.08s

2020-05-30 13:08:31 (62.0 MB/s) - ‘title.ratings.tsv.gz’ saved [5165953/5165953]

/bin/bash: line 2: fg: no job control
```

In [16]:

```
title_ratings = spark.read.option("sep", "\t").csv('file:/databricks/driver/title.ratings.tsv', header=True, inferSchema = True)
title_ratings.show(3)
```

```
+---------+-------------+--------+
   tconst|averageRating|numVotes|
+---------+-------------+--------+
tt0000001|          5.6|    1617|
tt0000002|          6.0|     198|
tt0000003|          6.5|    1299|
+---------+-------------+--------+
only showing top 3 rows
```

In [17]:

```
names_basic.show(3)
title_basics.show(3)
title_principals.show(3)
title_akas.show(3)
title_crew.show(3)
title_episode.show(3)
title_ratings.show(3)
```

```
+---------+--------------+---------+---------+-------------------+-----------
--------+
   nconst|    primaryName|birthYear|deathYear|   primaryProfession|      knownFo
rTitles|
+---------+--------------+---------+---------+-------------------+-----------
--------+
nm0000001|   Fred Astaire|     1899|     1987|soundtrack,actor,...|tt0043044,tt0
0531...|
nm0000002|  Lauren Bacall|     1924|     2014|  actress,soundtrack|tt0071877,tt0
1170...|
nm0000003|Brigitte Bardot|     1934|       \N|actress,soundtrac...|tt0054452,tt0
0491...|
+---------+--------------+---------+---------+-------------------+-----------
--------+
only showing top 3 rows

+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
   tconst|titleType|        primaryTitle|       originalTitle|isAdult|startYear|
endYear|runtimeMinutes|              genres|
+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
tt0000001|    short|          Carmencita|          Carmencita|      0|     1894|
\N|             1|   Documentary,Short|
tt0000002|    short|Le clown et ses c...|Le clown et ses c...|      0|     1892|
\N|             5|     Animation,Short|
tt0000003|    short|      Pauvre Pierrot|      Pauvre Pierrot|      0|     1892|
\N|             4|Animation,Comedy,...|
+---------+---------+--------------------+--------------------+-------+---------
+-------+-------------+--------------------+
only showing top 3 rows

+---------+--------+---------+---------------+--------------------+----------+
   tconst|ordering|   nconst|       category|                 job|characters|
+---------+--------+---------+---------------+--------------------+----------+
tt0000001|       1|nm1588970|           self|                  \N|  ["Self"]|
tt0000001|       2|nm0005690|       director|                  \N|        \N|
tt0000001|       3|nm0374658|cinematographer|director of photo...|        \N|
+---------+--------+---------+---------------+--------------------+----------+
only showing top 3 rows

+---------+--------+--------------------+------+--------+-----------+-----------
--+---------------+
  titleId|ordering|               title|region|language|      types|   attribute
s|isOriginalTitle|
+---------+--------+--------------------+------+--------+-----------+-----------
--+---------------+
tt0000001|       1|          Карменсіта|    UA|      \N|imdbDisplay|
\N|              0|
tt0000001|       2|          Carmencita|    DE|      \N|         \N|literal titl
e|             0|
tt0000001|       3|Carmencita - span...|    HU|      \N|imdbDisplay|
\N|              0|
+---------+--------+--------------------+------+--------+-----------+-----------
```

```
--+---------------+
only showing top 3 rows

+---------+---------+-------+
   tconst|directors|writers|
+---------+---------+-------+
tt0000001|nm0005690|     \N|
tt0000002|nm0721526|     \N|
tt0000003|nm0721526|     \N|
+---------+---------+-------+
only showing top 3 rows

+---------+------------+------------+-------------+
   tconst|parentTconst|seasonNumber|episodeNumber|
+---------+------------+------------+-------------+
tt0041951|   tt0041038|           1|            9|
tt0042816|   tt0989125|           1|           17|
tt0042889|   tt0989125|          \N|           \N|
+---------+------------+------------+-------------+
only showing top 3 rows

