

MapReduce

Classroom example

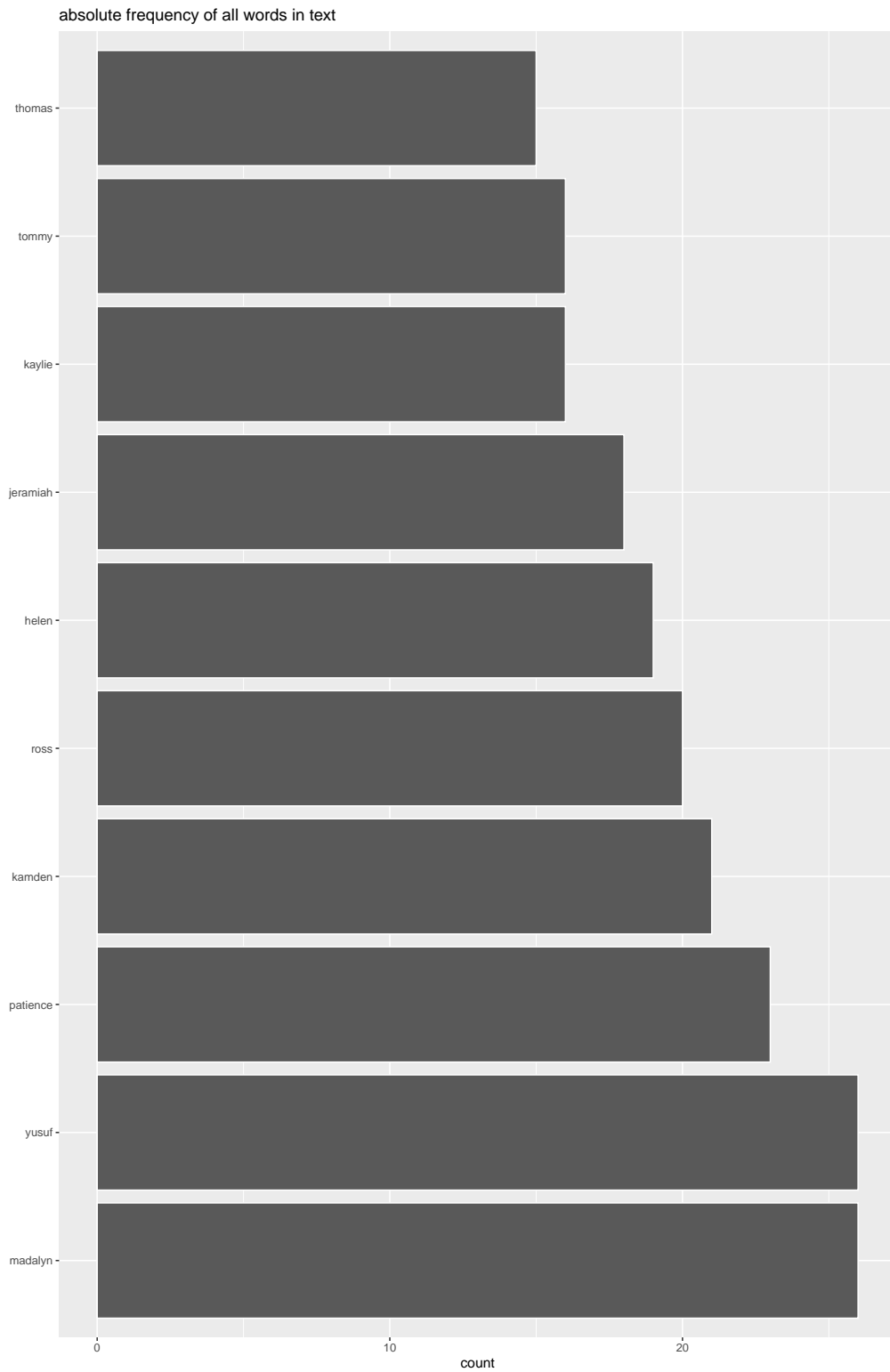
This is the file to create a map reduce classroom example. The setup is as follows

