

MapReduce

Classroom example

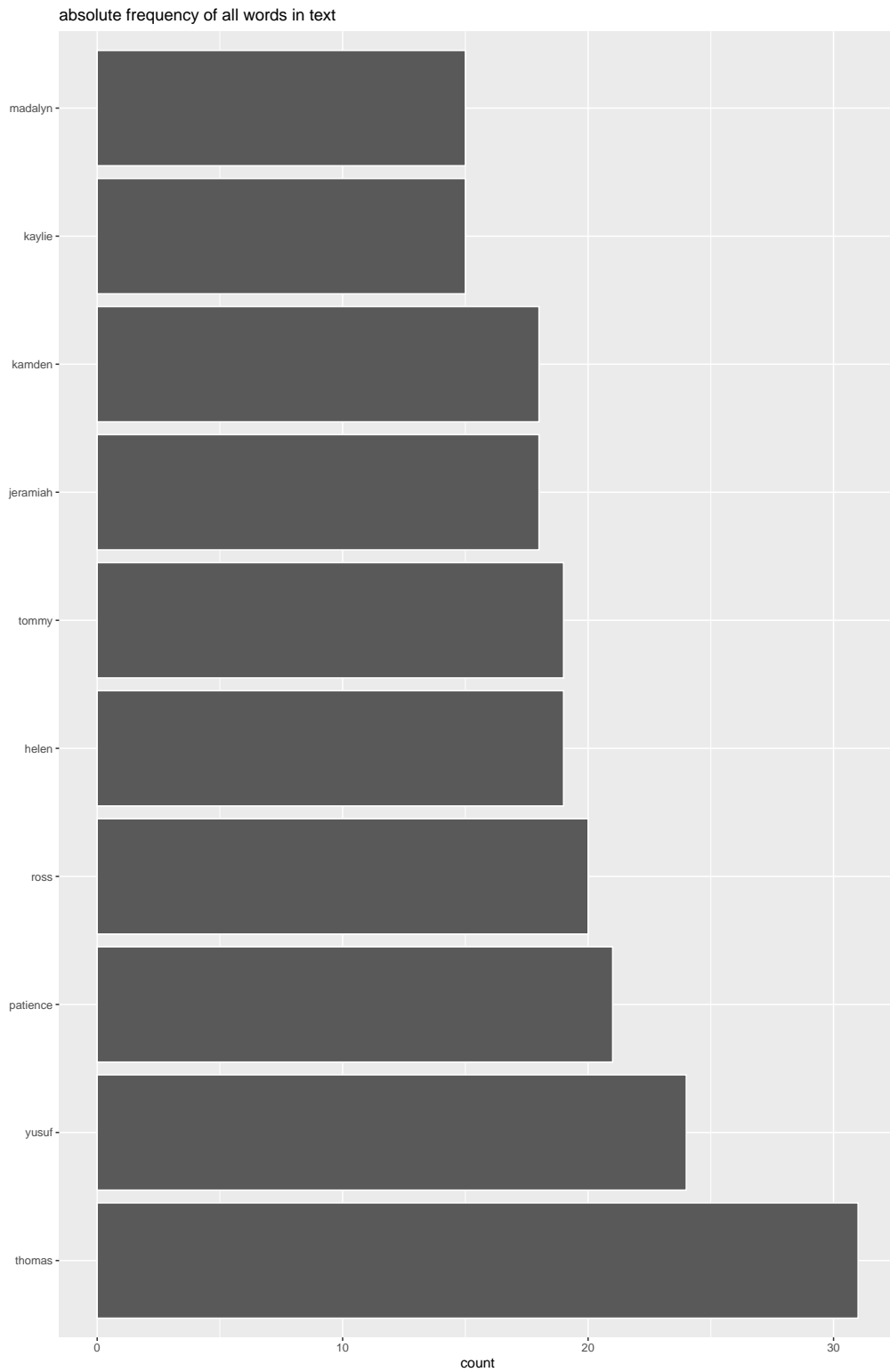
This is the file to create a map reduce classroom example. The setup is as follows

