

MapReduce

Classroom example

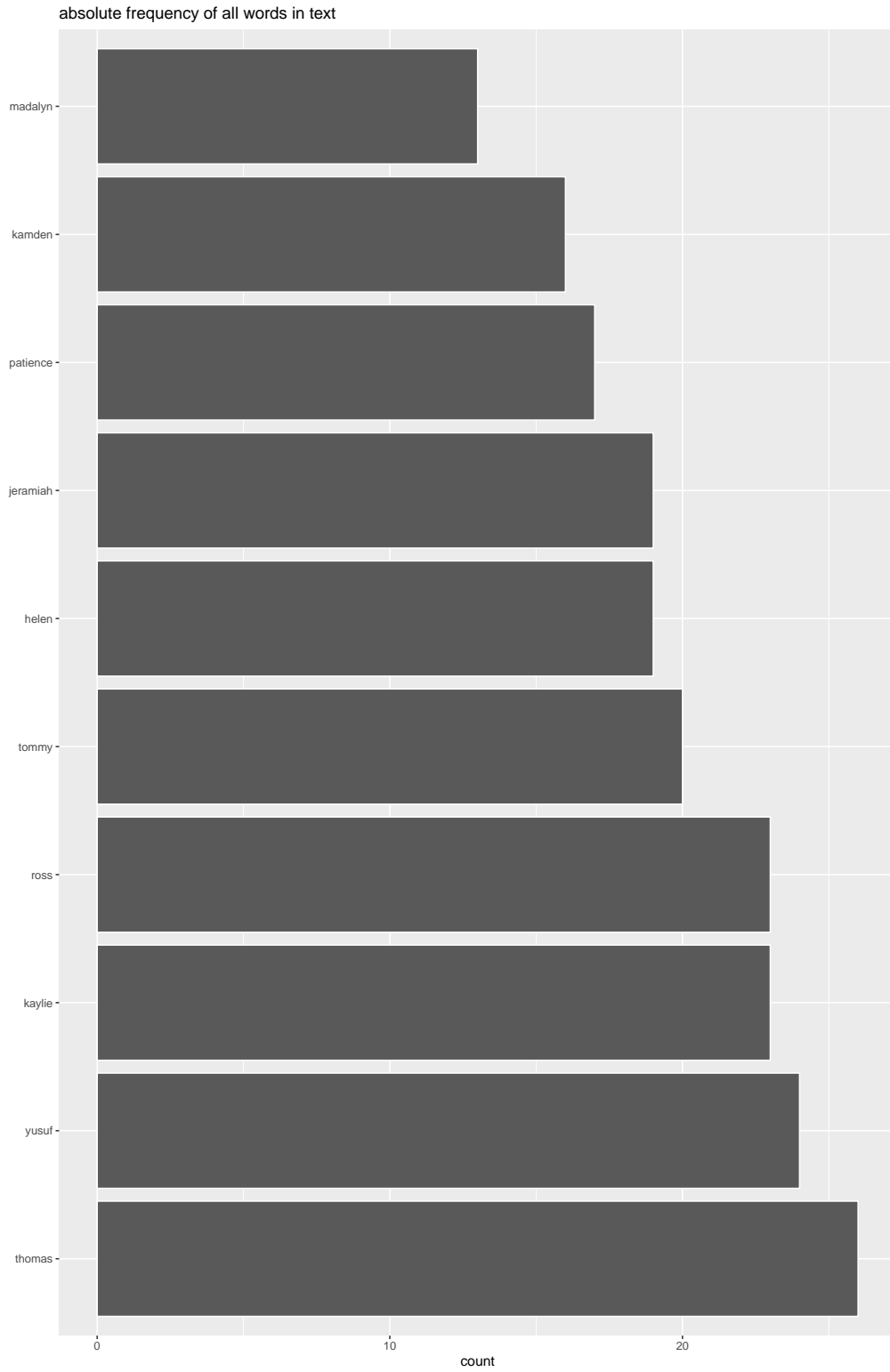
This is the file to create a map reduce classroom example. The setup is as follows

