

MapReduce

Classroom example

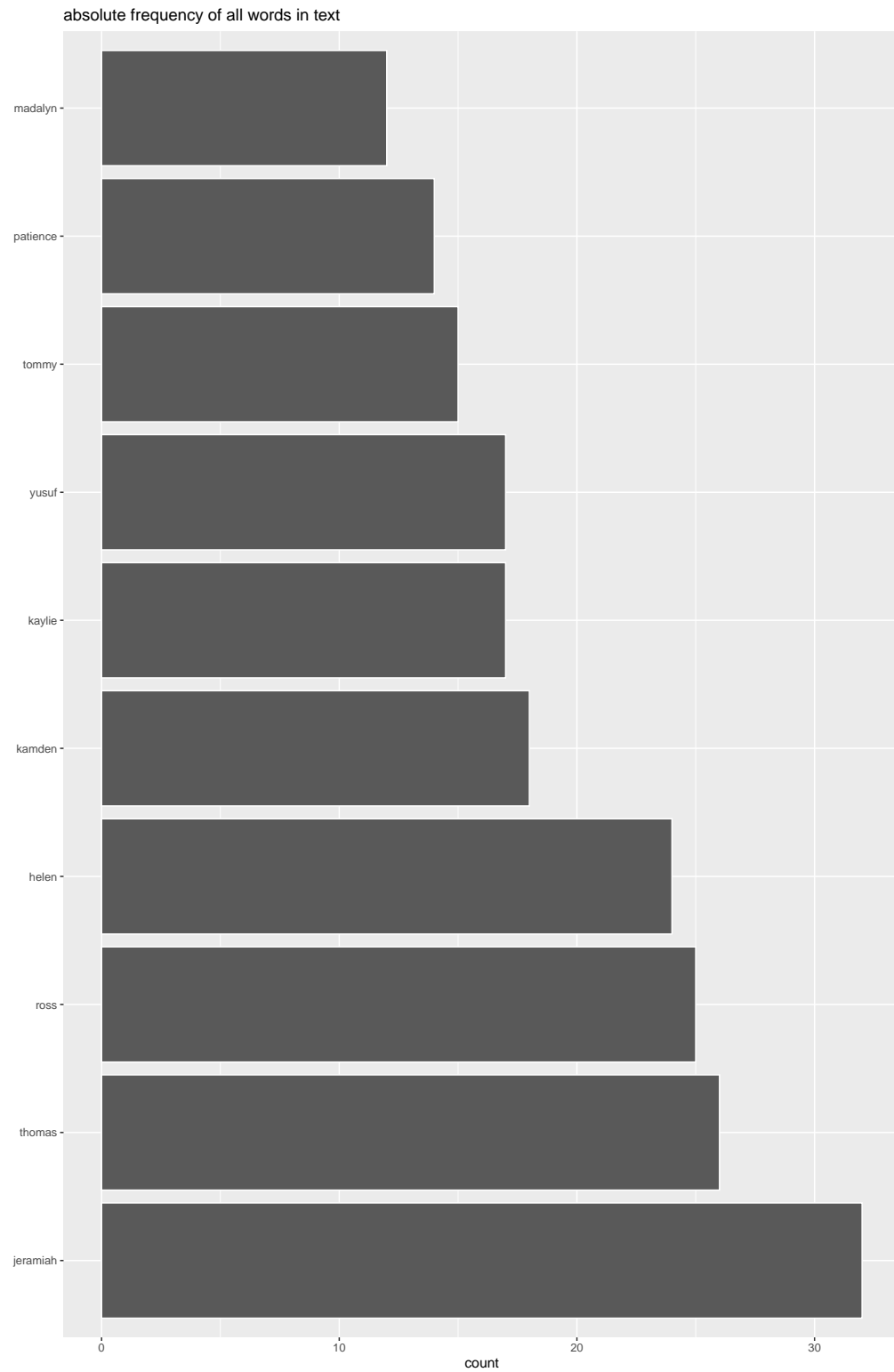
This is the file to create a map reduce classroom example. The setup is as follows

