Project 1 - Apache Hive

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Question 1

Which English wikipedia article got the most traffic on October 20?

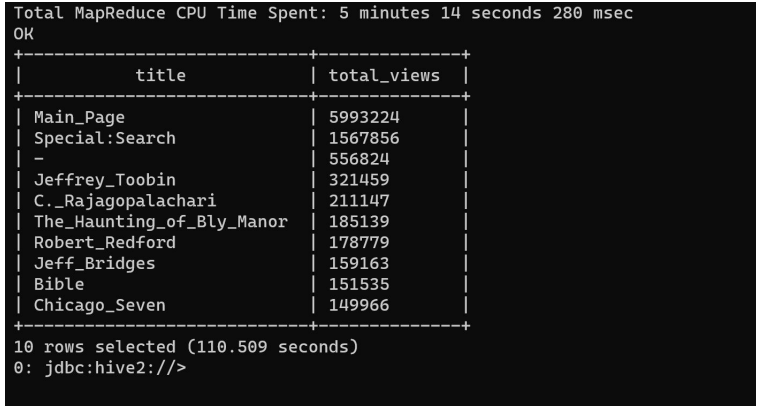
- Wget '___' from wikipedia.
  - All 24 files related to october 20, 2020.
- CREATE TABLE oct20 (Nothing fancy here, I just included the same columns)
- LOAD INPATH LOCAL ___ INTO TABLE oct20

Process

Select Statement:

- SELECT
  - Title,
  - SUM(num_views) AS total_views
- FROM oct20
- WHERE domain LIKE ‘%en%’
- GROUP BY title
- ORDER BY total_views DESC
- LIMIT 10;

Results: Main Page was the top result



```
Total MapReduce CPU Time Spent: 5 minutes 14 seconds 280 msec
OK
+----------------------------+--------------+
|           title            | total_views  |
+----------------------------+--------------+
| Main_Page                  | 5993224      |
| Special:Search             | 1567856      |
| -                          | 556824       |
| Jeffrey_Toobin             | 321459       |
| C._Rajagopalachari         | 211147       |
| The_Haunting_of_Bly_Manor  | 185139       |
| Robert_Redford             | 178779       |
| Jeff_Bridges               | 159163       |
| Bible                      | 151535       |
| Chicago_Seven              | 149966       |
+----------------------------+--------------+
10 rows selected (110.509 seconds)
0: jdbc:hive2://>
```

Question 2

What English wikipedia article has the largest fraction of its readers follow an internal link to another wikipedia article?

-- Key Assumptions --
- October 20 represents a typical day
- Any analysis run on October 20 can be multiplied by 30 to represent that of a 30-day month

-- Effects on Data
- Results can have > 100% link rate

Table Creation:

- Wget '*https://dumps.wikimedia.org/other/clickstream/2020-09/clickstream-enwiki-2020-09.tsv.gz*'

- CREATE TABLE prev_clicks AS
  - SELECT prev,
  - SUM(CASE WHEN type = 'link' THEN num ELSE 0 END) AS link_occurences
  - FROM sept_click
  - GROUP BY prev;

- CREATE TABLE one_day_views AS
  - SELECT title, SUM(views) AS num_views
  - FROM october20
  - WHERE domain LIKE '%en%'
  - GROUP BY title;

Merge Tables and get Results

- CREATE TABLE merged AS
  - SELECT one_day_views.title,
    - One_day_views.num_views,
    - Prev_clicks.link_occurences,
    - (prev_clicks.link_occurences/(one_day_views .num_views * 30)) AS percentage
  - FROM one_day_views JOIN prev_clicks
  - ON (one_day_views.title = prev_clicks.prev)
  - ORDER BY percentage DESC

SELECT * FROM merged WHERE num_views> 10000 LIMIT 10;

```
0: jdbc:hive2://> SELECT * FROM merged WHERE num_views> 10000 LIMIT 10;
OK
+-----------------------------------+-------------------+-------------------------+----------------------+
|           merged.title            | merged.num_views  | merged.link_occurences  |  merged.percentage   |
+-----------------------------------+-------------------+-------------------------+----------------------+
| Ruth_Bader_Ginsburg               | 19911             | 2489227                 | 4.167255955669395    |
| Cobra_Kai                         | 19018             | 2241751                 | 3.929174115749991    |
| Enola_Holmes_(film)               | 17708             | 1356311                 | 2.553104058429335    |
| September_11_attacks              | 11359             | 850181                  | 2.4948821785955335   |
| Supreme_Court_of_the_United_States | 14517             | 1002716                 | 2.3023948933434366   |
| Mulan_(2020_film)                 | 25958             | 1749519                 | 2.246602203559596    |
| The_Devil_All_the_Time_(film)     | 16335             | 1071565                 | 2.1866442199775533   |
| Dennis_Nilsen                     | 10210             | 660393                  | 2.1560333006856025   |
| Ratched_(TV_series)               | 26384             | 1668477                 | 2.1079404184354154   |
| Nurse_Ratched                     | 10192             | 546567                  | 1.7875686813186813   |
+-----------------------------------+-------------------+-------------------------+----------------------+
10 rows selected (0.204 seconds)
0: jdbc:hive2://>
```

