

MapReduce

Classroom example

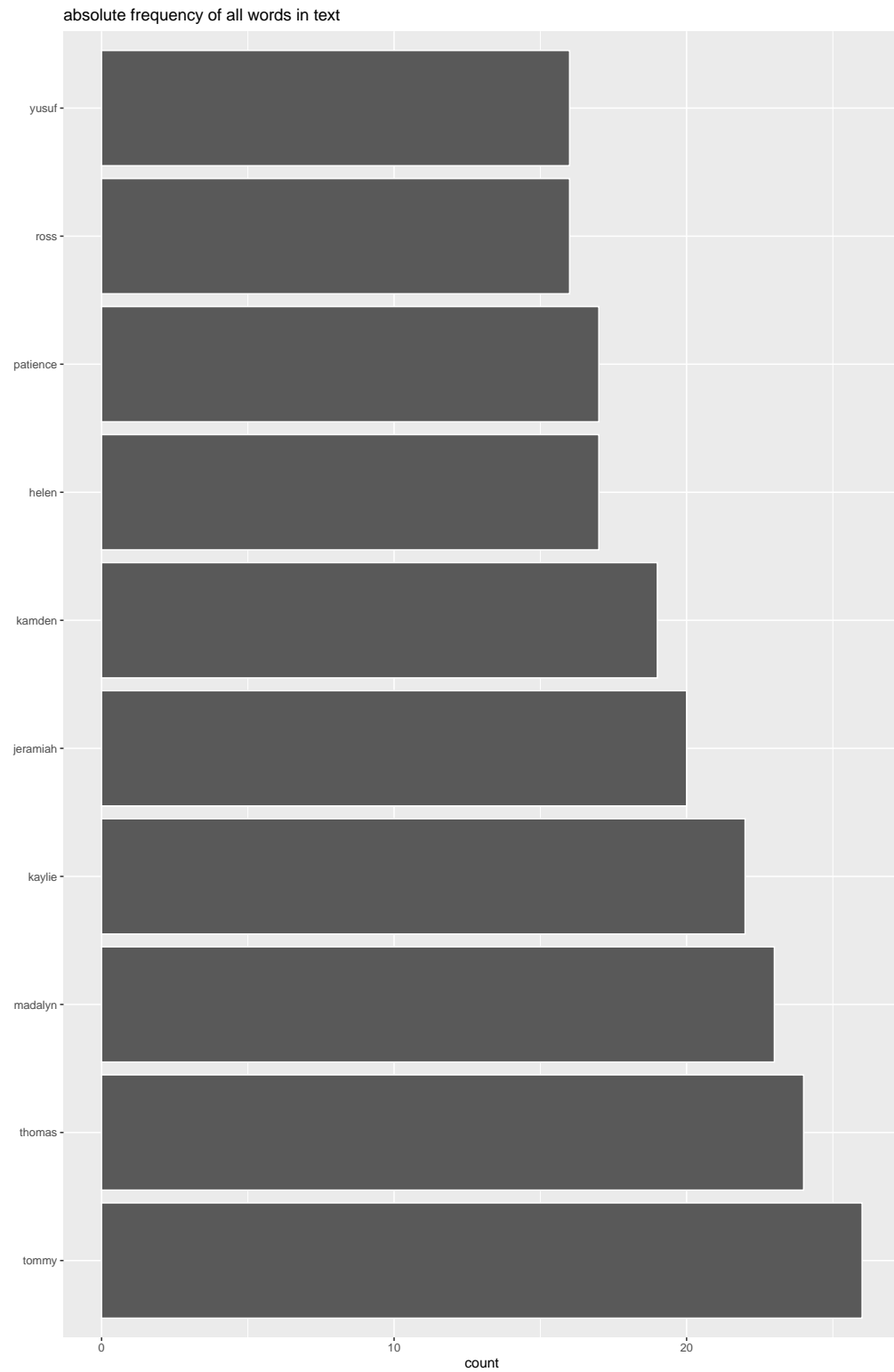
This is the file to create a map reduce classroom example. The setup is as follows