+---------+-------------+--------+
   tconst|averageRating|numVotes|
+---------+-------------+--------+
tt0000001|          5.6|    1617|
tt0000002|          6.0|     198|
tt0000003|          6.5|    1299|
+---------+-------------+--------+
only showing top 3 rows
```

Network Inference, Let's build a network

In the following questions you will look to summarise the data and build a network. We want to examine a network that abstracts how actors and actress are related through their co-participation in movies. To that end perform the following steps:

Q1 Create a DataFrame that combines the information on each of the titles (i.e., movies, tv-shows, etc …) and the information on the participants in those movies (i.e., actors, directors, etc …), make sure the actual names of the movies and participants are included. It may be worth reviewing the following questions to see how this dataframe will be used.

How many rows does yoru dataframe have?

In [19]:

```
joined1 = title_principals.join(title_basics, title_principals.tconst == title_basics.t
const,how='left')
df_network = joined1.join(names_basic, joined1.nconst == names_basic.nconst,how='left')
```

In [20]:

```
print("My final anwser is:", df_network.count())
```

```
My final anwser is: 39471189
```

In [21]:

```
# #Second chance
# df_network = title_principals.join(title_basics,['tconst'],how='left_outer').join(nam
es_basic,['nconst'],how='left_outer')
# df_network.take(1)
```

md **Q2** Create a new DataFrame based on the previous step, with the following removed:

1. Any participant that is not an actor or actress (as measured by the category column);
2. All adult movies;
3. All dead actors or actresses;
4. All actors or actresses born before 1920 or with no date of birth listed;
5. All titles that are not of the type movie.

How many rows does your dataframe have?

In [23]:

```
df_filter = df_network.filter(df_network.category.isin(['actor', 'actress'])) \
                                        .filter(df_network.isAdult != 1) \
                                        .filter(df_network.deathYear == "\\N") \
                                        .filter(df_network.birthYear.isNotNull()) \
                                        .filter(df_network.birthYear >= 1920) \
                                        .filter(df_network.titleType == 'movie')
```

In [24]:

```
print("My final anwser is:", df_filter.count())
```

```
My final anwser is: 451091
```

Q3 Convert the above Dataframe to an RDD (you can use `.rdd` to convert a dataframe to and RDD of row objects). Use map and reduce to create a paired RDD which counts how many movies each actor / actress appears in.

Display names of the top 10 actors/actresses according to the number of movies in which they appeared. Be careful to deal with different actors / actresses with the same name, these could be different people.

In [26]:

```
df_1 = df_filter.rdd.map(lambda x :((x[2], x[16]), 1))
df_2 = df_1.reduceByKey(lambda x,y : x+y)
df_f = df_2.sortBy(lambda x: x[1], False)
```

In [27]:

```
from graphframes import *
from pyspark.sql.types import *
import graphframes.graphframe as gfm

df_ff = df_f.map(lambda x: (x[0][0],x[0][1],x[1]))
df_ff

Id_actor = StructField("Id_actor",StringType(),True)
Movie = StructField("Movie",StringType(),True)
nvotes = StructField("nvotes",StringType(),True)

df_ff_3 = sqlContext.createDataFrame(df_ff, StructType([Id_actor, Movie,nvotes])).persi
st()

print("My final anwser is:")
print(df_ff_3.show(10))
```

```
My final anwser is:
+---------+-----------------+------+
 Id_actor|            Movie|nvotes|
+---------+-----------------+------+
nm0103977|     Brahmanandam|   809|
nm0007123|        Mammootty|   379|
nm0482320|         Mohanlal|   343|
nm0149822|Mithun Chakraborty|   332|
nm0007106|    Shakti Kapoor|   309|
nm0415549| Jagathi Sreekumar|   303|
nm0035067|     Cüneyt Arkin|   294|
nm0374974|            Helen|   281|
nm0534867|            Madhu|   277|
nm0004429|       Dharmendra|   270|
+---------+-----------------+------+
only showing top 10 rows

None
```

Q4 Start with the dataframe from **Q2**. Generate a DataFrame that lists all links of your network. Here we shall consider that a link connects a pair of actors/actresses if they participated in at least one movie together (actors / actresses should be represented by their unique ID's). For every link we then need anytime a pair of actors were together in a movie as a link in each direction (A -> B and B -> A). However links should be distinct we do not need duplicates when two actors worked together in several movies.

In [29]:

```
actors_rdd_1 = df_filter.rdd.map(list).map(lambda x :(x[0], x[2]))
actors_rdd_2 = df_filter.rdd.map(list).map(lambda x :(x[0], x[2]))
actors_rdd_2.take(4)
```

```
Out[249]: [('tt0110116', 'nm0000198'),
 ('tt1345836', 'nm0000198'),
 ('tt0097125', 'nm0000198'),
 ('tt3239932', 'nm0000198')]
```

In [30]:

```
from pyspark.sql import Row
actor_pairs_row =  actors_rdd_1.join(actors_rdd_2).map(lambda x :Row(x[1][0], x[1][1]))
.filter(lambda x: x[0] != x[1]).distinct()
```

In [31]:

```
ActorA = StructField("ActorA",StringType(),True)
ActorB = StructField("ActorB",StringType(),True)

df_actors_link = sqlContext.createDataFrame(actor_pairs_row, StructType([ActorA, ActorB
])).persist()
df_ff_3.show(10)
df_actors_link.show(4)
```

```
+---------+---------+
   ActorA|   ActorB|
+---------+---------+
nm3216408|nm0453304|
nm0544425|nm0000778|
nm2507102|nm0102403|
nm0668271|nm0001151|
+---------+---------+
only showing top 4 rows
```

In [32]:

```
print("My final anwser is:", actor_pairs_row.count(),df_actors_link.show(10))
```

```
+---------+---------+
   ActorA|   ActorB|
+---------+---------+
nm3216408|nm0453304|
nm0544425|nm0000778|
nm2507102|nm0102403|
nm0668271|nm0001151|
nm0429385|nm0005541|
nm0059847|nm0036924|
nm0000665|nm0000546|
nm0879203|nm0863831|
nm1231899|nm0695177|
nm0666140|nm0744037|
+---------+---------+
only showing top 10 rows

My final anwser is: 712112 None
```

Q5 Compute the page rank of each actor. This can be done using GraphFrames or by using RDDs and the iterative implementation of the PageRank algorithm. Do not take more than 5 iterations and use reset probility = 0.1.

List the top 10 actors / actresses by pagerank.

In [34]:

```
df_vertices = df_actors_link.select(df_actors_link['ActorA']).selectExpr("ActorA as id"
).distinct()
df_link = df_actors_link.selectExpr("ActorA as src", "ActorB as dst")
df_link.take(3)
```

```
Out[253]: [Row(src='nm3216408', dst='nm0453304'),
 Row(src='nm0544425', dst='nm0000778'),
 Row(src='nm2507102', dst='nm0102403')]
```

In [35]:

```
ourGraph = gfm.GraphFrame(df_vertices, df_link)
# ourGraph.vertices.show()
# ourGraph.edges.show()
```

In [36]:

```
pageRanks = ourGraph.pageRank(resetProbability=0.1, maxIter = 5)
#pageRanks.vertices.sort("pagerank", ascending = False).show(10)
```

In [37]:

```
print("My final anwser is:")
print(pageRanks.vertices.sort("pagerank", ascending = False).show(10))
```

```
My final anwser is:
+---------+------------------+
       id|          pagerank|
+---------+------------------+
nm0000616|  40.6478874245532|
nm0000514|24.226138058070163|
nm0001744|23.419848197831612|
nm0001803|20.555441795470156|
nm0000448|17.663207647023903|
nm0001698|17.583580336085777|
nm0004193|16.881922296919786|
nm0000367|16.832482667099892|
nm0000800|16.111563992409874|
nm0626259|15.962778479477862|
+---------+------------------+
only showing top 10 rows

None
```

Q6: Create an RDD with the number of outDegrees for each actor. Display the top 10 by outDegrees.

In [39]:

```
#ID, PrimaryName and Outdegree
q6 = ourGraph.outDegrees.sort('outDegree', ascending = False)
print("My final anwser is:")
print(q6.show(10))
```