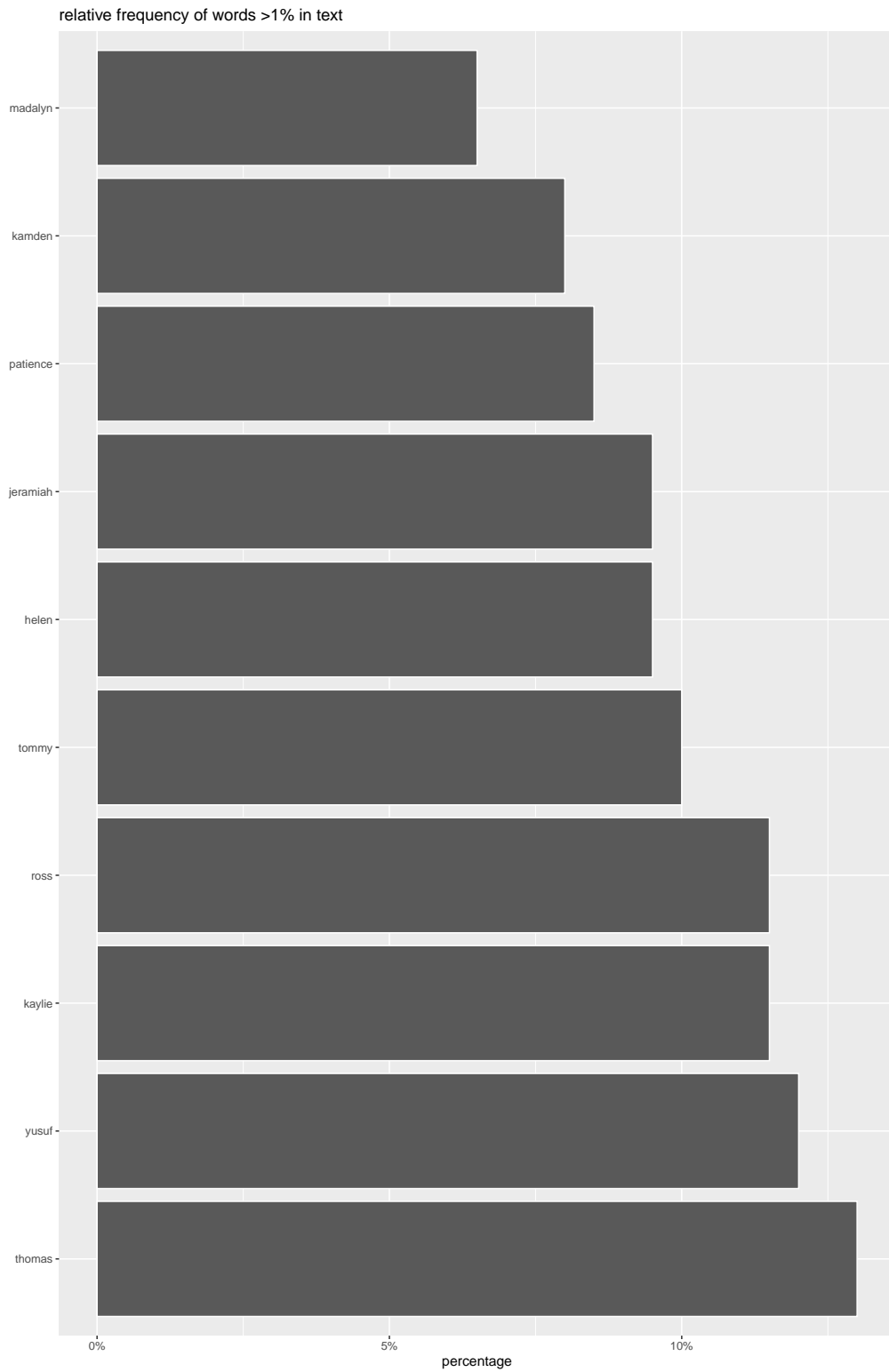
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student acts as the “reduce” server, collecting all the counts.
5. write the counts on the whiteboard including the times
6. which number of groups is the most efficient and which produces considerable overhead?