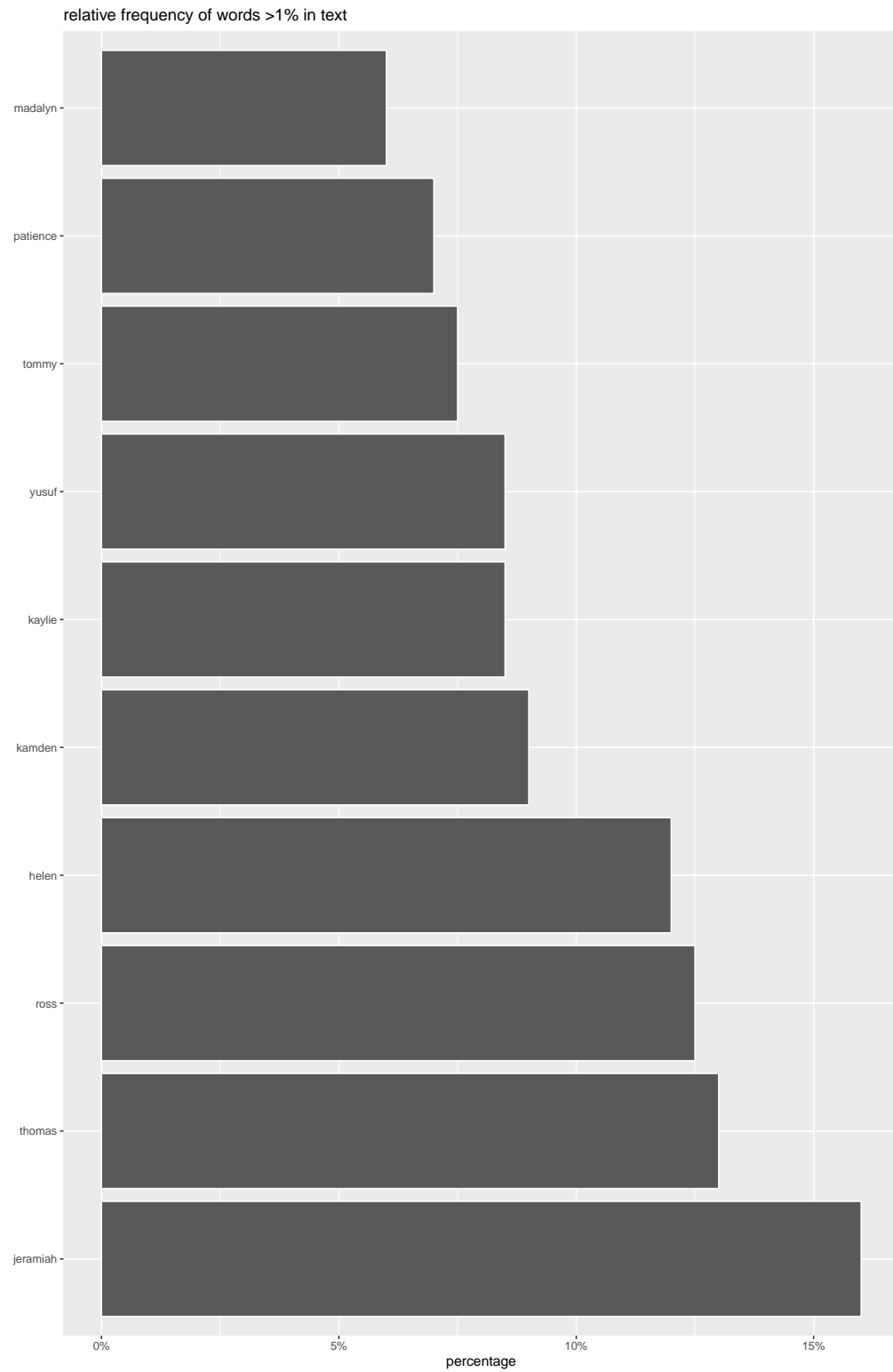
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