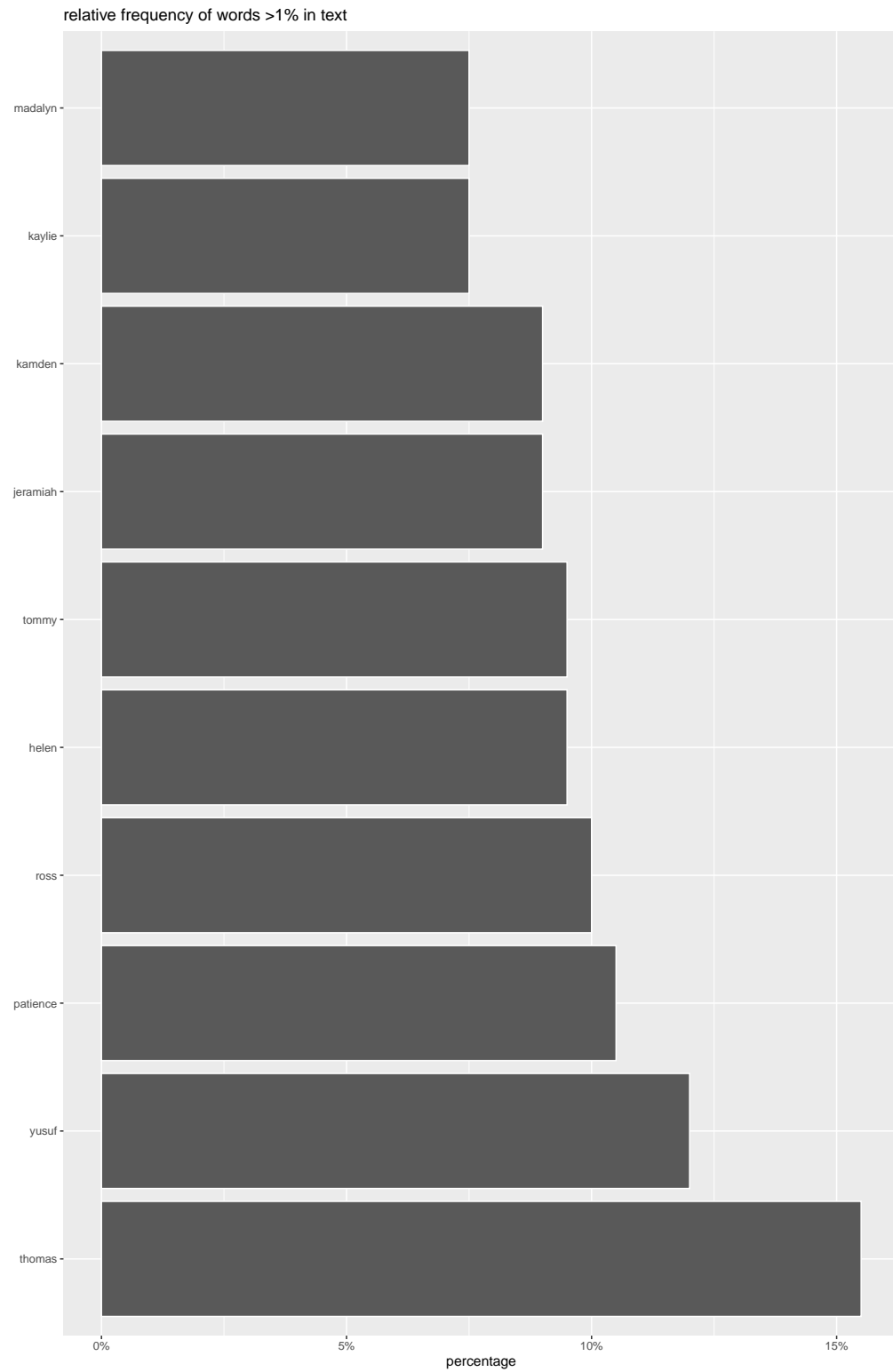
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

