

MapReduce

Classroom example

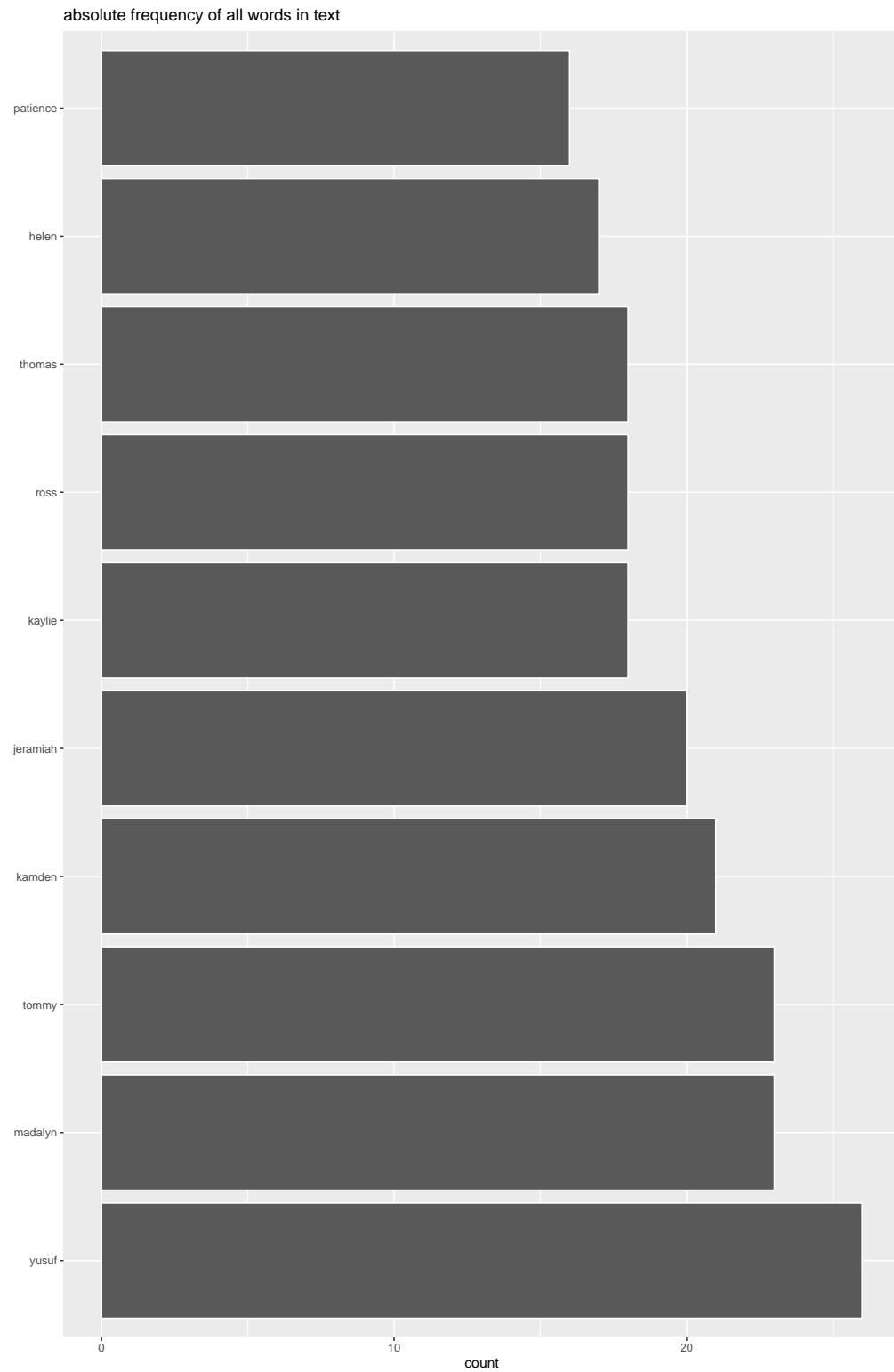
This is the file to create a map reduce classroom example. The setup is as follows