```
My final anwser is:
+---------+---------+
       id|outDegree|
+---------+---------+
nm0000616|      438|
nm0000514|      289|
nm0000367|      263|
nm0001744|      261|
nm0945189|      253|
nm0451600|      239|
nm0149822|      232|
nm0001803|      231|
nm0874676|      227|
nm0938893|      225|
+---------+---------+
only showing top 10 rows

None
```

Let's play Kevin's own game

Q7 Start with the graphframe / dataframe you developed in the previous section. Using Spark GraphFrame and/or Spark Core library perform the following steps:

1. Identify the id of Kevin Bacon, there are two actors named 'Kevin Bacon', we will use the one with the highest degree, that is, the one that participated in most titles;
2. Estimate the shortest path between every actor/actress in the database and Kevin Bacon, keep a dataframe with a column that includes the number of steps to Kevin Bacon as you will need it later (this will require a little processing to get from the graphframes output);
3. Summarise the data, that is, count the number of actors at each number of degress from kevin bacon (you will need to deal with actors unconnected to kevin bacon, if not connected to Kevin Bacon given these actors / actresses a score of 20). You could use the display() barchart functionality of databricks to easily display the distribution of the data.

Note: The solution time on this step can be ~15 minutes

In [41]:

```
df_filter1 = df_filter.join(df_filter,['nconst','primaryName'],how='left')
```

In [42]:

```
import pyspark.sql.functions
from pyspark.sql.functions import split, substring, length, col, expr
from pyspark.sql import functions as F
from pyspark.sql.functions import *
```

In [43]:

```
# Q7(2)
q7_2 = ourGraph.shortestPaths(landmarks=["nm0000102"])
```

In [44]:

```
from pyspark.sql.functions import explode_outer
distances_value = q7_2.select("id", explode_outer("distances"))
```

In [45]:

```
# Summarise the data, that is, count the number of actors at each number of degress fro
m kevin bacon (you will need to deal with actors unconnected to kevin bacon, if not con
nected to Kevin Bacon given these actors / actresses a score of 20). You could use the
 display() barchart functionality of databricks to easily display the distribution of t
he data.

#groupby e count
q7_f = distances_value.groupBy('value').count().sort("count", ascending = False)
print("My final anwser is:")
print(q7_f.show(10))
```

```
My final anwser is:
+-----+-----+
value|count|
+-----+-----+
    4|29068|
    3|18311|
    5|13095|
 null| 6529|
    2| 3302|
    6| 2251|
    7|  311|
    1|  126|
    8|   38|
   10|   12|
+-----+-----+
only showing top 10 rows

None
```

In [46]:

```
# Alternative
# Id = StructField("Id",StringType(),True)
# Distance = StructField("Distance",StringType(),True)

# q7_3 = sqlContext.createDataFrame(q7_2_1, StructType([Id, Distance])).persist()
# q7_3.show(4)
# q7_4 = q7_3.withColumn('Distance1', split(q7_3['Distance'], '=')[1])
# q7_5 = q7_4.withColumn('Distance2', split(q7_4['Distance1'], '}')[0])
# q7_6 = q7_5.withColumn('code', split(q7_5['Distance'], '=')[0])
# q7_8 = q7_6.drop('Distance','Distance1')
# q7_7 = q7_8.select('code',substring('code', 2, 10000).alias('nconst_1'))
# new_df = q7_7.join(q7_8,['code'])
# new_df = new_df.drop('code')
# new_df.show(3)
```

Exploring the data with RDD's

Using RDDs and (not dataframes) answer the following questions (if you loaded your data into spark in a dataframe you can convert to an RDD of rows easily using `.rdd`):

Hint: paired RDD's will be useful.

Q8 Movies can have multiple genres. Considering only titles of the type 'movie' what is the combination of genres that is the most popluar (as measured by number of reviews)?

In [48]:

```
movies_genres = df_filter.join(title_ratings,['tconst'])
```

In [49]:

```
title = movies_genres.rdd.map(list).map(lambda x :(x[14], x[22]))
# title.collect()
```

In [50]:

```
# title.distinct().countByKey().sortBy()
title_1 = title.reduceByKey(lambda x,y: x+y)
title_2 = title_1.sortBy(lambda x: x[1], False)

print("My final anwser is:", title_2.take(1))
```

```
My final anwser is: [('Action,Adventure,Sci-Fi', 164846210)]
```

Q9 Movies can have multiple genres. Considering only titles of the type 'movie', and movies with more than 500 ratings, what is the combination of genres that has the highest **average movie rating** (you can average the movie rating for each movie in that genre combination).

In [52]:

```
Rdd_q9 = title_basics.rdd.map(lambda x:(x[0],(x[1],x[-1]))).join(title_ratings.rdd.map(
lambda x: (x[0],(x[1],x[2]))))
# Rdd_q9.take(5)
```

In [53]:

```
movie = Rdd_q9.map(lambda x: (x[1][0][0],x[1][0][1],x[1][1][0],x[1][1][1]))
```

In [54]:

```
q9 = movie.filter(lambda x: (x[0] == 'movie') & (x[3] >= 500)).map(lambda x: (x[1],x[2
]))
```

In [55]:

```
Avg_q9 = q9.mapValues(lambda x: (x,1))
Avg_q9 = Avg_q9.reduceByKey(lambda x,y: (x[0]+y[0], x[1]+y[1])).mapValues(lambda x: x[0
]/x[1]).sortBy(lambda x: x[1], False)
print("My final anwser is:", Avg_q9.take(1))
```

```
My final anwser is: [('Music,Musical', 8.5)]
```

In [56]:

```
#Alternative
# average_moving_Rate2 = average_moving_Rate1.reduceByKey(lambda x,y: x+y)
# average_moving_Rate3 = average_moving_Rate2.sortBy(lambda x: x[1], False)
# average_moving_Rate3.take(5)
# average_moving_Rate1.distinct().countByKey()
# avg_by_key = average_moving_Rate1 \
#     .mapValues(lambda v: (v, 1)) \
#     .reduceByKey(lambda a,b: (a[0]+b[0], a[1]+b[1])) \
#     .mapValues(lambda v: v[0]/v[1])
# Sorted_avg_by_key = avg_by_key.sortBy(lambda x: x[1], False)
# Sorted_avg_by_key.take(5)
```

Q10 Movies can have multiple genres. What is **the individual genre** which is the most popular as meaured by number of votes. Votes for multiple genres count towards each genre listed.

Hint: Think about the wordcount exercise we have done with RDDs.

In [58]:

```
Rdd_q10 = title_basics.rdd.map(lambda x:(x[0],(x[1],x[-1]))).join(title_ratings.rdd.map
(lambda x: (x[0],(x[1],x[2]))))
```

In [59]:

```
movie_10 = Rdd_q10.map(lambda x: (x[1][0][0],x[1][0][1],x[1][1][0],x[1][1][1]))
movie_10.take(5)
```

```
Out[55]: [('short', 'Documentary,Short', 5.6, 1617),
 ('short', 'Documentary,Short', 5.7, 1539),
 ('short', 'Documentary,Short', 5.5, 812),
 ('short', 'Documentary,Short,Sport', 4.1, 147),
 ('short', 'Documentary,Short', 4.3, 15)]
```

In [60]:

```
q10 = movie_10.filter(lambda x: (x[0] == 'movie')).map(lambda x: (x[1],x[3]))
```

```
Out[56]: [('Drama', 17),
 ('Drama', 12),
 ('\\N', 13),
 ('\\N', 17),
 ('Crime,Thriller', 12)]
```

In [61]:

```
Split_RDD = q10.map(lambda x: (x[0].split(","), x[1]))
Split_RDD0 = Split_RDD.flatMap(lambda x: [(y, int(x[1])) for y in x[0]])
Split_RDD1 = Split_RDD0.reduceByKey(lambda x,y: x+y)
Split_RDD_Final = Split_RDD1.sortBy(lambda x: x[1], False)
print("My final anwser is:", Split_RDD_Final.take(1))
```

