

MapReduce

Classroom example

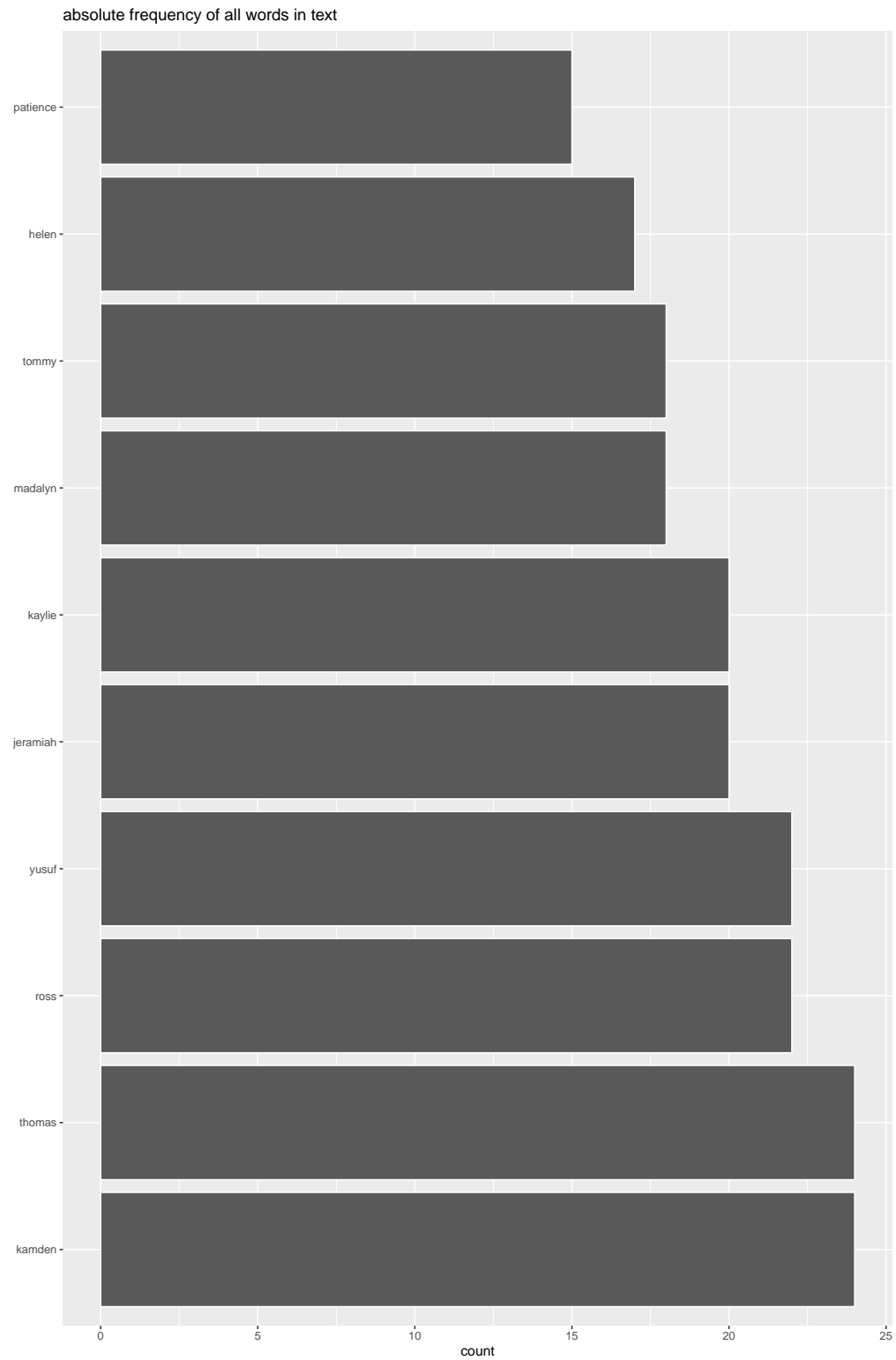
This is the file to create a map reduce classroom example. The setup is as follows

