

MapReduce

Classroom example

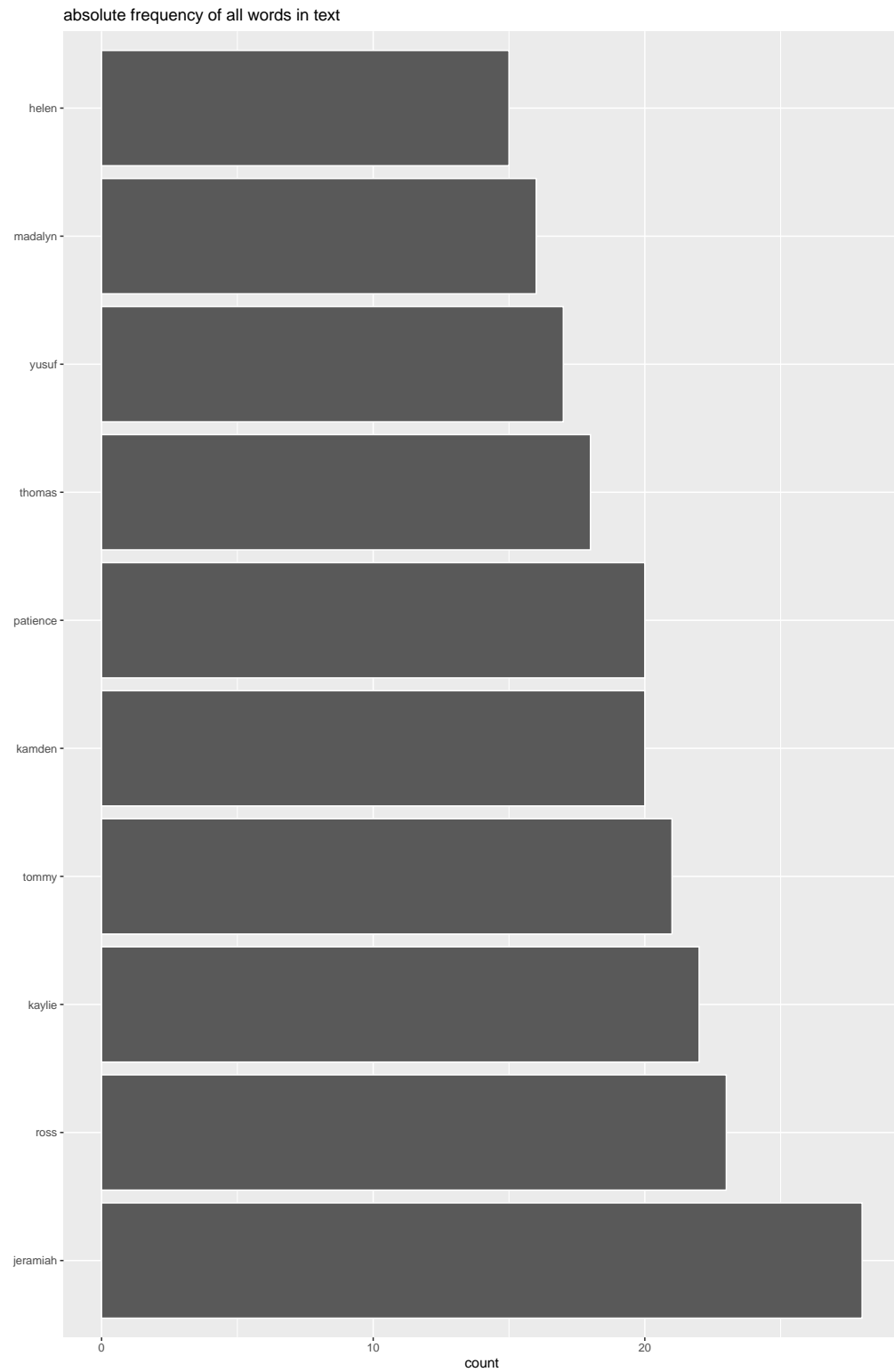
This is the file to create a map reduce classroom example. The setup is as follows