```
My final anwser is: [('Drama', 405750616)]
```

Engineering the perfect cast

We have created a number of potential features for predicting the rating of a movie based on its cast. Use sparkML to build a simple linear model to predict the rating of a movie based on the following features:

1. The total number of movies in which the actors / actresses in the current movie have acted (based on Q3)
2. The average pagerank of the cast in each movie (based on Q5)
3. The average outDegree of the cast in each movie (based on Q6)
4. The average value for for the cast of degrees of Kevin Bacon (based on Q7).

If you were unable to generate any of these features as you could not answer the previous questions, just skip that particular feature.

You will need to create a dataframe with the required features and label. Use a pipeline to create the vectors required by sparkML and apply the model. Remember to split your dataset, leave 30% of the data for testing, when splitting your data use the option `seed=0` .

Q11 Provide the coefficients of the regression and the accuracy of your model on the test dataset according to RSME.

In [63]:

```
# Movie id, Actor ID, -> join -> table wieh movie ID, actor ID and the information for
 each actior
  # Get the table from question 2
  # And then join the inf about the score rate
#Table: Movie id, actors, all variables about the questions, avg rating too,
  # One movie appears many times, is one line per actor
  # Ex Titanic - Leonardo has 15 , and Olivia has 10 -> there will be 25
  # Score Rating, use the max to take it
# title_principals.show()
```

```
+---------+--------+---------+---------------+--------------------+------------
-+
   tconst|ordering|   nconst|       category|                 job|    characters
|
+---------+--------+---------+---------------+--------------------+------------
-+
tt0000001|       1|nm1588970|           self|                  \N|      ["Self"]
|
tt0000001|       2|nm0005690|       director|                  \N|            \N
|
tt0000001|       3|nm0374658|cinematographer|director of photo...|            \N
|
tt0000002|       1|nm0721526|       director|                  \N|            \N
|
tt0000002|       2|nm1335271|       composer|                  \N|            \N
|
tt0000003|       1|nm0721526|       director|                  \N|            \N
|
tt0000003|       2|nm5442194|       producer|            producer|            \N
|
tt0000003|       3|nm1335271|       composer|                  \N|            \N
|
tt0000003|       4|nm5442200|         editor|                  \N|            \N
|
tt0000004|       1|nm0721526|       director|                  \N|            \N
|
tt0000004|       2|nm1335271|       composer|                  \N|            \N
|
tt0000005|       1|nm0443482|          actor|                  \N|["Blacksmith"]
|
tt0000005|       2|nm0653042|          actor|                  \N| ["Assistant"]
|
tt0000005|       3|nm0005690|       director|                  \N|            \N
|
tt0000005|       4|nm0249379|       producer|            producer|            \N
|
tt0000006|       1|nm0005690|       director|                  \N|            \N
|
tt0000007|       1|nm0179163|          actor|                  \N|            \N
|
tt0000007|       2|nm0183947|          actor|                  \N|            \N
|
tt0000007|       3|nm0005690|       director|                  \N|            \N
|
tt0000007|       4|nm0374658|       director|                  \N|            \N
|
+---------+--------+---------+---------------+--------------------+------------
-+
only showing top 20 rows
```

In [64]:

```
# Question 3 (SUM)
df_f

df_ff = df_f.map(lambda x: (x[0][0],x[0][1],x[1]))
df_ff.collect()

Id_actor = StructField("nconst",StringType(),True)
Movie = StructField("Movie",StringType(),True)
nvotes = StructField("TotalActs",StringType(),True)

df_ff_3 = sqlContext.createDataFrame(df_ff, StructType([Id_actor, Movie,nvotes])).persi
st()

q11_MR = df_ff_3.join(title_principals,['nconst']).select(['nconst','TotalActs','Movie'
,'tconst']).distinct().groupBy('tconst').agg({'TotalActs':'sum'})
```

In [65]:

```
#Question 5 (AVG) #PAgeRank
rank_renamed = pageRanks.vertices.withColumnRenamed('id','nconst')

q11_PR = rank_renamed.join(title_principals,'nconst').select(['tconst','nconst','pagera
nk']).distinct().groupBy('tconst').agg({'pagerank':'avg'})
q11_PR.show()
```

In [66]:

```
#Question 6 (AVG)

# df_out = spark.createDataFrame(ourGraph.outDegrees, schema=['nconst','OutDegree'])
df_out = ourGraph.outDegrees.withColumnRenamed("id","nconst")


q11_OD = df_out.join(title_principals,'nconst').select(['tconst','nconst','outDegree'])
.distinct().groupBy('tconst').agg({'outDegree':'avg'})
```

In [67]:

```
  #Question 7 (AVG)

  distancia = distances_value.withColumnRenamed("id","nconst")
  distancia = distancia.withColumnRenamed("value","distance")

  q11_DD = distancia.join(title_principals,'nconst').select(['nconst','distance','tcons
t']).distinct().groupBy('tconst').agg({'distance':'avg'})
```

In [68]:

```
all_together = q11_MR.join(q11_PR, ['tconst'],'inner').join(q11_OD, ['tconst'], 'inner'
).join(q11_DD, ['tconst'],'inner').join(title_ratings, ["tconst"], how="left_outer")
```

In [69]:

```
all_together_without_nan = all_together.na.drop()
```

In [70]:

```
#Don't need the tconst, numVotes and averageRating columns to create the features set
all_together_without_nan = all_together_without_nan.drop("tconst", "numVotes")
```

In [71]:

```
train_test = all_together_without_nan.randomSplit([0.7,0.3], seed=0)
train = train_test[0]
test = train_test[1]
```

In [72]:

```
features_Columns = all_together_without_nan.columns
#removing the target from features
features_Columns.remove("averageRating")
#Concatenate all the features columns into a single feature vector in a new column call
ed rawfeatures
vectorAssembler = VectorAssembler(inputCols = features_Columns, outputCol = "features")
```

In [73]:

```
# Define LinearRegression algorithm
model = LinearRegression(labelCol = "averageRating")

#Combine all part assembled into a single pipeline
pipeline = Pipeline(stages = [vectorAssembler, model])

# # Print the fitted model parameters
# print(">>>> ModelA intercept: %r, coefficient: %r" % (modelA.intercept, modelA.coeffi
cients[0]))
```

In [74]:

```
#Fitting the model
pipelineModel = pipeline.fit(train)
```

In [75]:

```
pred = pipelineModel.transform(test)
print('My pre final answer is:')
print(pred.show())
```

```
My final answer is:
+--------------+------------------+--------------+-------------+-------------+-
------------------+------------------+
sum(TotalActs)|      avg(pagerank)|avg(outDegree)|avg(distance)|averageRating|
features|        prediction|
+--------------+------------------+--------------+-------------+-------------+-
------------------+------------------+
           1.0|0.15388023022273636|           1.0|          5.0|          5.2|
[1.0,0.1538802302...| 6.738432970469312|
           1.0|  0.162737367142549|           1.0|          3.0|          6.3|
[1.0,0.1627373671...| 7.185733923450423|
           1.0|  0.162737367142549|           1.0|          3.0|          6.9|
[1.0,0.1627373671...| 7.185733923450423|
           1.0|  0.162737367142549|           1.0|          3.0|          7.2|
[1.0,0.1627373671...| 7.185733923450423|
           1.0|0.16791307168844505|           1.0|          4.0|          3.7|
[1.0,0.1679130716...|6.9608558268126215|
           1.0|0.19473857188077948|           1.0|          4.0|          7.0|
[1.0,0.1947385718...| 6.957426985871079|
           1.0|0.20332216586340757|           1.0|          5.0|          7.2|
[1.0,0.2033221658...|6.7321132921058755|
           1.0| 0.2105218908680771|           1.0|          5.0|          5.9|
[1.0,0.2105218908...| 6.731193021777761|
           1.0|0.22704666506160767|           1.0|          4.0|          6.6|
[1.0,0.2270466650...| 6.953297358768236|
           1.0|0.22965060706387092|           1.0|          4.0|          8.1|
[1.0,0.2296506070...| 6.952964522366948|
           1.0|0.24709725743081595|           2.0|          3.0|          7.8|
[1.0,0.2470972574...| 7.177427593951279|
           1.0|0.26841102627865837|           2.0|          3.0|          8.1|
[1.0,0.2684110262...| 7.174703263641683|
           1.0| 0.2715918183356083|           3.0|          3.0|          7.4|
[1.0,0.2715918183...| 7.176773263143577|
           1.0|0.27810086881857393|           3.0|          3.0|          8.2|
[1.0,0.2781008688...| 7.175941274974614|
           1.0| 0.2912773061673283|           2.0|          4.0|          7.5|
[1.0,0.2912773061...| 6.947563954031903|
           1.0| 0.2919258536181646|           3.0|          3.0|          7.4|
[1.0,0.2919258536...|7.1741741625794235|
           1.0| 0.2927553532000262|           2.0|          4.0|          6.5|
[1.0,0.2927553532...| 6.947375029756758|
           1.0|0.30756869810114995|           1.0|          4.0|          7.4|
[1.0,0.3075686981...| 6.943005015974899|
           1.0|0.31456468460774367|           2.0|          4.0|          8.6|
[1.0,0.3145646846...| 6.944587356539025|
           1.0| 0.3181350057007517|           2.0|          3.0|          6.7|
[1.0,0.3181350057...| 7.168347534384205|
+--------------+------------------+--------------+-------------+-------------+-
------------------+------------------+
only showing top 20 rows