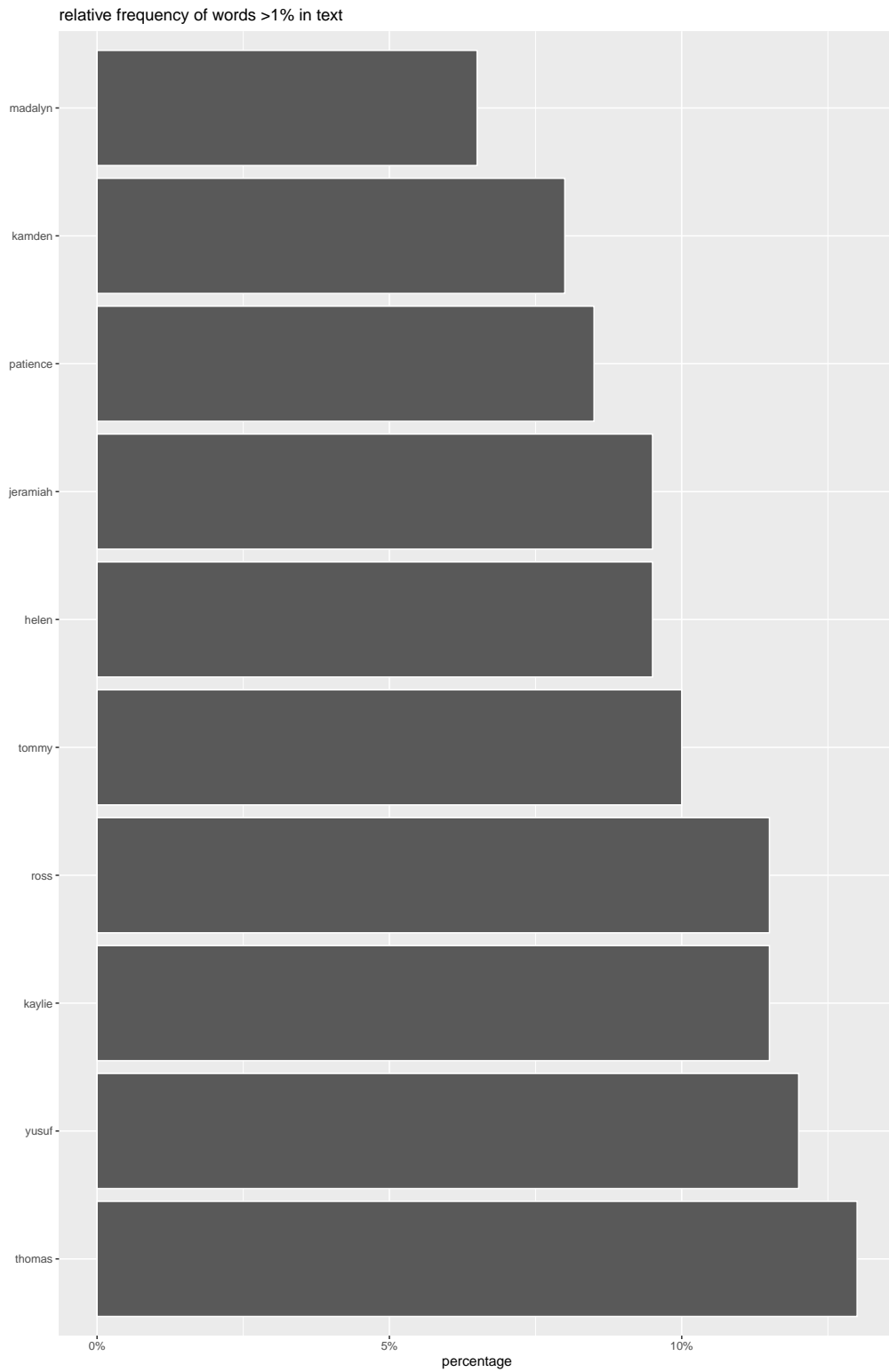
some summary statistics on the raw data

In total there are 200 words available.

