Thi Hong Yen Truong
ID: 614745

# W2D2

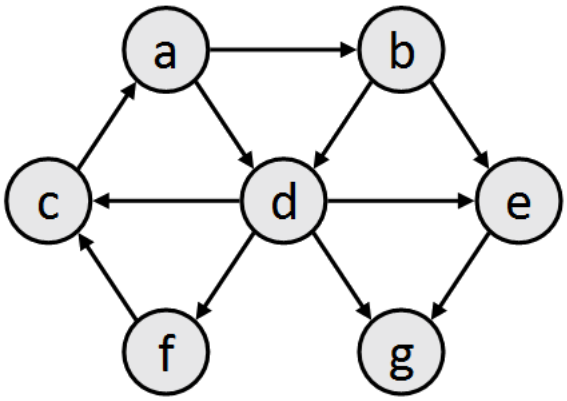
## Q1. Build inverted index.

Input Split 1 (Doc ID 101) [cat pat mat sat cat eat]
Input Split 2 (Doc ID 201) [pat mat sat pat mat eat]
Input Split 3 (Doc ID 301) [sat mat cat pat fat mat]

Assume three Mappers and two Reducers.
Let cat mat and sat be processed by Reducer 1 and rest by Reducer 2.

| Input Split 1 (Doc ID 101) | Input Split 2 (Doc ID 201) | Input Split 3 (Doc ID 301) |
|---|---|---|
| [cat pat mat sat cat eat] | [pat mat sat pat mat eat] | [sat mat cat pat fat mat] |
| **Mapper 1 output** | **Mapper 2 output** | **Mapper 3 output** |
| ((cat, 101), 2)<br>((pat, 101), 1)<br>((mat, 101), 1)<br>((sat, 101), 1)<br>((eat, 101), 1) | ((pat, 201), 2)<br>((mat, 201), 2)<br>((sat, 201), 1)<br>((eat, 201), 1) | ((sat, 301), 1)<br>((mat, 301), 2)<br>((cat, 301), 1)<br>((pat, 301), 1)<br>((fat, 301), 1) |
| **Shuffle and Sort** | | |
| **Reducer 1 input** | **Reducer 2 input** | |
| ((cat, 101), [2])<br>((cat, 301), [2])<br>((mat, 101), [1])<br>((mat, 201), [2])<br>((mat, 301), [2])<br>((sat, 101), [1])<br>((sat, 201), [1])<br>((sat, 301), [1]) | ((eat, 101), [1])<br>((eat, 201), [1])<br>((fat, 301), [1])<br>((pat, 101), [1])<br>((pat, 201), [2])<br>((pat, 301), [1]) | |
| **Reducer 1 output** | **Reducer 2 output** | |
| (cat, [(101, 2), (301, 2)])<br>(mat, [(101, 1), (201, 2), (301, 2)])<br>(sat, [(101, 1), (201, 1), (301, 1)]) | (eat, [(101, 1), (201, 1)])<br>(fat, [(301, 1)])<br>(pat, [(101, 1), (201, 2), (301, 1)]) | |

## Q2. Illustrate Page Rank Algorithm (Three steps only).




| Steps | a | b | c | d | e | f | g |
|---|---|---|---|---|---|---|---|
| 0 | 1/7 | 1/7 | 1/7 | 1/7 | 1/7 | 1/7 | 1/7 |
| 1 | 1/7 | 1/14 | 5/28 | 1/7 | 3/28 | 1/28 | 5/28 |
| 2 | 5/28 | 1/14 | 1/14 | 3/28 | 1/14 | 1/28 | 1/7 |

**Q3. Apply all the data compression algorithm covered in class by the professor through examples on the following list of postings.**

[(512, 15), (2080, 93), (5748, 195), (7080, 255] => Total is 24 bytes

**Step: Common to all compression schemes (d-Gaps):**
[(512, 15), (1568, 93), (3668, 195), (1332, 255)]

➔ 512 15 1568 93 3668 195 1332 255

**Step: Byte-aligned codes:**
512 = 1000000000

| | |
|---|---|
| 0000 0100 | 1000 0000 |

15 = 1111

| |
|---|
| 1000 1111 |

1568 = 1100010000

| | |
|---|---|
| 0000 0110 | 1001 0000 |

93 = 1011101

| |
|---|
| 1101 1101 |

3668 = 111001010100

| | |
|---|---|
| 0001 1100 | 0101 0100 |

195 = 11000011

| | |
|---|---|
| 0000 0001 | 1100 0011 |

1332 = 10100110100

| | |
|---|---|
| 0000 1010 | 1011 0100 |

255 = 11111111

| | |
|---|---|
| 0000 0001 | 1111 1111 |

Compressed -> Total is 14 bytes