None
```

In [76]:

```
from pyspark.ml.evaluation import RegressionEvaluator

RMSE = RegressionEvaluator(labelCol = "averageRating", predictionCol = "prediction", me
tricName = "rmse")
print('My final answer is:')
rmse = RMSE.evaluate(pred)
print(rmse)
```

```
My final answer is:
1.3404186671846205
```

Q12 What score would your model predict for the 1997 movie Titanic and how does this compare to it's actual score.

In [78]:

```
titanic = df_filter.filter((df_filter.primaryTitle == "Titanic") & (df_filter.startYear
== 1997)).distinct()
```

In [79]:

```
toPredict = all_together.filter(all_together.tconst == "tt0120338")
```

In [80]:

```
#Preprocess to do the prediction
toPredict = toPredict.drop("tconst", "numVotes")
```

In [81]:

```
prediction = pipelineModel.transform(toPredict)
# print("And My final Answer is: ")
# print(prediction.select("averageRating",'Prediction').show())
prediction.select("averageRating",'Prediction').show()
```

```
+-------------+-----------------+
averageRating|       Prediction|
+-------------+-----------------+
          7.8|6.3255040028494625|
+-------------+-----------------+
```

In [82]:

```
# from pyspark.ml.feature import VectorAssembler, VectorIndexer
# featuresCols = toPredict.columns

# # This concatenates all feature columns into a single feature vector in a new column
 "rawFeatures".
# vectorAssembler = VectorAssembler(inputCols=featuresCols, outputCol="rawFeatures")
# # This identifies categorical features and indexes them.
# vectorIndexer = VectorIndexer(inputCol="rawFeatures", outputCol="features", maxCatego
ries=4)
```

Q13 Create dummy variables for each of the top 10 movie genres from **Q10**. These variable should have a value of 1 if the movie was rated with that genre and 0 otherwise. For example the 1997 movie Titanic should have a 1 in the dummy variable column for Romance, and a 1 in the dummy variable column for Drama, and 0's in all the other dummy variable columns.

If you were unable to answer Q10 you can just select 10 different genres and construct the same data.

Note: Question 10 uses the number of votes per genre and not the average votes per genre.

Does adding these variables to the regression improve your results? What is the new RMSE and predicted rating for the 1997 movie Titanic.

In [84]:

```
### Pipeline
# I tried to do but i got negaive scores
```

Q14 Improve your model by testing different machine learning algorithms, using hyperparameter tuning on these algorithms, changing the included features. Be careful not to cheat and use test data in the training of your model.

Note: We are not testing your knowledge of different algorithms, we are just testing that you can apply the different tools in the spark toolkit and can compare between them.

What is the RMSE of you final model and what rating does it predict for the 1997 movie Titanic.

In [86]:

```
#Pipeline
# It was taking so much to run and i couldn't finish it
```