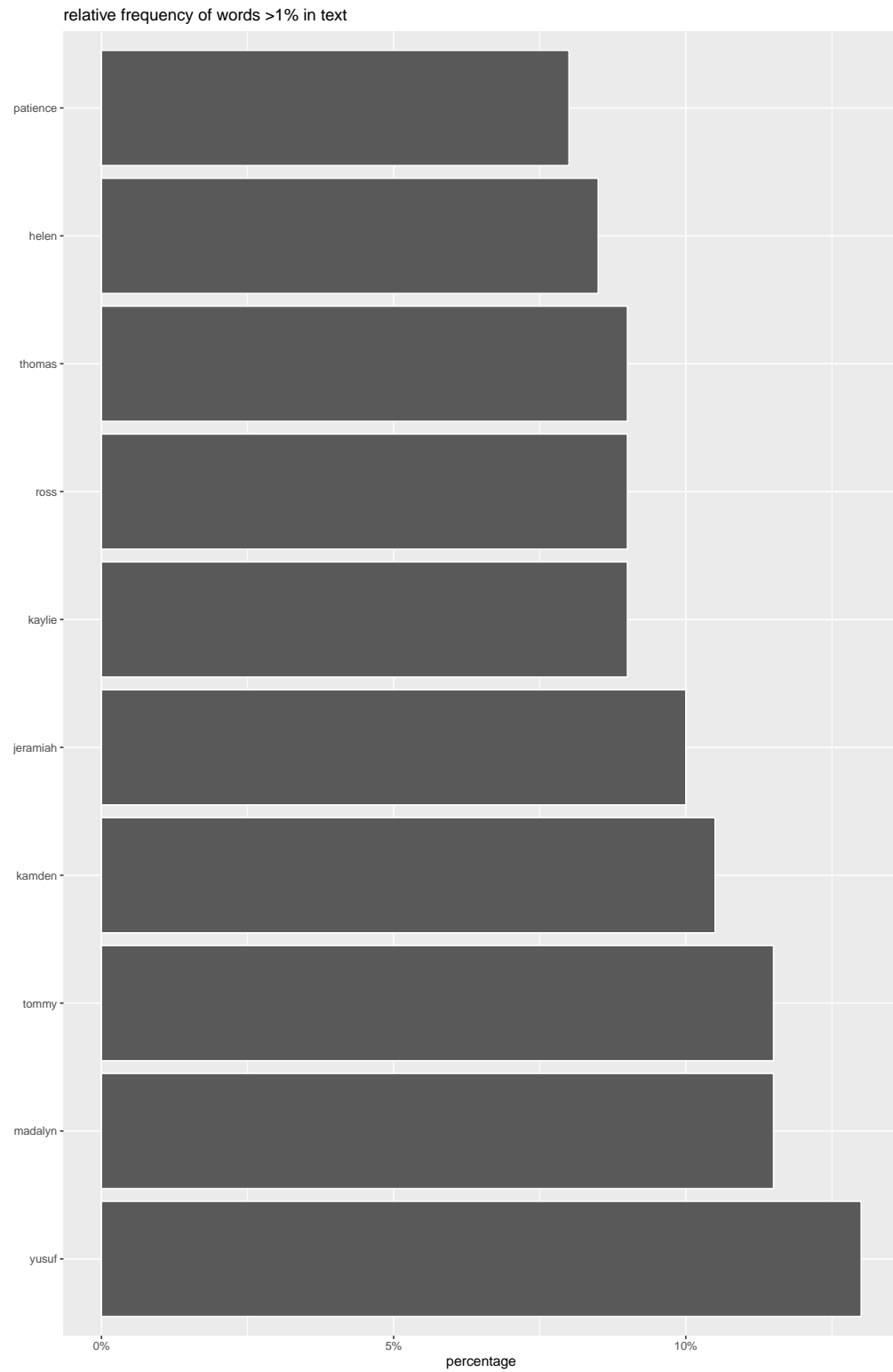
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

