

MapReduce

Classroom example

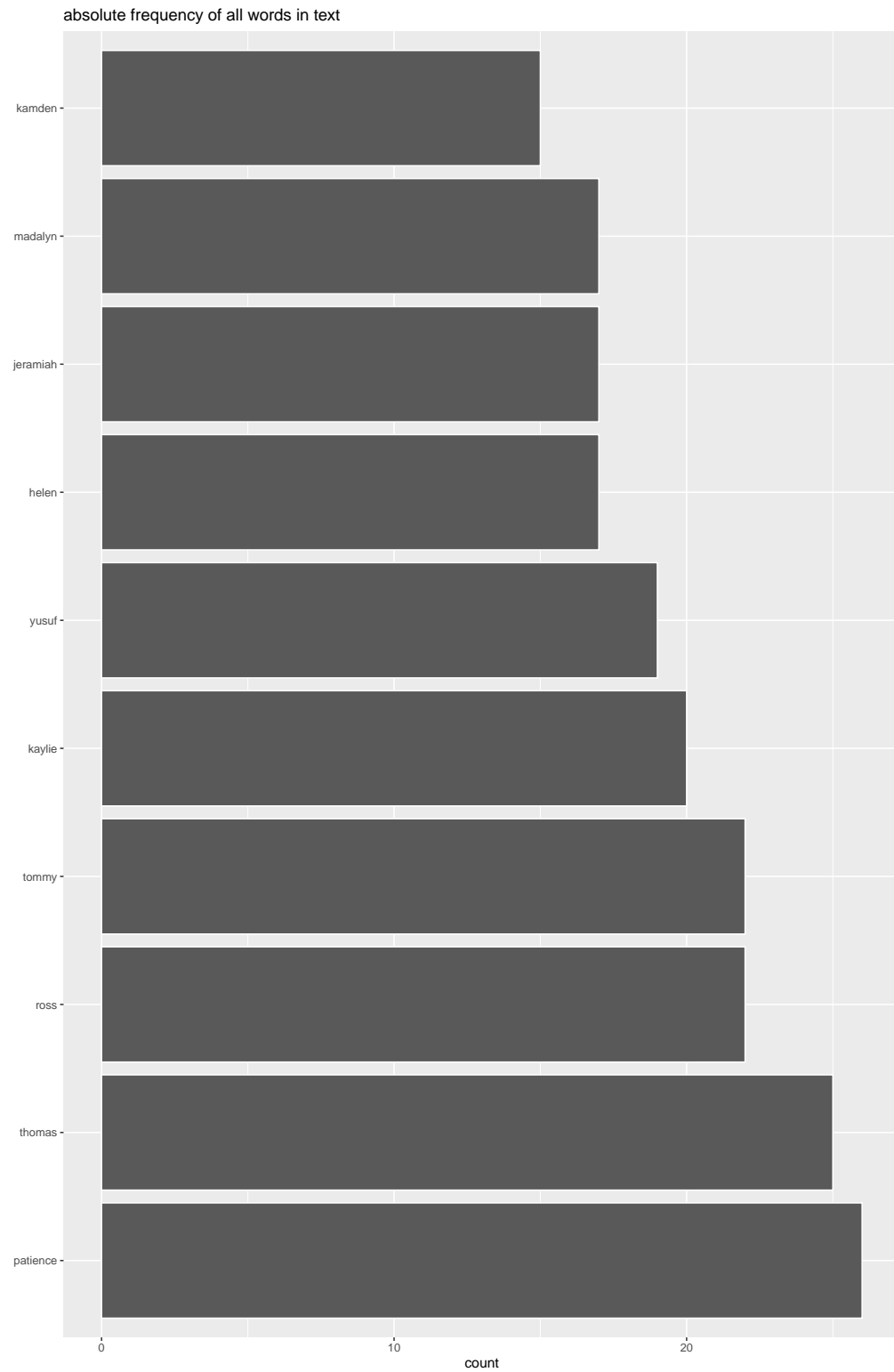
This is the file to create a map reduce classroom example. The setup is as follows