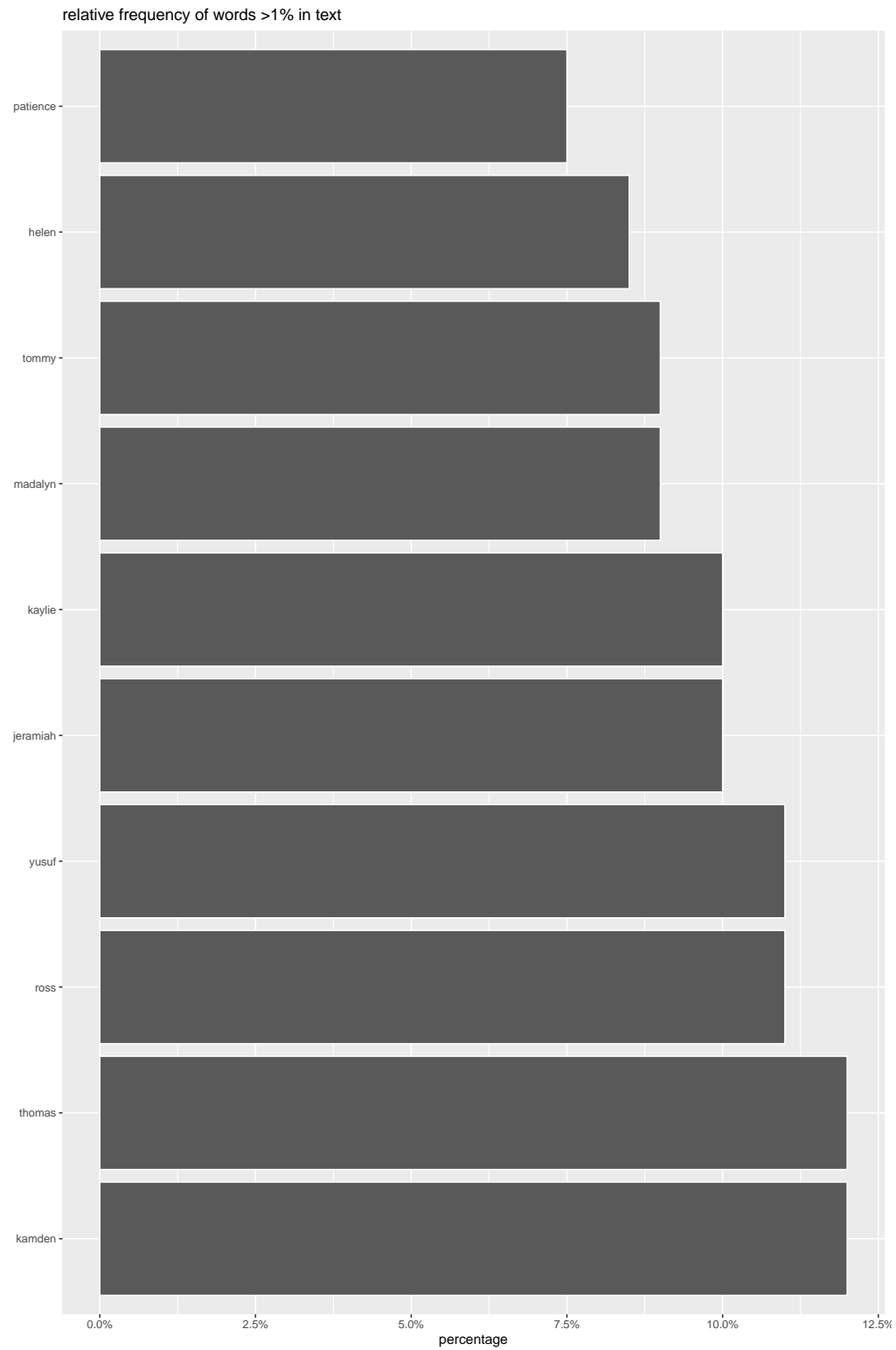
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