| words | Freq | percentage | percentage_round |
|----------|------|------------|------------------|
| thomas | 26 | 13.00% | 13.00% |
| yusuf | 24 | 12.00% | 12.00% |
| kaylie | 23 | 11.50% | 11.50% |
| ross | 23 | 11.50% | 11.50% |
| tommy | 20 | 10.00% | 10.00% |
| helen | 19 | 9.50% | 9.50% |
| jeramiah | 19 | 9.50% | 9.50% |
| patience | 17 | 8.50% | 8.50% |
| kamden | 16 | 8.00% | 8.00% |
| madalyn | 13 | 6.50% | 6.50% |







The Raw data 01

Madalyn, Kamden, Madalyn, Tommy, Helen, Kaylie, Patience, Thomas, Madalyn, Kamden, Tommy, Yusuf, Madalyn, Madalyn, Yusuf, Kaylie, Madalyn, Madalyn, Thomas, Kaylie, Tommy, Jeramiah, Tommy, Helen, Madalyn, Helen, Thomas, Kaylie, Jeramiah, Tommy, Jeramiah, Helen, Ross , Patience, Helen, Kaylie, Kaylie, Thomas, Kamden, Thomas, Helen, Thomas, Patience, Jeramiah, Jeramiah, Patience, Ross , Yusuf, Ross , Patience, Ross , Tommy, Kamden, Helen, Helen, Ross , Ross , Kamden, Patience, Kaylie, Kaylie, Patience, Tommy, Yusuf, Jeramiah, Thomas, Jeramiah, Ross , Kaylie, Tommy, Thomas, Yusuf, Yusuf, Patience, Thomas, Tommy, Kaylie, Kaylie, Thomas, Ross , Kamden, Thomas, Ross , Helen, Tommy, Kaylie, Ross , Jeramiah, Thomas, Kaylie, Kaylie, Thomas, Tommy, Tommy, Madalyn, Jeramiah, Ross , Kamden, Madalyn, Kamden, Kamden, Helen, Tommy, Thomas, Tommy, Yusuf, Yusuf, Yusuf, Thomas, Tommy, Madalyn, Patience, Yusuf, Madalyn, Kamden, Helen, Yusuf, Jeramiah, Thomas, Ross , Jeramiah, Jeramiah, Patience, Ross , Patience, Ross , Jeramiah, Yusuf, Jeramiah, Yusuf, Kamden, Thomas, Yusuf, Helen, Thomas, Thomas, Ross , Jeramiah, Yusuf, Tommy, Helen, Madalyn, Thomas, Helen, Kamden, Kaylie, Patience, Kaylie, Kamden, Thomas, Tommy, Ross , Yusuf, Patience, Patience, Patience, Yusuf, Kaylie, Patience, Jeramiah, Kaylie, Thomas, Ross , Thomas, Kaylie, Yusuf, Jeramiah, Yusuf, Jeramiah, Yusuf, Ross , Yusuf, Kaylie, Thomas, Ross , Kaylie, Tommy, Yusuf, Ross , Kaylie, Helen, Thomas, Kamden, Yusuf, Ross , Helen, Tommy, Kamden, Ross , Patience, Yusuf, Thomas, Tommy, Helen, Kamden, Helen, Kaylie, Jeramiah, Helen, Ross