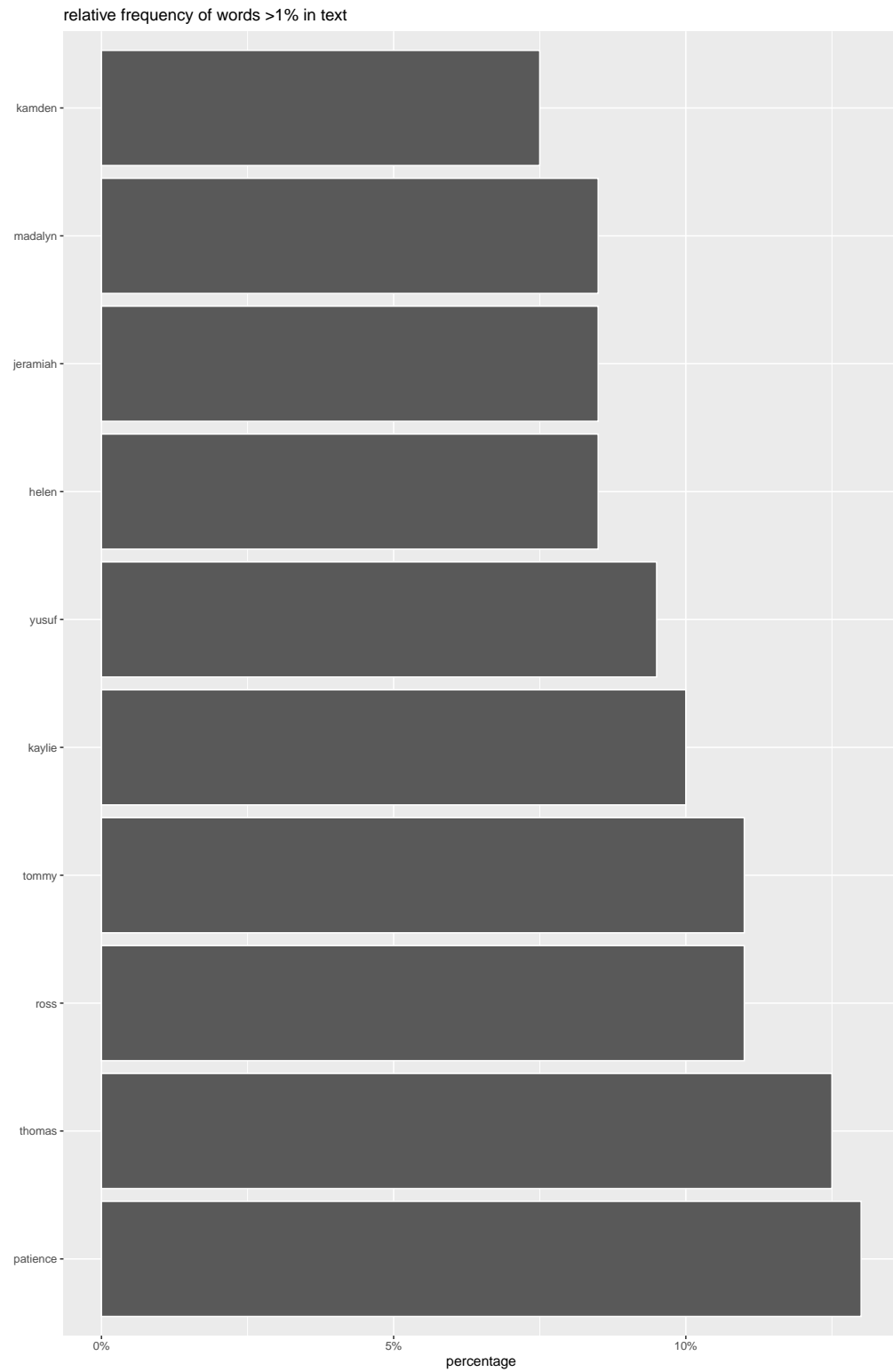
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