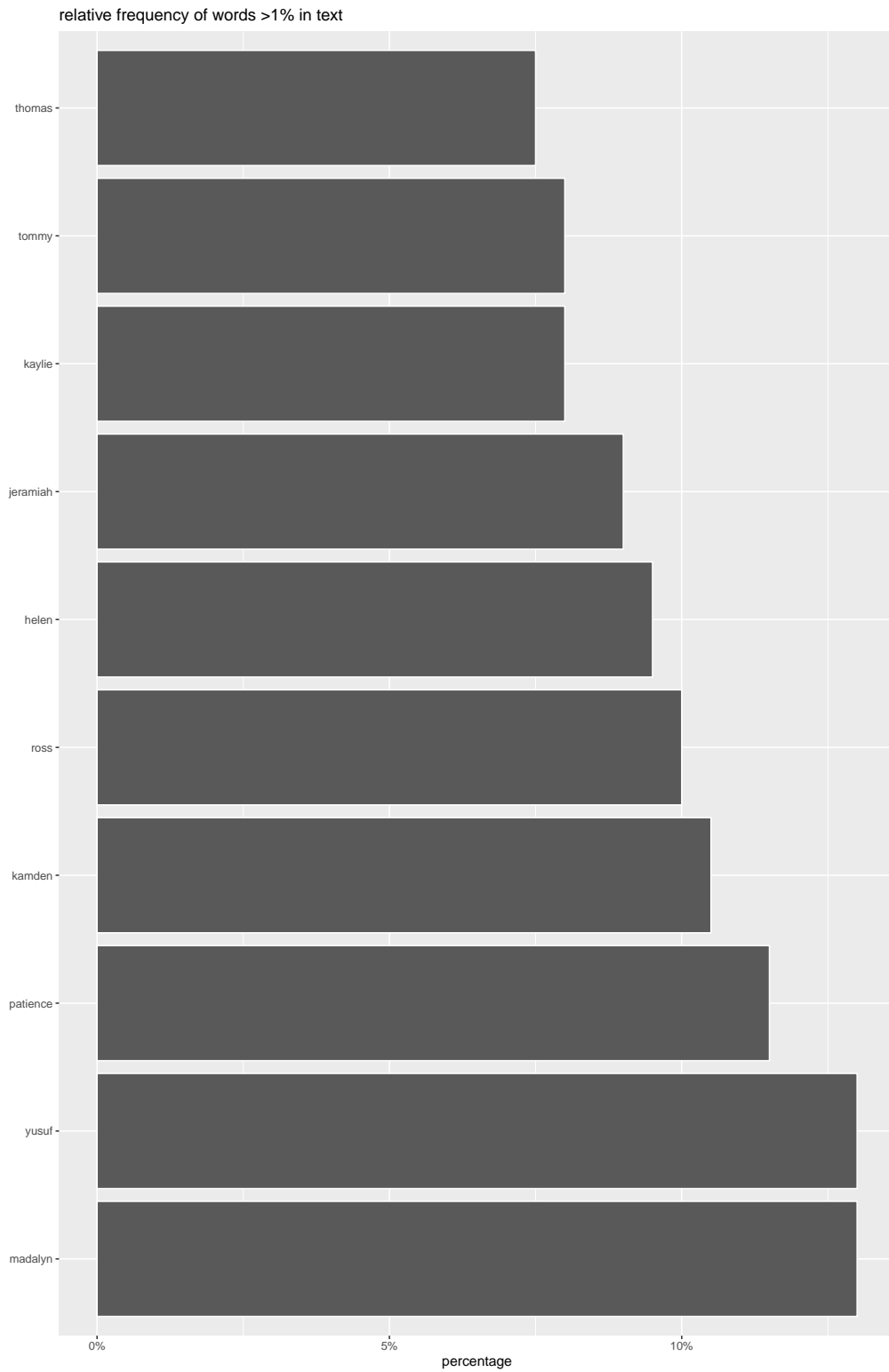
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