The Raw data 02

Madalyn, Kamden, Madalyn, Tommy, Helen, Kaylie, Patience, Thomas, Madalyn, Kamden, Tommy, Yusuf, Madalyn, Madalyn, Yusuf, Kaylie, Madalyn, Madalyn, Thomas, Kaylie, Tommy, Jeramiah, Tommy, Helen, Madalyn, Helen, Thomas, Kaylie, Jeramiah, Tommy, Jeramiah, Helen, Ross , Patience, Helen, Kaylie, Kaylie, Thomas, Kamden, Thomas, Helen, Thomas, Patience, Jeramiah, Jeramiah, Patience, Ross , Yusuf, Ross , Patience, Ross , Tommy, Kamden, Helen, Helen, Ross , Ross , Kamden, Patience, Kaylie, Kaylie, Patience, Tommy, Yusuf, Jeramiah, Thomas, Jeramiah, Ross , Kaylie, Tommy, Thomas, Yusuf, Yusuf, Patience, Thomas, Tommy, Kaylie, Kaylie, Thomas, Ross , Kamden, Thomas, Ross , Helen, Tommy, Kaylie, Ross , Jeramiah, Thomas, Kaylie, Kaylie, Thomas, Tommy, Tommy, Madalyn, Jeramiah, Ross , Kamden, Madalyn, Kamden, Kamden, Helen, Tommy, Thomas, Tommy, Yusuf, Yusuf, Yusuf, Thomas, Tommy, Madalyn, Patience, Yusuf, Madalyn, Kamden, Helen, Yusuf, Jeramiah, Thomas, Ross , Jeramiah, Jeramiah, Patience, Ross , Patience, Ross , Jeramiah, Yusuf, Jeramiah, Yusuf, Kamden, Thomas, Yusuf, Helen, Thomas, Thomas, Ross , Jeramiah, Yusuf, Tommy, Helen, Madalyn, Thomas, Helen, Kamden, Kaylie, Patience, Kaylie, Kamden, Thomas, Tommy, Ross , Yusuf, Patience, Patience, Patience, Yusuf, Kaylie, Patience, Jeramiah, Kaylie, Thomas, Ross , Thomas, Kaylie, Yusuf, Jeramiah, Yusuf, Jeramiah, Yusuf, Ross , Yusuf, Kaylie, Thomas, Ross , Kaylie, Tommy, Yusuf, Ross , Kaylie, Helen, Thomas, Kamden, Yusuf, Ross , Helen, Tommy, Kamden, Ross , Patience, Yusuf, Thomas, Tommy, Helen, Kamden, Helen, Kaylie, Jeramiah, Helen, Ross

The Raw data 03

Madalyn, Kamden, Madalyn, Tommy, Helen, Kaylie, Patience, Thomas, Madalyn, Kamden, Tommy, Yusuf, Madalyn, Madalyn, Yusuf, Kaylie, Madalyn, Madalyn, Thomas, Kaylie, Tommy, Jeramiah, Tommy, Helen, Madalyn, Helen, Thomas, Kaylie, Jeramiah, Tommy, Jeramiah, Helen, Ross , Patience, Helen, Kaylie, Kaylie, Thomas, Kamden, Thomas, Helen, Thomas, Patience, Jeramiah, Jeramiah, Patience, Ross , Yusuf, Ross , Patience, Ross , Tommy, Kamden, Helen, Helen, Ross , Ross , Kamden, Patience, Kaylie, Kaylie, Patience, Tommy, Yusuf, Jeramiah, Thomas, Jeramiah, Ross , Kaylie, Tommy, Thomas, Yusuf, Yusuf, Patience, Thomas, Tommy, Kaylie, Kaylie, Thomas, Ross , Kamden, Thomas, Ross , Helen, Tommy, Kaylie, Ross , Jeramiah, Thomas, Kaylie, Kaylie, Thomas, Tommy, Tommy, Madalyn, Jeramiah, Ross , Kamden, Madalyn, Kamden, Kamden, Helen, Tommy, Thomas, Tommy, Yusuf, Yusuf, Yusuf, Thomas, Tommy, Madalyn, Patience, Yusuf, Madalyn, Kamden, Helen, Yusuf, Jeramiah, Thomas, Ross , Jeramiah, Jeramiah, Patience, Ross , Patience, Ross , Jeramiah, Yusuf, Jeramiah, Yusuf, Kamden, Thomas, Yusuf, Helen, Thomas, Thomas, Ross , Jeramiah, Yusuf, Tommy, Helen, Madalyn, Thomas, Helen, Kamden, Kaylie, Patience, Kaylie, Kamden, Thomas, Tommy, Ross , Yusuf, Patience, Patience, Patience, Yusuf, Kaylie, Patience, Jeramiah, Kaylie, Thomas, Ross , Thomas, Kaylie, Yusuf, Jeramiah, Yusuf, Jeramiah, Yusuf, Ross , Yusuf, Kaylie, Thomas, Ross , Kaylie, Tommy, Yusuf, Ross , Kaylie, Helen, Thomas, Kamden, Yusuf, Ross , Helen, Tommy, Kamden, Ross , Patience, Yusuf, Thomas, Tommy, Helen, Kamden, Helen, Kaylie, Jeramiah, Helen, Ross