Side Note: This analysis also contains data as to which articles were more popular in september than October

Question 3

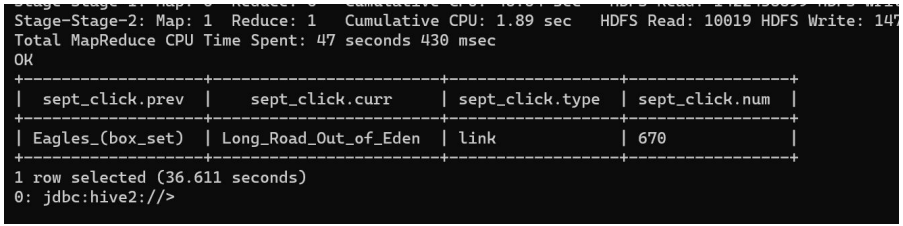
What series of wikipedia articles, starting with ‘Hotel_California’ keeps the largest fraction of its readers clicking on internal sites

```
SELECT * FROM sept_click
WHERE type = 'link' AND prev LIKE 'Eagles_(box_set)'
SORT BY num DESC
LIMIT 1;
```

- Used an existing Table
- Ran the Above Command Multiple times
- At each iteration, I recorded the highest link, as well as the link’s new title
- At the next iteration, I swapped the title

Results

This is what the 10th Link looked like



```
Stage-Stage-2: Map: 1  Reduce: 1   Cumulative CPU: 1.89 sec   HDFS Read: 10019 HDFS Write: 147
Total MapReduce CPU Time Spent: 47 seconds 430 msec
OK
+--------------------+-----------------------+-------------------+-------------------+
|  sept_click.prev   |    sept_click.curr    | sept_click.type   | sept_click.num    |
+--------------------+-----------------------+-------------------+-------------------+
| Eagles_(box_set)   | Long_Road_Out_of_Eden | link              | 670               |
+--------------------+-----------------------+-------------------+-------------------+
1 row selected (36.611 seconds)
0: jdbc:hive2://>
```

Page Title	Links To Next Page
Hotel_California	->2222->
Hotel_California_(Eagles_album)	->2127->
The_Long_Run_(album)	->1322->
Eagles_Live	->1136->
Eagles_Greatest_Hits,_Vol._2 -	>996->
The_Very_Best_of_the_Eagles	->892->
Hell_Freezes_Over	->735->
Selected_Works:_1972–1999	->705->
The_Very_Best_Of_(Eagles_album)	->646->
Eagles_(box_set)	->670->
Long_Road_Out_of_Eden	

Question 4

Find an example of a wikipedia article that is relatively more popular in the UK. Find the same for the US and Australia.

--Key Assumptions--

- October 20th represents a typical day
- Each country is most active for six hours surrounding lunch/mid-afternoon
- Data will then be summed by country from 10:00 AM to 4:00 PM

Hours Used:

America (5 Hours behind)	->	15:00 - 20:00 (inclusive)
UK is on time	->	10:00 - 15:00 (inclusive)
Australia (11 Hours ahead)	->	23:00 - 04:00 (inclusive)

Loading Data:

```
LOAD DATA LOCAL INPATH
'/home/trevorbuck/project2/data/pageviews-20201020-??0000'
INTO TABLE one_day_???;
```

Table Creation:

```
CREATE TABLE one_day_usa(
domain STRING,
title STRING,
views INT,
response INT
)
ROW FORMAT DELIMITEd
FIELDS TERMINATED BY ' ';
```

Side-Note:

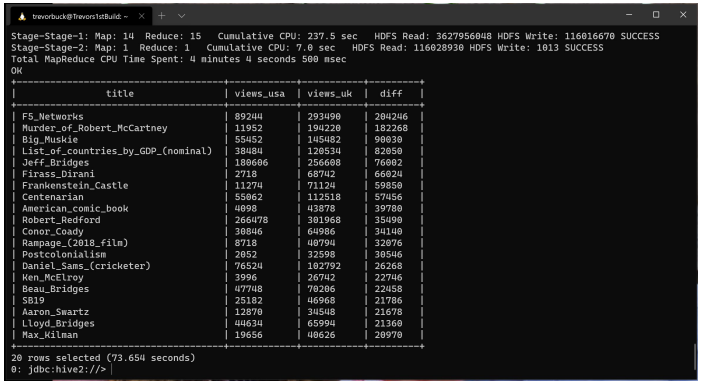
I copied the same table format for both UK and AUS

