

Mapper

```
class MAPPER
```

```
    method MAP(doc id, doc d)
        for all word w in doc d do
            EMIT(word w_id, count 1)
```

Reducer

```
class REDUCER
```

```
    method INITIALIZE()
        DICT <- new DICTIONARY

    method REDUCE(word w_id, counts [c1, c2, .....])
        sum <- 0
        for all count c in counts [c1, c2, .....] do
            sum <- sum + c
        ADD_TO_DICT(word w_id, count sum)
    method ADD_TO_DICT(word w_id, count sum)
        split word w_id and add it to dictionary DICT a list of year-wise count
    method CALCULATE()
        for each word w in DICT:
            MIN <- min(list of values for word w)
            MAX <- max(list of values for word w)
            AVG <- sum(list of values for word w) / 231.0
            EMIT(word w, MIN, MAX, AVG)
```