The Raw data 04

Madalyn, Kamden, Madalyn, Tommy, Helen, Kaylie, Patience, Thomas, Madalyn, Kamden, Tommy, Yusuf, Madalyn, Madalyn, Yusuf, Kaylie, Madalyn, Madalyn, Thomas, Kaylie, Tommy, Jeramiah, Tommy, Helen, Madalyn, Helen, Thomas, Kaylie, Jeramiah, Tommy, Jeramiah, Helen, Ross , Patience, Helen, Kaylie, Kaylie, Thomas, Kamden, Thomas, Helen, Thomas, Patience, Jeramiah, Jeramiah, Patience, Ross , Yusuf, Ross , Patience, Ross , Tommy, Kamden, Helen, Helen, Ross , Ross , Kamden, Patience, Kaylie, Kaylie, Patience, Tommy, Yusuf, Jeramiah, Thomas, Jeramiah, Ross , Kaylie, Tommy, Thomas, Yusuf, Yusuf, Patience, Thomas, Tommy, Kaylie, Kaylie, Thomas, Ross , Kamden, Thomas, Ross , Helen, Tommy, Kaylie, Ross , Jeramiah, Thomas, Kaylie, Kaylie, Thomas, Tommy, Tommy, Madalyn, Jeramiah, Ross , Kamden, Madalyn, Kamden, Kamden, Helen, Tommy, Thomas, Tommy, Yusuf, Yusuf, Yusuf, Thomas, Tommy, Madalyn, Patience, Yusuf, Madalyn, Kamden, Helen, Yusuf, Jeramiah, Thomas, Ross , Jeramiah, Jeramiah, Patience, Ross , Patience, Ross , Jeramiah, Yusuf, Jeramiah, Yusuf, Kamden, Thomas, Yusuf, Helen, Thomas, Thomas, Ross , Jeramiah, Yusuf, Tommy, Helen, Madalyn, Thomas, Helen, Kamden, Kaylie, Patience, Kaylie, Kamden, Thomas, Tommy, Ross , Yusuf, Patience, Patience, Patience, Yusuf, Kaylie, Patience, Jeramiah, Kaylie, Thomas, Ross , Thomas, Kaylie, Yusuf, Jeramiah, Yusuf, Jeramiah, Yusuf, Ross , Yusuf, Kaylie, Thomas, Ross , Kaylie, Tommy, Yusuf, Ross , Kaylie, Helen, Thomas, Kamden, Yusuf, Ross , Helen, Tommy, Kamden, Ross , Patience, Yusuf, Thomas, Tommy, Helen, Kamden, Helen, Kaylie, Jeramiah, Helen, Ross

Two Groups

Part 1 of 2 (100 words)

madalyn madalyn helen patience madalyn tommy madalyn yusuf madalyn thomas tommy
tommy madalyn thomas jeramiah jeramiah ross helen kaylie kamden helen patience jeramiah
ross ross ross kamden helen ross patience kaylie tommy jeramiah jeramiah kaylie thomas yusuf
thomas kaylie thomas kamden ross tommy ross thomas kaylie tommy madalyn ross madalyn
kamden tommy tommy yusuf thomas madalyn yusuf kamden yusuf thomas jeramiah patience
patience jeramiah jeramiah kamden yusuf thomas ross yusuf helen thomas kamden patience
kamden tommy yusuf patience yusuf patience kaylie ross kaylie jeramiah jeramiah ross kaylie
ross tommy ross helen kamden ross tommy ross yusuf tommy kamden kaylie helen

Part 2 of 2 (100 words)

kamden tommy kaylie thomas kamden yusuf madalyn kaylie madalyn kaylie jeramiah helen
helen kaylie tommy helen patience kaylie thomas thomas thomas jeramiah patience yusuf pa-
tience tommy helen ross kamden kaylie patience yusuf thomas ross tommy yusuf patience
tommy kaylie ross thomas helen kaylie jeramiah kaylie thomas tommy jeramiah kamden kam-
den helen thomas yusuf yusuf tommy patience madalyn helen jeramiah ross jeramiah ross ross
yusuf yusuf thomas helen thomas jeramiah tommy madalyn helen kaylie kaylie thomas ross
patience patience kaylie jeramiah thomas thomas yusuf yusuf yusuf yusuf thomas kaylie yusuf
kaylie thomas yusuf helen kamden patience thomas helen helen jeramiah ross