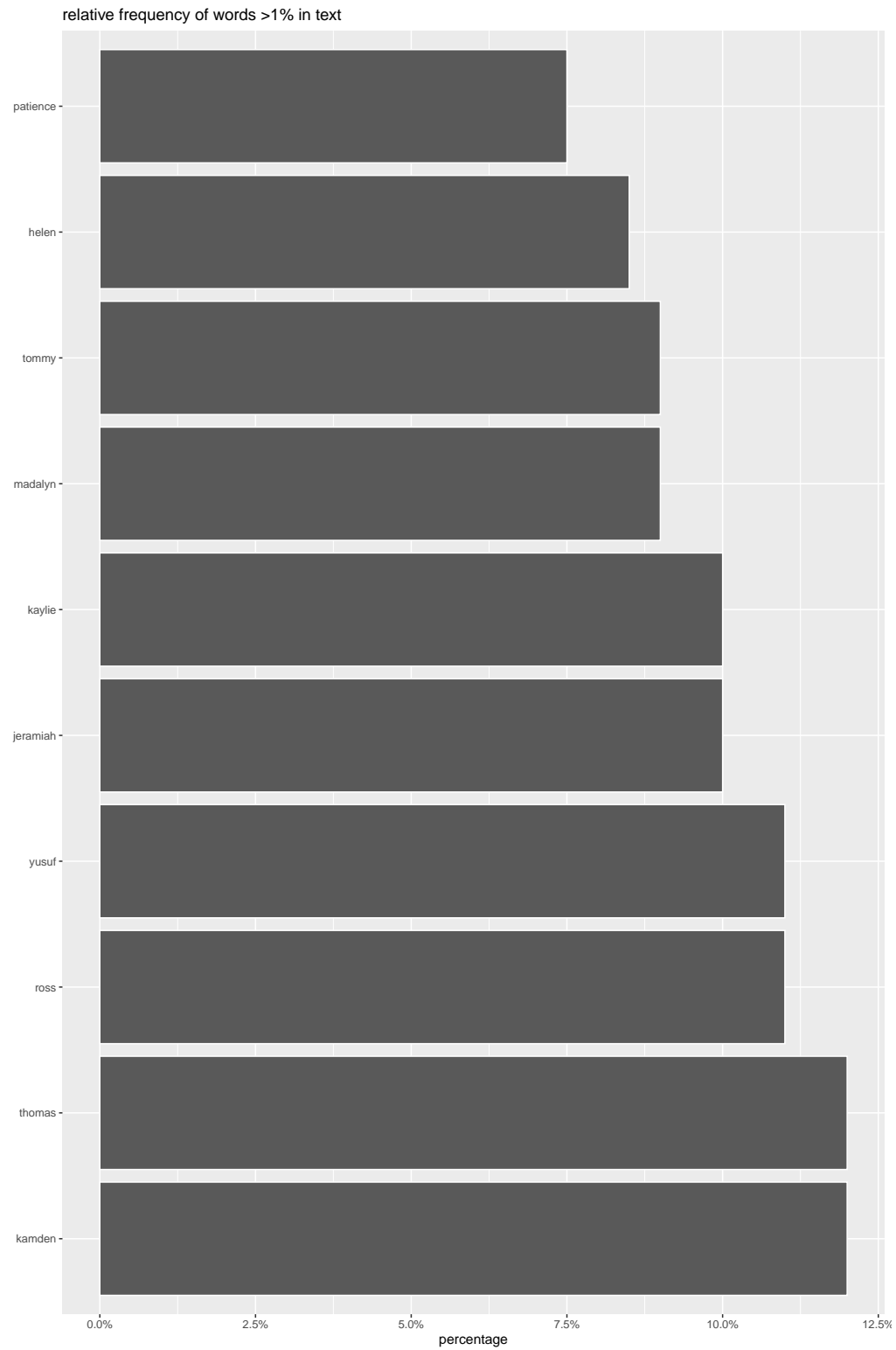
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
kamden	24	12.00%	12.00%
thomas	24	12.00%	12.00%
ross	22	11.00%	11.00%
yusuf	22	11.00%	11.00%
jeramiah	20	10.00%	10.00%
kaylie	20	10.00%	10.00%
madalyn	18	9.00%	9.00%
tommy	18	9.00%	9.00%
helen	17	8.50%	8.50%
patience	15	7.50%	7.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

madalyn madalyn helen kaylie madalyn tommy thomas yusuf helen yusuf

Part 2 of 20 (10 words)

patience helen yusuf tommy kaylie helen kaylie madalyn madalyn thomas

Part 3 of 20 (10 words)

patience kaylie madalyn jeramiah ross kamden madalyn thomas patience madalyn

Part 4 of 20 (10 words)

ross kamden madalyn tommy yusuf yusuf madalyn jeramiah kaylie jeramiah

Part 5 of 20 (10 words)

helen ross patience thomas helen thomas thomas patience yusuf yusuf

Part 6 of 20 (10 words)

kamden kaylie helen jeramiah thomas kamden ross yusuf tommy tommy

Part 7 of 20 (10 words)

thomas kamden thomas tommy kamden tommy ross kamden helen ross

Part 8 of 20 (10 words)

ross kaylie kaylie thomas thomas jeramiah thomas thomas thomas ross

Part 9 of 20 (10 words)

madalyn patience jeramiah kaylie kaylie helen yusuf yusuf kamden jeramiah

Part 10 of 20 (10 words)

kamden tommy patience ross thomas ross jeramiah jeramiah yusuf kaylie

Part 11 of 20 (10 words)

tommy ross kaylie ross tommy patience patience thomas madalyn ross

Part 12 of 20 (10 words)

yusuf yusuf kamden tommy yusuf thomas kamden tommy kaylie thomas

Part 13 of 20 (10 words)

kamden kamden jeramiah jeramiah helen kamden yusuf tommy jeramiah madalyn

Part 14 of 20 (10 words)

kaylie madalyn jeramiah ross kamden jeramiah kamden thomas kamden kaylie

Part 15 of 20 (10 words)

thomas kaylie tommy jeramiah patience madalyn yusuf kaylie ross kaylie

Part 16 of 20 (10 words)

patience kamden madalyn ross kaylie helen yusuf thomas madalyn yusuf

Part 17 of 20 (10 words)

madalyn kamden jeramiah ross patience kamden patience kaylie tommy jeramiah

Part 18 of 20 (10 words)

patience ross thomas tommy yusuf tommy jeramiah thomas helen yusuf

Part 19 of 20 (10 words)

ross ross kamden helen helen helen tommy kamden ross helen

Part 20 of 20 (10 words)

jeramiah thomas helen yusuf yusuf kamden patience jeramiah ross kamden