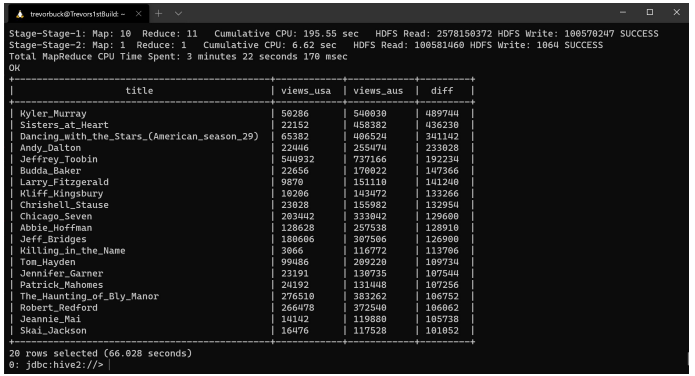
Merge Table and Results

```
CREATE TABLE usa_uk AS
SELECT one_day_usa.domain, one_day_usa.title, one_day_usa.views
AS views_usa, one_day_uk.views AS views_uk
FROM one_day_usa JOIN one_day_uk
ON (one_day_usa.title = one_day_uk.title AND one_day_usa.domain
= one_day_uk.domain);
```

```
SELECT title, SUM(views_usa), SUM(views_uk), SUM(views_uk - views_usa) AS diff
FROM usa_uk
WHERE domain LIKE '%en%'
GROUP BY title
ORDER BY diff DESC
LIMIT 20;
```

Note: This same process was used in creating the table for usa_aus.





Question 5

Analyze how many users will see the average vandalized wikipedia article page before the offending edit is reversed.

- Big Long Create Table Statement that did nothing but create the table with all 70 empty fields
- Load Data
  - LOAD DATA LOCAL INPATH
  - '/home/trevorbuck/project2/data/revisions/2020-10.enwiki.2020-10.tsv.bz2'
  - INTO TABLE revisions;
- CREATE TABLE revision_plus_views AS
  - SELECT
    - revisions.page_title AS title,
    - revisions.revision_seconds_to_identity_revert AS seconds_to_revert,
    - october20.views AS views
  - FROM revisions JOIN october20
  - ON (revisions.page_title = october20.title);

Results

Select Statement:

- SELECT AVG(seconds_to_revert) AS seconds_average, AVG(views) AS views_average_per_day
- FROM revision_plus_views
- WHERE seconds_to_revert > 0;

```
Total MapReduce CPU Time Spent: 2 minutes 5 seconds 950 msec
OK
+--------------------+------------------------+
|  seconds_average   | views_average_per_day  |
+--------------------+------------------------+
| 65287.89730011033  | 28.415237131249395     |
+--------------------+------------------------+
1 row selected (35.172 seconds)
0: jdbc:hive2://>
```

--Final Math

-- seconds_average * views_average_per_day * (1 day / 86400 second) = x views before edit

-- 65287.89730011033 * 28.415237131249395 / 86400 =
21.47188754147329 views before edit

Answer: 21.47 views before edit

Question 6

Run an analysis you find interesting on the wikipedia sets we're using.

Which wikipedia articles were more popular throughout the months of the year?

Note: This process was repeated for each month of the year.

For January

```
CREATE TABLE jan (
prev STRING,
curr STRING,
type STRING,
num INT
)
ROW FORMAT DELIMITED
FIELDS TERMINATED BY '\t';

LOAD DATA LOCAL INPATH
'/home/trevorbuck/project2/data/months/click
stream-dewiki-2020-02.tsv.gz'
INTO TABLE jan;
```

Results (Feb)

- SELECT
  - feb.curr AS title,
  - SUM(feb.num - sept_click.num) AS diff
- FROM feb JOIN sept_click
- ON (feb.curr = sept_click.curr)
- GROUP BY feb.curr
- ORDER BY diff DESC
- LIMIT 10;

  Once again, repeated for each month

```
Total MapReduce CPU Time Spent: 4 minutes 12 seconds 150 msec
OK
+-----------------+------------+
|      title      |    diff    |
+-----------------+------------+
| Pornhub         | 194344226  |
| Kirk_Douglas    | 110968832  |
| Super_Bowl      | 85809219   |
| New_York_City   | 58526567   |
| Billie_Eilish   | 53046582   |
| Influenza       | 50939874   |
| Kobe_Bryant     | 50596787   |
| Bernie_Sanders  | 44691591   |
| Jennifer_Lopez  | 40316686   |
| Super_Bowl_LIV  | 38982930   |
+-----------------+------------+
10 rows selected (99.043 seconds)
0: jdbc:hive2://>
```

Results By Month

January - Joaquin Pheonix, Patrick Mahomes

February - Super Bowl, Kobe Bryant, Influenza

March - Coronavirus, Spanish Flu, Kenny Rogers

April - Kim Jong Un, Joe Exotic, Covid19 pandemic

May - Michael Jordan, Elon Musk, Covid19 pandemic

June - Sushant Singh Rajput, George Floyd, Jeffrey Epstein

July - Grant Imahara, Alexander Hamilton, Lin-Manuel Miranda

August - Kamala Harris, Deaths in 2020, Beirut

September - Ruth Bader Ginsburg, Chadwick Boseman, Enola Holmes

Thanks!