Four Groups

Part 1 of 4 (50 words)

madalyn helen madalyn madalyn madalyn tommy madalyn jeramiah ross kaylie helen jeramiah
ross kamden ross kaylie jeramiah kaylie yusuf kaylie kamden tommy thomas tommy ross kam-
den tommy thomas yusuf yusuf jeramiah patience jeramiah yusuf ross helen kamden kamden
yusuf yusuf kaylie kaylie jeramiah kaylie tommy helen ross ross tommy kaylie

Part 2 of 4 (50 words)

kamden kaylie kamden madalyn madalyn jeramiah helen tommy patience thomas thomas
patience patience helen kamden patience thomas tommy patience kaylie thomas kaylie kaylie
tommy kamden helen yusuf tommy madalyn jeramiah jeramiah ross yusuf helen jeramiah
madalyn kaylie thomas patience kaylie thomas yusuf yusuf thomas yusuf thomas helen patience
helen jeramiah

Part 3 of 4 (50 words)

madalyn patience tommy yusuf thomas tommy thomas jeramiah helen kamden patience ross
ross helen patience tommy jeramiah thomas thomas thomas ross ross kaylie madalyn mada-
lyn tommy yusuf madalyn kamden thomas patience jeramiah kamden thomas yusuf thomas
patience tommy patience patience ross jeramiah ross ross ross kamden tommy yusuf kamden
helen

Part 4 of 4 (50 words)

tommy thomas yusuf kaylie kaylie helen kaylie helen kaylie thomas jeramiah yusuf tommy
ross kaylie yusuf ross yusuf tommy ross helen jeramiah thomas jeramiah kamden thomas
yusuf patience helen ross ross yusuf thomas thomas tommy helen kaylie ross patience jeramiah
thomas yusuf yusuf kaylie kaylie yusuf kamden thomas helen ross

Five Groups

Part 1 of 5 (40 words)

madalyn kaylie tommy kaylie tommy helen jeramiah kaylie helen patience ross ross kaylie
thomas thomas tommy kamden kaylie kaylie jeramiah kamden yusuf madalyn helen jeramiah
ross kamden thomas helen kaylie tommy patience kaylie yusuf ross kaylie helen helen yusuf
helen

Part 2 of 5 (40 words)

kamden patience yusuf madalyn jeramiah thomas helen kaylie thomas ross tommy ross patience
jeramiah yusuf kaylie thomas ross thomas ross helen yusuf patience yusuf jeramiah jeramiah
thomas ross madalyn patience ross yusuf thomas jeramiah yusuf tommy thomas tommy thomas
kaylie

Part 3 of 5 (40 words)

madalyn thomas madalyn madalyn tommy kaylie ross thomas patience yusuf kamden kamden
tommy ross yusuf kaylie ross jeramiah tommy kamden tommy yusuf yusuf jeramiah patience
yusuf yusuf jeramiah thomas kaylie yusuf kaylie ross yusuf kaylie yusuf kamden kamden tommy
jeramiah

Part 4 of 5 (40 words)

tommy madalyn madalyn thomas helen jeramiah patience kamden jeramiah ross helen patience
yusuf kaylie patience thomas helen thomas tommy madalyn thomas thomas madalyn thomas
ross jeramiah helen yusuf helen kamden patience patience thomas jeramiah thomas ross yusuf
ross helen helen

Part 5 of 5 (40 words)

helen kamden yusuf kaylie madalyn tommy helen thomas jeramiah patience helen kaylie
jeramiah tommy thomas ross tommy kaylie madalyn kamden tommy tommy kamden ross
patience yusuf thomas tommy kamden thomas patience jeramiah kaylie yusuf ross kaylie ross
patience kamden ross

Ten Groups

Part 1 of 10 (20 words)

madalyn tommy tommy jeramiah helen ross kaylie thomas kamden kaylie kamden madalyn
jeramiah kamden helen tommy kaylie ross helen yusuf