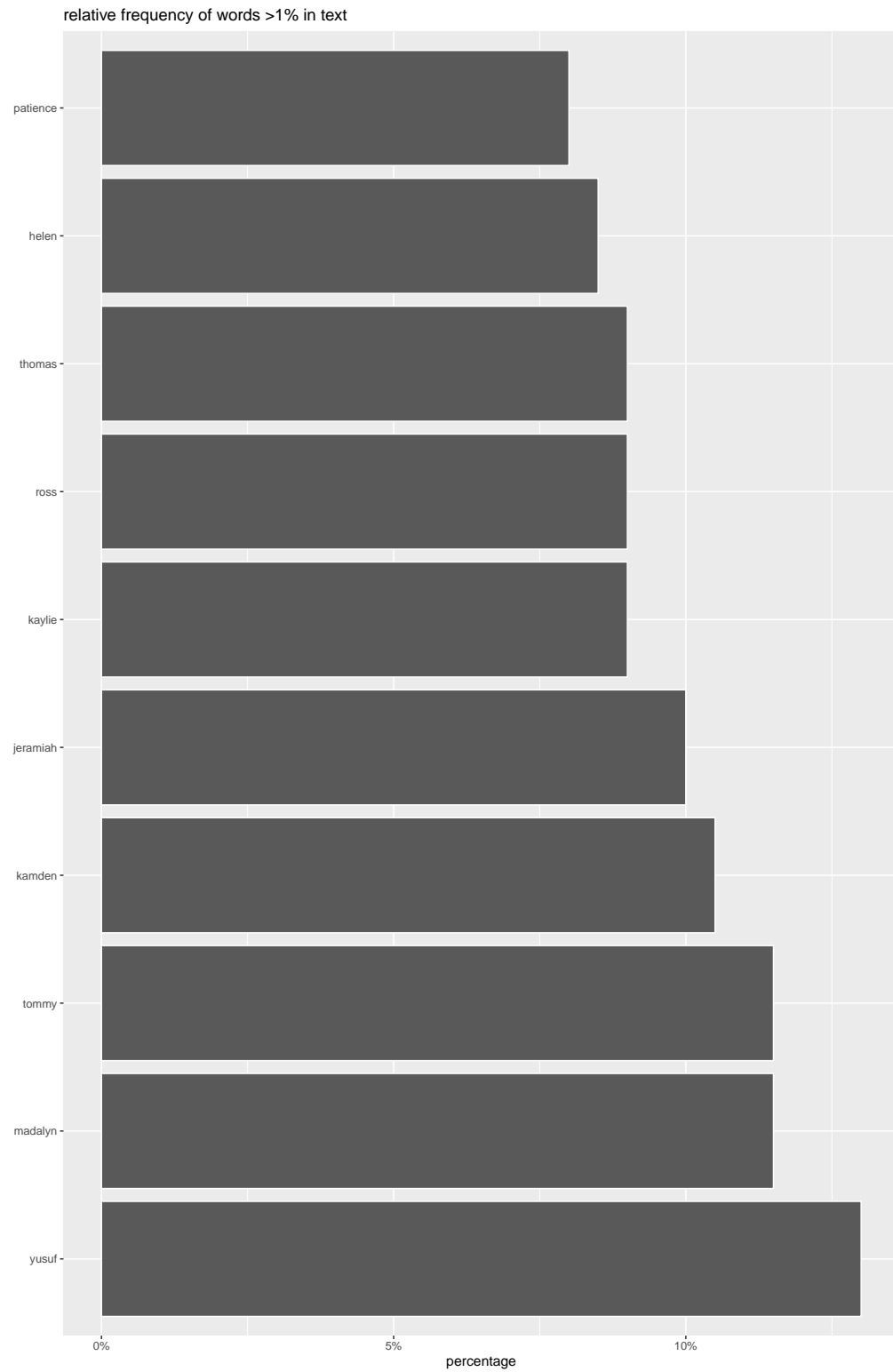
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
yusuf	26	13.00%	13.00%
madalyn	23	11.50%	11.50%
tommy	23	11.50%	11.50%
kamden	21	10.50%	10.50%
jeramiah	20	10.00%	10.00%
kaylie	18	9.00%	9.00%
ross	18	9.00%	9.00%
thomas	18	9.00%	9.00%
helen	17	8.50%	8.50%
patience	16	8.00%	8.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

jeramiah yusuf yusuf madalyn helen jeramiah thomas kamden jeramiah kaylie

Part 2 of 20 (10 words)

yusuf ross yusuf helen kamden kaylie tommy jeramiah thomas tommy

Part 3 of 20 (10 words)

madalyn tommy jeramiah jeramiah kamden jeramiah madalyn kamden yusuf madalyn

Part 4 of 20 (10 words)

tommy yusuf ross jeramiah kamden thomas kamden helen patience yusuf

Part 5 of 20 (10 words)

kamden patience kaylie helen tommy thomas madalyn ross tommy yusuf

Part 6 of 20 (10 words)

ross kaylie madalyn patience jeramiah patience patience yusuf tommy thomas

Part 7 of 20 (10 words)

kaylie madalyn thomas madalyn helen tommy yusuf thomas ross kamden

Part 8 of 20 (10 words)

thomas ross madalyn kaylie tommy kaylie thomas kamden patience kamden

Part 9 of 20 (10 words)

patience jeramiah helen tommy helen madalyn yusuf tommy thomas yusuf

Part 10 of 20 (10 words)

thomas madalyn madalyn madalyn madalyn yusuf helen kaylie patience yusuf

Part 11 of 20 (10 words)

jeramiah jeramiah madalyn madalyn thomas yusuf kaylie jeramiah ross yusuf

Part 12 of 20 (10 words)

madalyn yusuf helen jeramiah kaylie kamden kamden kamden madalyn kaylie

Part 13 of 20 (10 words)

patience helen ross kaylie thomas jeramiah tommy tommy tommy patience

Part 14 of 20 (10 words)

tommy tommy yusuf jeramiah yusuf yusuf yusuf kaylie helen kamden

Part 15 of 20 (10 words)

ross kaylie kaylie tommy kamden madalyn helen ross thomas ross

Part 16 of 20 (10 words)

kamden kamden patience tommy kamden yusuf ross jeramiah helen patience

Part 17 of 20 (10 words)

yusuf jeramiah tommy patience kaylie yusuf kaylie patience ross thomas

Part 18 of 20 (10 words)

tommy yusuf ross ross patience ross thomas tommy helen jeramiah

Part 19 of 20 (10 words)

madalyn helen tommy kamden helen ross tommy helen yusuf madalyn

Part 20 of 20 (10 words)

patience kamden jeramiah madalyn thomas madalyn thomas kamden kaylie ross