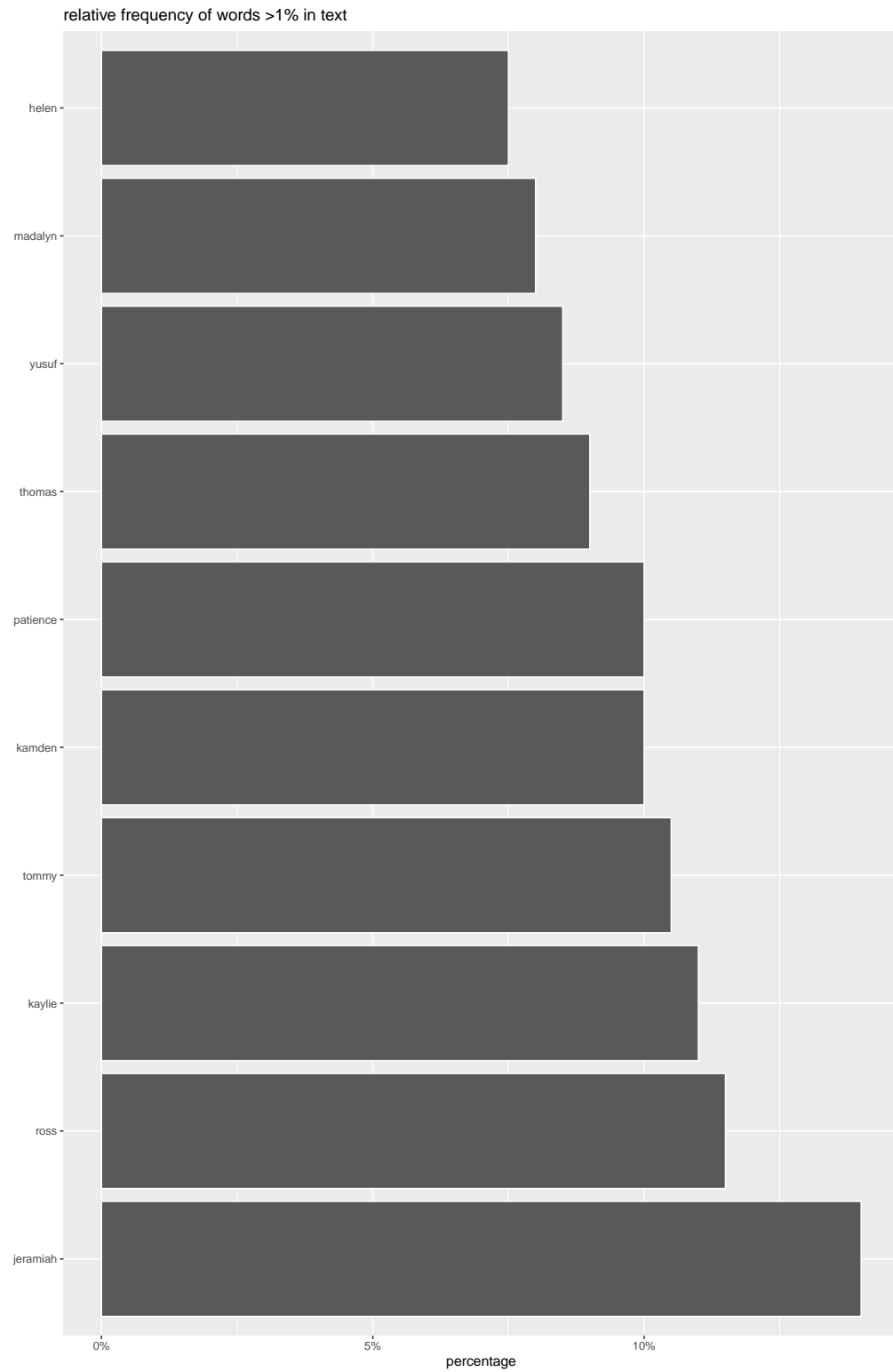
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