Part 2 of 10 (20 words)

kamden yusuf jeramiah helen thomas tommy patience yusuf thomas thomas helen patience
jeramiah thomas madalyn ross thomas yusuf thomas thomas

Part 3 of 10 (20 words)

madalyn madalyn tommy ross patience kamden tommy yusuf ross tommy tommy yusuf patience yusuf thomas yusuf ross kaylie kamden tommy

Part 4 of 10 (20 words)

tommy madalyn helen patience jeramiah helen yusuf patience helen tommy thomas madalyn
ross helen helen patience thomas thomas yusuf helen

Part 5 of 10 (20 words)

helen yusuf madalyn helen jeramiah helen jeramiah thomas tommy madalyn tommy kamden
patience thomas kamden patience kaylie ross ross kamden

Part 6 of 10 (20 words)

kaylie kaylie helen kaylie patience ross thomas tommy kaylie jeramiah yusuf helen ross thomas
kaylie patience yusuf kaylie helen helen

Part 7 of 10 (20 words)

patience madalyn thomas kaylie ross ross jeramiah kaylie ross ross yusuf yusuf jeramiah ross
patience yusuf jeramiah tommy tommy kaylie

Part 8 of 10 (20 words)

thomas madalyn kaylie thomas yusuf kamden ross kaylie jeramiah kamden yusuf jeramiah
yusuf jeramiah kaylie kaylie yusuf yusuf kamden jeramiah

Part 9 of 10 (20 words)

madalyn thomas jeramiah kamden ross patience kaylie thomas thomas madalyn thomas
thomas jeramiah yusuf kamden patience jeramiah ross ross helen

Part 10 of 10 (20 words)

kamden kaylie tommy thomas patience kaylie tommy ross kaylie kamden tommy ross yusuf
tommy thomas jeramiah yusuf kaylie patience ross

Twenty Groups

Part 1 of 20 (10 words)

madalyn tommy helen kaylie kamden kamden jeramiah helen kaylie helen

Part 2 of 20 (10 words)

kamden jeramiah thomas patience thomas helen jeramiah madalyn thomas thomas

Part 3 of 20 (10 words)

madalyn tommy patience tommy ross tommy patience thomas ross kamden

Part 4 of 20 (10 words)

tommy helen jeramiah yusuf helen thomas ross helen thomas yusuf

Part 5 of 20 (10 words)

helen madalyn jeramiah jeramiah tommy tommy patience kamden kaylie ross

Part 6 of 20 (10 words)

kaylie helen patience thomas kaylie yusuf ross kaylie yusuf helen

Part 7 of 20 (10 words)

patience thomas ross jeramiah ross yusuf jeramiah patience jeramiah tommy

Part 8 of 20 (10 words)

thomas kaylie yusuf ross jeramiah yusuf yusuf kaylie yusuf kamden

Part 9 of 20 (10 words)

madalyn jeramiah ross kaylie thomas thomas jeramiah kamden jeramiah ross

Part 10 of 20 (10 words)

kamden tommy patience tommy kaylie tommy yusuf thomas yusuf patience

Part 11 of 20 (10 words)

tommy jeramiah ross thomas kaylie madalyn kamden tommy ross yusuf

Part 12 of 20 (10 words)

yusuf helen tommy yusuf thomas patience thomas ross yusuf thomas

Part 13 of 20 (10 words)

madalyn ross kamden yusuf tommy yusuf yusuf yusuf kaylie tommy

Part 14 of 20 (10 words)

madalyn patience helen patience tommy madalyn helen patience thomas helen

Part 15 of 20 (10 words)

yusuf helen helen thomas madalyn kamden thomas patience ross kamden

Part 16 of 20 (10 words)

kaylie kaylie ross tommy jeramiah helen thomas patience kaylie helen

Part 17 of 20 (10 words)

madalyn kaylie ross kaylie ross yusuf ross yusuf tommy kaylie

Part 18 of 20 (10 words)

madalyn thomas kamden kaylie kamden jeramiah jeramiah kaylie yusuf jeramiah

Part 19 of 20 (10 words)

thomas kamden patience thomas madalyn thomas yusuf patience ross helen

Part 20 of 20 (10 words)

kaylie thomas kaylie ross kamden ross tommy jeramiah kaylie ross