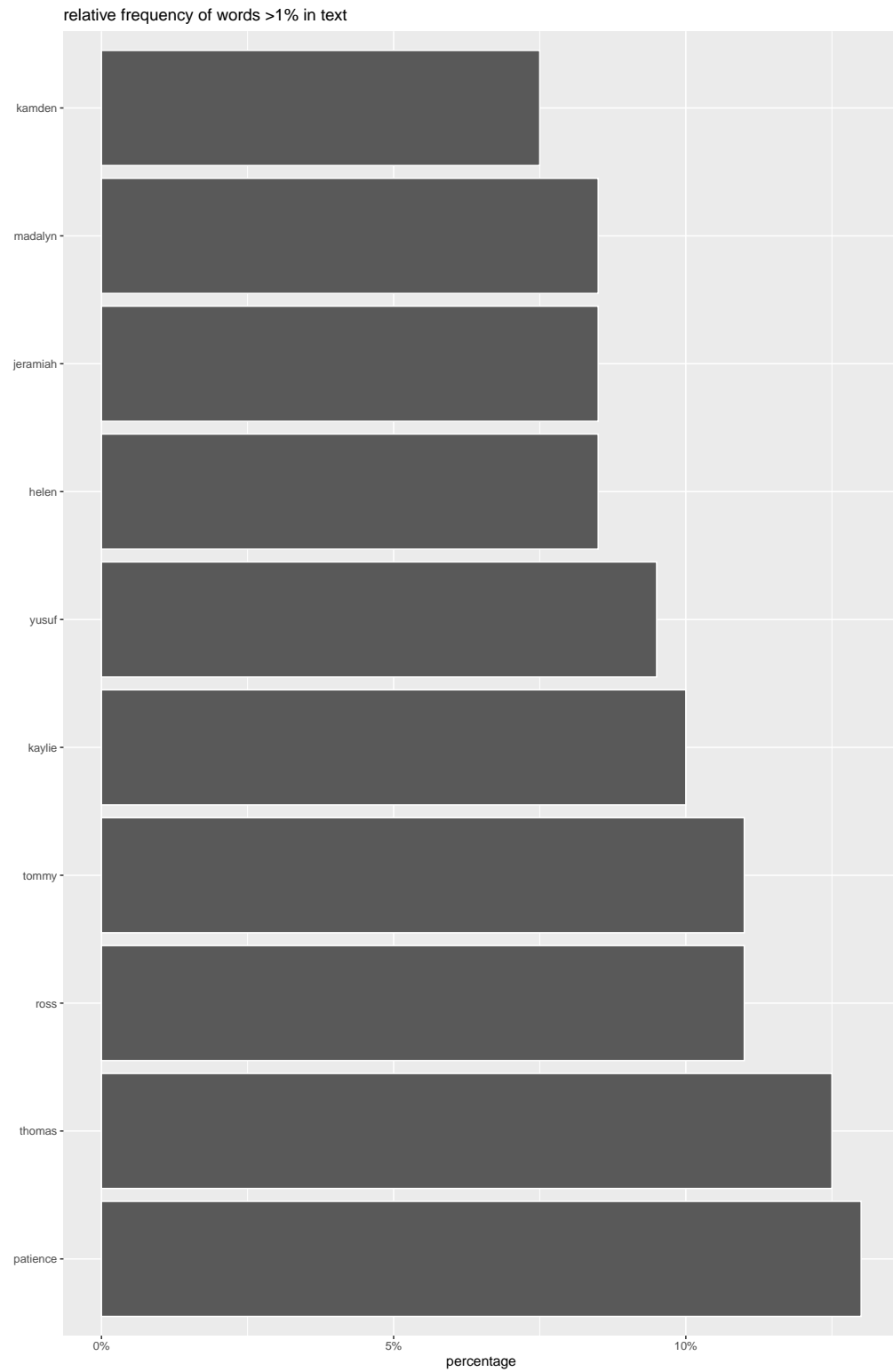
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
patience	26	13.00%	13.00%
thomas	25	12.50%	12.50%
ross	22	11.00%	11.00%
tommy	22	11.00%	11.00%
kaylie	20	10.00%	10.00%
yusuf	19	9.50%	9.50%
helen	17	8.50%	8.50%
jeramiah	17	8.50%	8.50%
madalyn	17	8.50%	8.50%
kamden	15	7.50%	7.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

jeramiah helen kamden thomas jeramiah jeramiah ross jeramiah helen thomas thomas tommy
patience helen kamden ross helen patience ross patience

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

kaylie madalyn thomas yusuf tommy patience ross jeramiah yusuf patience

Part 2 of 20 (10 words)

ross kaylie ross kamden patience kamden kaylie kaylie ross ross

Part 3 of 20 (10 words)

jeramiah kamden jeramiah ross helen thomas patience kamden helen ross

Part 4 of 20 (10 words)

yusuf helen patience tommy kaylie thomas thomas yusuf madalyn ross

Part 5 of 20 (10 words)

tommy ross patience madalyn tommy yusuf madalyn helen patience kamden

Part 6 of 20 (10 words)

tommy tommy ross thomas yusuf yusuf kaylie patience jeramiah ross

Part 7 of 20 (10 words)

jeramiah patience jeramiah patience tommy tommy patience madalyn tommy kamden

Part 8 of 20 (10 words)

thomas jeramiah kamden helen kaylie thomas tommy patience yusuf ross

Part 9 of 20 (10 words)

kaylie patience madalyn yusuf madalyn patience yusuf ross yusuf patience

Part 10 of 20 (10 words)

thomas ross ross patience tommy thomas helen helen tommy madalyn

Part 11 of 20 (10 words)

thomas kaylie ross jeramiah kaylie kamden tommy tommy patience thomas

Part 12 of 20 (10 words)

thomas tommy kamden kaylie madalyn jeramiah helen tommy jeramiah helen

Part 13 of 20 (10 words)

helen thomas jeramiah jeramiah thomas tommy helen ross patience patience

Part 14 of 20 (10 words)

tommy tommy jeramiah ross kaylie patience kamden yusuf patience thomas

Part 15 of 20 (10 words)

thomas yusuf kaylie ross kaylie thomas yusuf kaylie kamden kaylie

Part 16 of 20 (10 words)

jeramiah patience yusuf tommy patience kaylie patience thomas ross tommy

Part 17 of 20 (10 words)

thomas helen kamden thomas thomas helen jeramiah kaylie yusuf kamden

Part 18 of 20 (10 words)

helen patience thomas madalyn madalyn ross helen madalyn patience helen

Part 19 of 20 (10 words)

madalyn kaylie madalyn kaylie madalyn kamden kamden thomas tommy yusuf

Part 20 of 20 (10 words)

ross thomas madalyn helen thomas madalyn yusuf jeramiah yusuf jeramiah