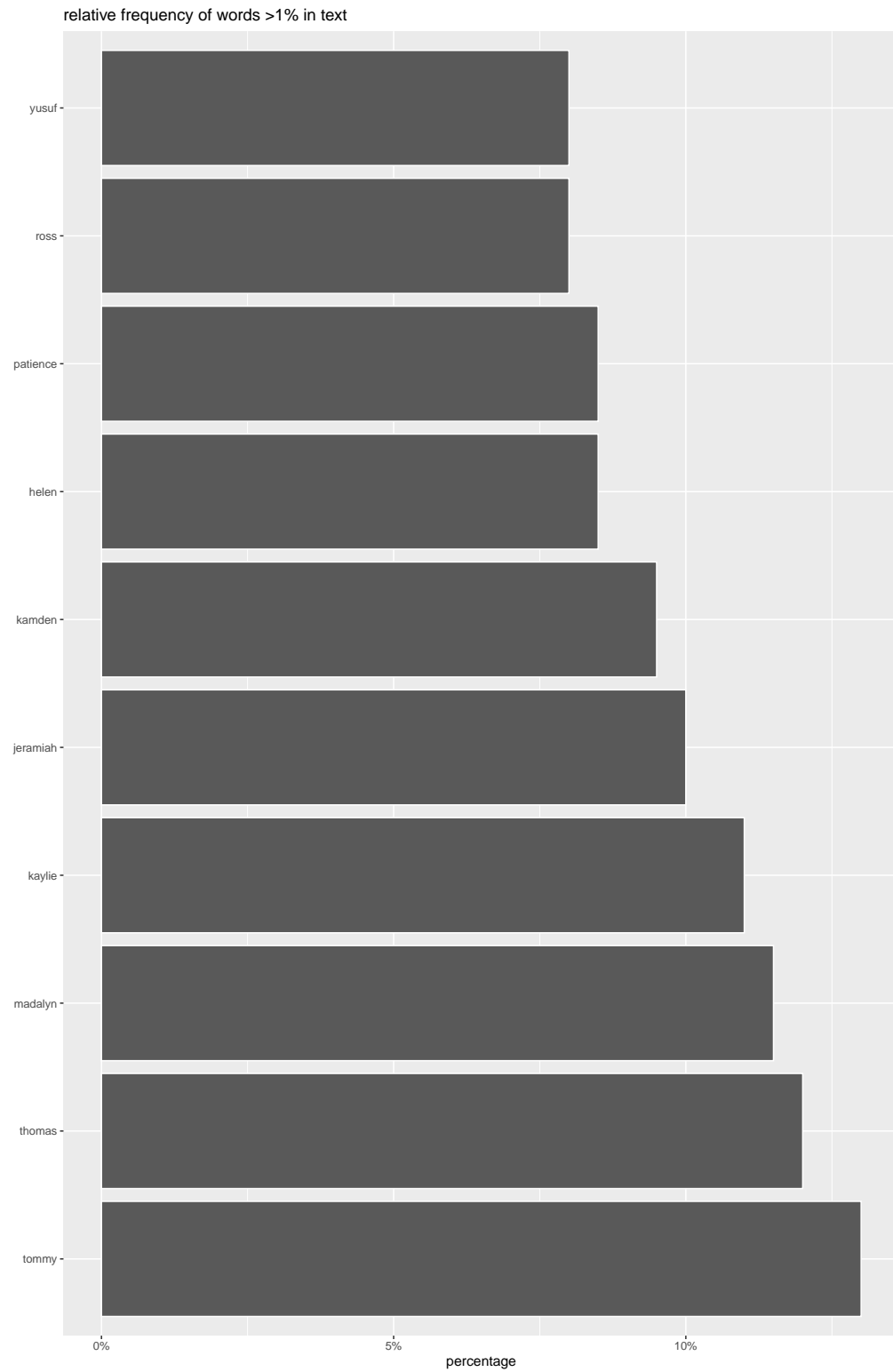
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student 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?