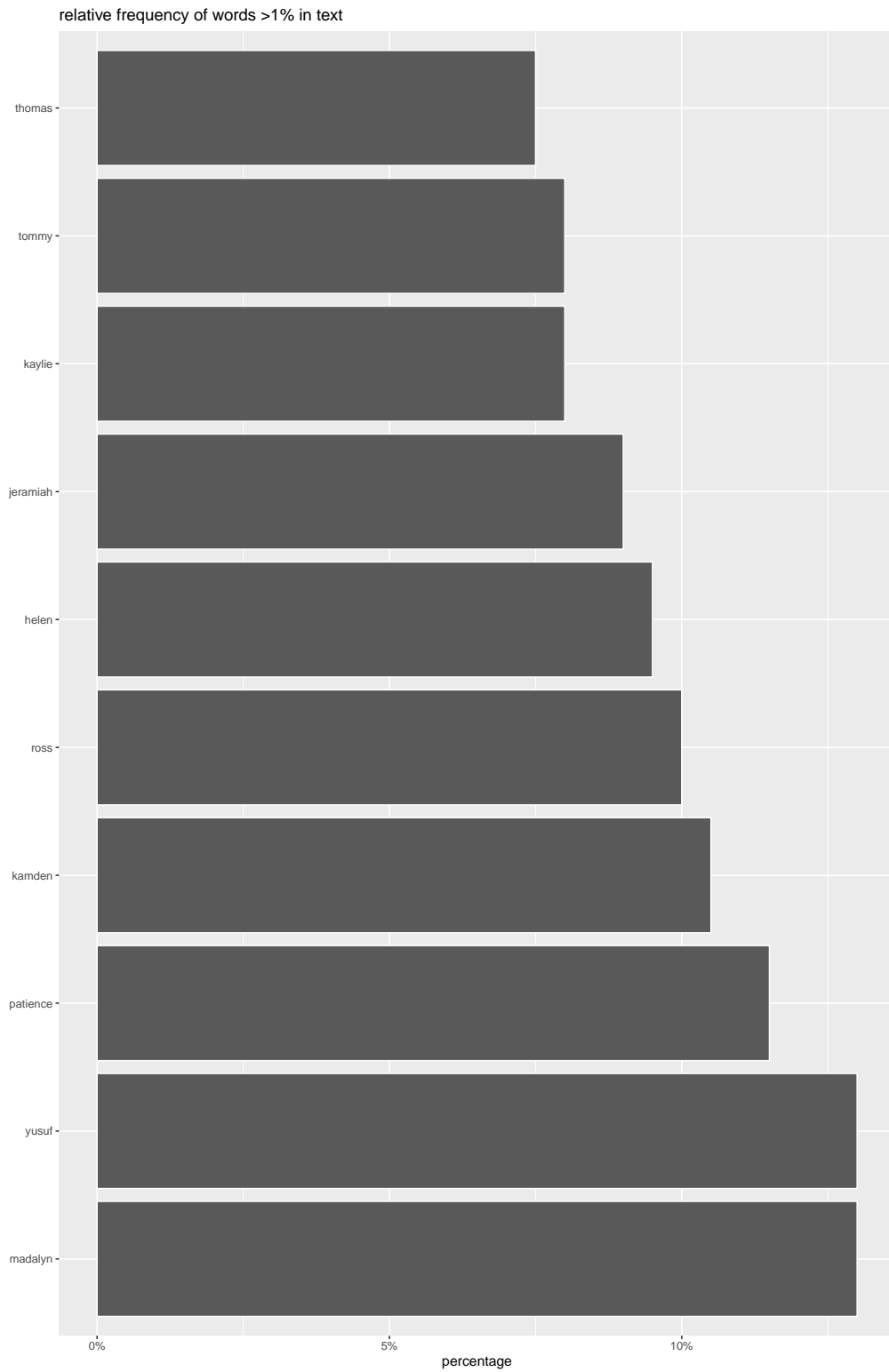
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
madalyn	26	13.00%	13.00%
yusuf	26	13.00%	13.00%
patience	23	11.50%	11.50%
kamden	21	10.50%	10.50%
ross	20	10.00%	10.00%
helen	19	9.50%	9.50%
jeramiah	18	9.00%	9.00%
kaylie	16	8.00%	8.00%
tommy	16	8.00%	8.00%
thomas	15	7.50%	7.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

jeramiah ross thomas helen tommy tommy yusuf kamden jeramiah patience

Part 2 of 20 (10 words)

helen patience ross ross yusuf kaylie thomas patience yusuf ross

Part 3 of 20 (10 words)

patience ross kamden kaylie kaylie jeramiah thomas kamden madalyn jeramiah

Part 4 of 20 (10 words)

kamden patience yusuf madalyn yusuf ross jeramiah ross thomas helen

Part 5 of 20 (10 words)

jeramiah ross helen madalyn jeramiah madalyn madalyn tommy kamden patience

Part 6 of 20 (10 words)

yusuf madalyn madalyn yusuf madalyn kamden madalyn kamden yusuf madalyn

Part 7 of 20 (10 words)

tommy kamden madalyn yusuf thomas jeramiah jeramiah kamden kaylie patience

Part 8 of 20 (10 words)

madalyn madalyn helen jeramiah yusuf jeramiah yusuf patience thomas kamden

Part 9 of 20 (10 words)

tommy helen madalyn madalyn patience tommy kamden tommy patience jeramiah

Part 10 of 20 (10 words)

thomas kaylie kamden helen ross tommy patience madalyn thomas helen

Part 11 of 20 (10 words)

yusuf ross helen kamden helen yusuf helen thomas ross kamden

Part 12 of 20 (10 words)

tommy ross yusuf madalyn yusuf yusuf ross thomas yusuf yusuf

Part 13 of 20 (10 words)

yusuf jeramiah helen helen patience madalyn ross yusuf kamden tommy

Part 14 of 20 (10 words)

yusuf kamden madalyn kamden patience patience helen madalyn kaylie kamden

Part 15 of 20 (10 words)

jeramiah ross tommy tommy thomas thomas kaylie kaylie jeramiah thomas

Part 16 of 20 (10 words)

thomas helen patience ross jeramiah kamden kaylie kaylie helen patience

Part 17 of 20 (10 words)

jeramiah kaylie madalyn kaylie patience patience helen kaylie patience tommy

Part 18 of 20 (10 words)

patience ross yusuf kaylie ross madalyn kaylie helen madalyn madalyn

Part 19 of 20 (10 words)

yusuf yusuf patience tommy ross helen kamden thomas jeramiah yusuf

Part 20 of 20 (10 words)

patience madalyn tommy madalyn ross kaylie yusuf patience kamden tommy