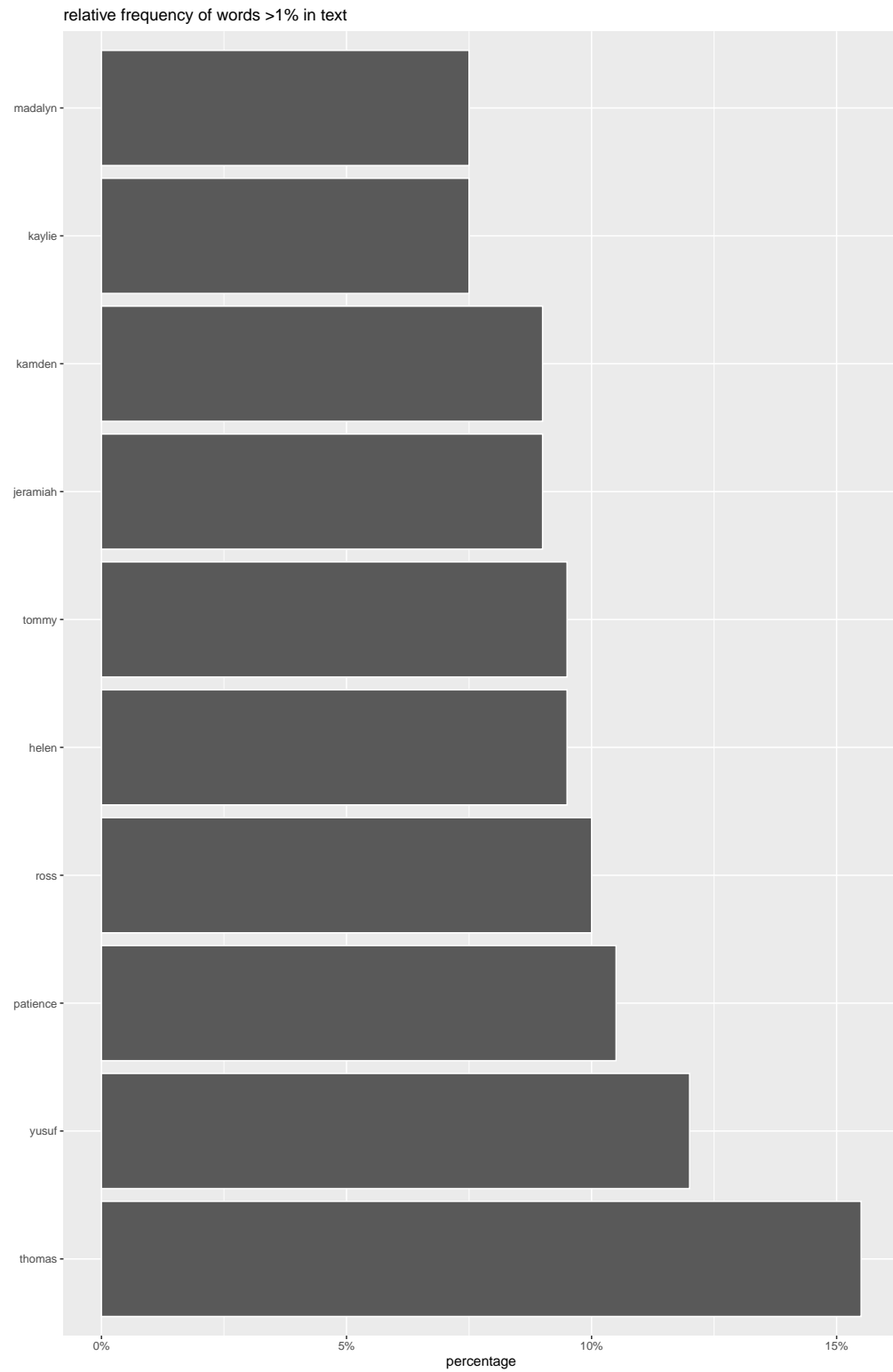
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
thomas	31	15.50%	15.50%
yusuf	24	12.00%	12.00%
patience	21	10.50%	10.50%
ross	20	10.00%	10.00%
helen	19	9.50%	9.50%
tommy	19	9.50%	9.50%
jeramiah	18	9.00%	9.00%
kamden	18	9.00%	9.00%
kaylie	15	7.50%	7.50%
madalyn	15	7.50%	7.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

kamden tommy tommy kaylie kaylie jeramiah thomas jeramiah patience thomas tommy
thomas kaylie thomas kamden kamden thomas tommy thomas helen

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

tommy yusuf thomas yusuf jeramiah tommy patience patience jeramiah helen

Part 2 of 20 (10 words)

kamden tommy kaylie thomas patience tommy kaylie kamden thomas thomas

Part 3 of 20 (10 words)

ross kaylie yusuf kamden yusuf kamden jeramiah patience yusuf yusuf

Part 4 of 20 (10 words)

tommy madalyn ross yusuf helen kaylie kaylie jeramiah yusuf thomas

Part 5 of 20 (10 words)

yusuf jeramiah thomas madalyn yusuf thomas jeramiah ross helen patience

Part 6 of 20 (10 words)

patience tommy madalyn kaylie tommy thomas jeramiah yusuf jeramiah thomas

Part 7 of 20 (10 words)

patience patience thomas helen ross yusuf ross ross madalyn helen

Part 8 of 20 (10 words)

kamden kaylie yusuf yusuf madalyn yusuf ross helen madalyn thomas

Part 9 of 20 (10 words)

helen thomas kamden thomas tommy madalyn jeramiah kamden yusuf patience

Part 10 of 20 (10 words)

helen kamden kaylie kamden tommy madalyn thomas thomas jeramiah jeramiah

Part 11 of 20 (10 words)

yusuf jeramiah thomas helen ross ross patience patience tommy kaylie

Part 12 of 20 (10 words)

tommy kaylie jeramiah jeramiah thomas thomas thomas kamden tommy helen

Part 13 of 20 (10 words)

thomas jeramiah ross tommy ross ross helen helen thomas kaylie

Part 14 of 20 (10 words)

tommy kamden yusuf thomas madalyn kamden yusuf kamden yusuf patience

Part 15 of 20 (10 words)

tommy patience thomas madalyn patience kamden ross patience yusuf kamden

Part 16 of 20 (10 words)

thomas jeramiah kamden madalyn yusuf ross patience thomas helen kaylie

Part 17 of 20 (10 words)

jeramiah helen helen madalyn thomas patience ross patience helen patience

Part 18 of 20 (10 words)

helen yusuf tommy kamden ross patience madalyn kamden jeramiah kaylie

Part 19 of 20 (10 words)

helen thomas ross tommy thomas ross tommy helen thomas kaylie

Part 20 of 20 (10 words)

ross madalyn yusuf ross tommy thomas madalyn kaylie thomas patience