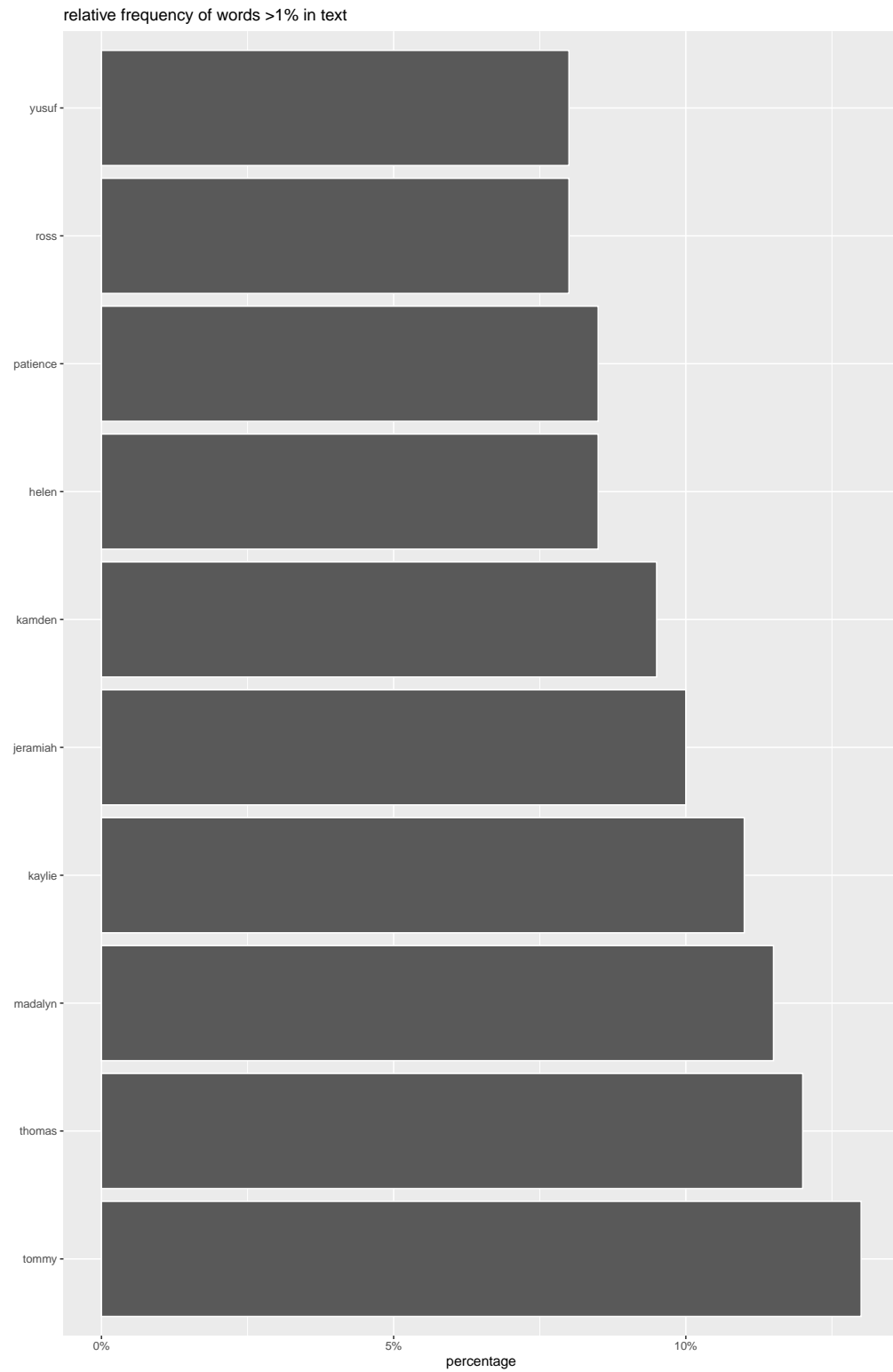
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
tommy	26	13.00%	13.00%
thomas	24	12.00%	12.00%
madalyn	23	11.50%	11.50%
kaylie	22	11.00%	11.00%
jeramiah	20	10.00%	10.00%
kamden	19	9.50%	9.50%
helen	17	8.50%	8.50%
patience	17	8.50%	8.50%
ross	16	8.00%	8.00%
yusuf	16	8.00%	8.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

tommy kaylie ross thomas ross thomas helen kaylie kamden helen

Part 2 of 20 (10 words)

helen kaylie madalyn kamden tommy ross kaylie thomas helen jeramiah

Part 3 of 20 (10 words)

helen tommy ross tommy jeramiah kaylie madalyn tommy jeramiah yusuf

Part 4 of 20 (10 words)

thomas patience madalyn helen yusuf patience ross ross kaylie tommy

Part 5 of 20 (10 words)

patience jeramiah madalyn yusuf thomas tommy thomas kamden thomas kaylie

Part 6 of 20 (10 words)

patience madalyn thomas kaylie madalyn thomas madalyn thomas tommy yusuf

Part 7 of 20 (10 words)

yusuf jeramiah jeramiah thomas madalyn madalyn madalyn patience tommy kaylie

Part 8 of 20 (10 words)

madalyn kamden madalyn jeramiah jeramiah tommy patience kamden patience tommy

Part 9 of 20 (10 words)

helen jeramiah madalyn yusuf patience helen kamden ross thomas kamden

Part 10 of 20 (10 words)

thomas kamden jeramiah helen yusuf patience thomas tommy ross patience

Part 11 of 20 (10 words)

kaylie thomas yusuf jeramiah yusuf jeramiah madalyn yusuf patience patience

Part 12 of 20 (10 words)

kamden madalyn tommy thomas ross tommy jeramiah kaylie yusuf thomas

Part 13 of 20 (10 words)

madalyn kaylie helen yusuf jeramiah kamden helen kaylie madalyn tommy

Part 14 of 20 (10 words)

kaylie helen kamden tommy patience thomas kamden kamden kamden madalyn

Part 15 of 20 (10 words)

kamden patience tommy jeramiah helen kaylie tommy kamden helen tommy

Part 16 of 20 (10 words)

kaylie jeramiah patience tommy ross tommy ross yusuf madalyn jeramiah

Part 17 of 20 (10 words)

kaylie patience thomas kaylie patience tommy jeramiah thomas kamden tommy

Part 18 of 20 (10 words)

tommy yusuf ross madalyn ross kaylie madalyn jeramiah thomas helen

Part 19 of 20 (10 words)

kamden kamden yusuf thomas madalyn helen ross ross tommy ross

Part 20 of 20 (10 words)

kaylie yusuf jeramiah kaylie thomas thomas kaylie helen tommy madalyn