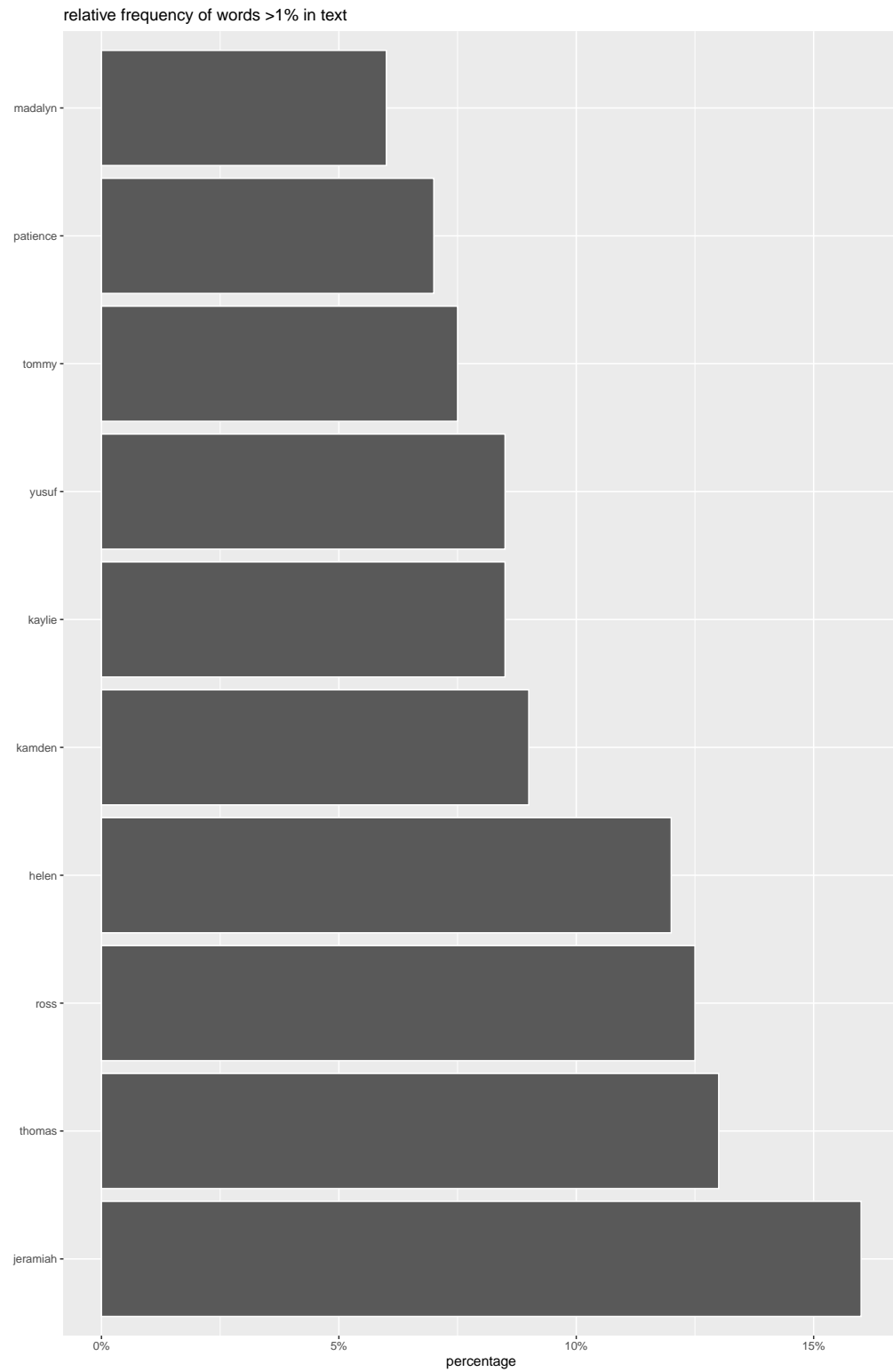
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
jeramiah	32	16.00%	16.00%
thomas	26	13.00%	13.00%
ross	25	12.50%	12.50%
helen	24	12.00%	12.00%
kamden	18	9.00%	9.00%
kaylie	17	8.50%	8.50%
yusuf	17	8.50%	8.50%
tommy	15	7.50%	7.50%
patience	14	7.00%	7.00%
madalyn	12	6.00%	6.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

jeramiah patience kaylie ross ross ross madalyn jeramiah kamden helen

Part 2 of 20 (10 words)

helen jeramiah patience thomas yusuf yusuf jeramiah jeramiah jeramiah kaylie

Part 3 of 20 (10 words)

kaylie helen jeramiah kaylie jeramiah ross tommy ross helen thomas

Part 4 of 20 (10 words)

thomas patience patience kaylie thomas thomas kaylie helen thomas helen

Part 5 of 20 (10 words)

madalyn helen kamden kamden ross madalyn jeramiah kamden helen thomas

Part 6 of 20 (10 words)

helen madalyn tommy thomas thomas ross helen helen thomas jeramiah

Part 7 of 20 (10 words)

jeramiah yusuf ross ross kaylie yusuf jeramiah madalyn thomas patience

Part 8 of 20 (10 words)

yusuf kaylie jeramiah yusuf kamden ross helen tommy tommy madalyn

Part 9 of 20 (10 words)

kaylie kaylie kamden thomas jeramiah yusuf yusuf jeramiah kaylie thomas

Part 10 of 20 (10 words)

helen thomas thomas jeramiah tommy thomas ross jeramiah tommy ross

Part 11 of 20 (10 words)

jeramiah thomas kamden helen jeramiah yusuf ross jeramiah helen kamden

Part 12 of 20 (10 words)

tommy patience thomas jeramiah thomas ross ross helen thomas kamden

Part 13 of 20 (10 words)

kamden tommy kamden thomas yusuf ross helen madalyn thomas ross

Part 14 of 20 (10 words)

jeramiah tommy jeramiah ross jeramiah yusuf madalyn ross patience ross

Part 15 of 20 (10 words)

patience kamden yusuf helen jeramiah kaylie kamden madalyn patience thomas

Part 16 of 20 (10 words)

kamden tommy kaylie tommy thomas thomas helen patience jeramiah jeramiah

Part 17 of 20 (10 words)

kaylie helen kamden patience tommy patience helen madalyn jeramiah ross

Part 18 of 20 (10 words)

patience thomas yusuf jeramiah tommy ross patience jeramiah helen yusuf

Part 19 of 20 (10 words)

tommy yusuf madalyn yusuf kaylie ross yusuf kaylie tommy ross

Part 20 of 20 (10 words)

helen jeramiah kaylie kamden ross kamden kamden helen madalyn jeramiah