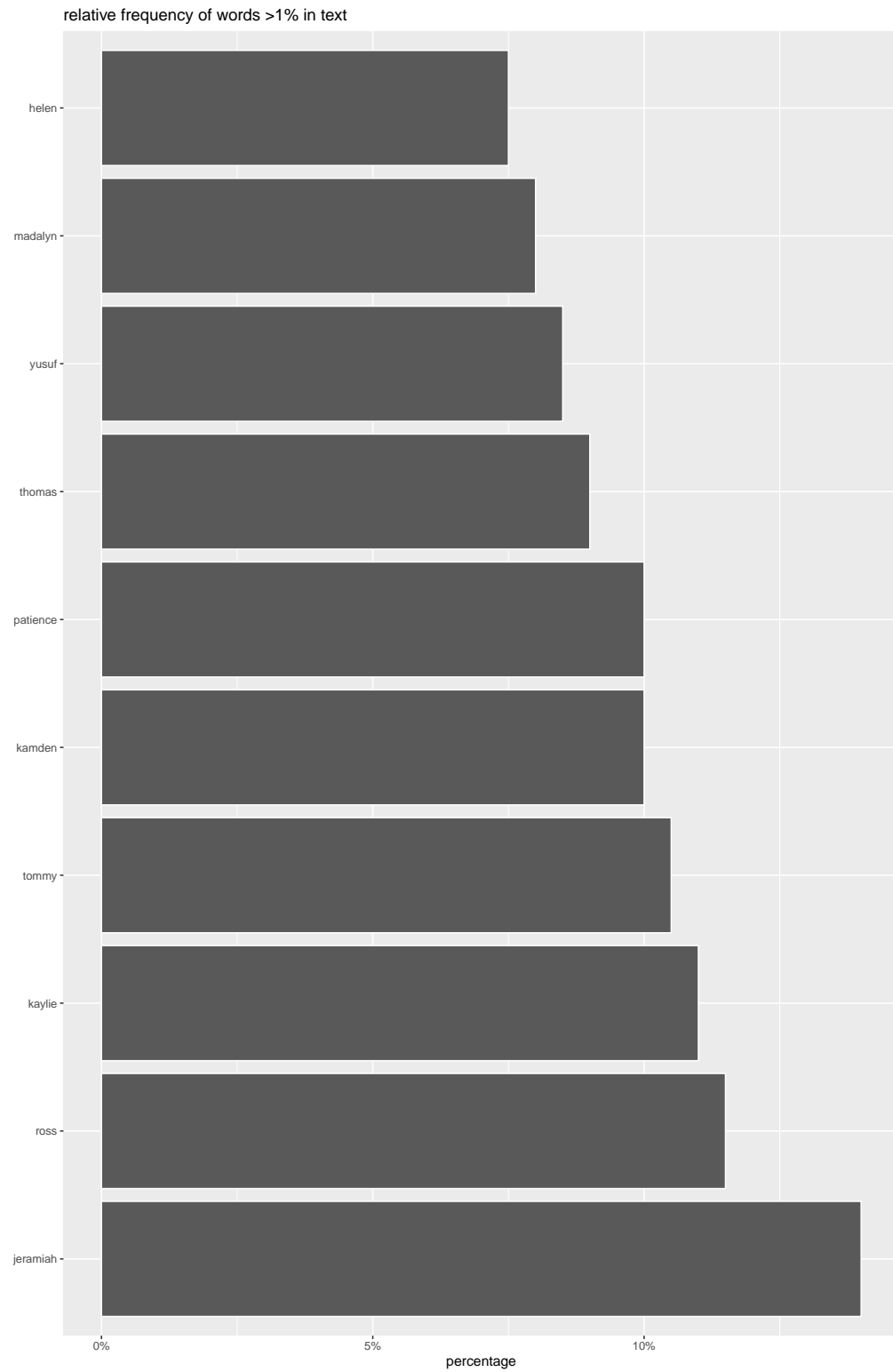
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
jeramiah	28	14.00%	14.00%
ross	23	11.50%	11.50%
kaylie	22	11.00%	11.00%
tommy	21	10.50%	10.50%
kamden	20	10.00%	10.00%
patience	20	10.00%	10.00%
thomas	18	9.00%	9.00%
yusuf	17	8.50%	8.50%
madalyn	16	8.00%	8.00%
helen	15	7.50%	7.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

kamden jeramiah tommy tommy jeramiah kaylie tommy ross thomas jeramiah kaylie tommy
kaylie jeramiah kaylie kaylie patience kaylie thomas ross

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

kamden tommy jeramiah tommy thomas kaylie kaylie kaylie patience thomas

Part 2 of 20 (10 words)

yusuf kamden jeramiah tommy patience tommy yusuf helen yusuf kamden

Part 3 of 20 (10 words)

tommy jeramiah patience kamden kaylie helen jeramiah thomas thomas jeramiah

Part 4 of 20 (10 words)

patience madalyn thomas kaylie jeramiah tommy yusuf madalyn kamden ross

Part 5 of 20 (10 words)

helen ross ross kamden kaylie kaylie ross jeramiah madalyn ross

Part 6 of 20 (10 words)

jeramiah yusuf madalyn ross helen ross jeramiah helen ross madalyn

Part 7 of 20 (10 words)

helen ross jeramiah yusuf kamden thomas patience jeramiah ross tommy

Part 8 of 20 (10 words)

patience kaylie yusuf tommy patience tommy kaylie tommy patience madalyn

Part 9 of 20 (10 words)

thomas yusuf ross madalyn madalyn patience kamden helen thomas helen

Part 10 of 20 (10 words)

kaylie kaylie madalyn kamden patience thomas ross kaylie madalyn thomas

Part 11 of 20 (10 words)

jeramiah tommy kaylie ross jeramiah tommy jeramiah kaylie kaylie ross

Part 12 of 20 (10 words)

kaylie ross kaylie ross yusuf jeramiah kaylie jeramiah madalyn ross

Part 13 of 20 (10 words)

jeramiah thomas ross yusuf kamden yusuf jeramiah patience thomas patience

Part 14 of 20 (10 words)

kaylie kamden tommy kamden tommy madalyn jeramiah tommy jeramiah tommy

Part 15 of 20 (10 words)

helen patience kamden ross tommy yusuf madalyn kaylie patience kamden

Part 16 of 20 (10 words)

jeramiah jeramiah helen jeramiah patience jeramiah patience patience thomas thomas

Part 17 of 20 (10 words)

yusuf madalyn tommy kamden kamden jeramiah helen yusuf tommy yusuf

Part 18 of 20 (10 words)

kaylie patience thomas yusuf jeramiah ross thomas tommy helen helen

Part 19 of 20 (10 words)

madalyn yusuf ross patience kaylie patience jeramiah helen kamden madalyn

Part 20 of 20 (10 words)

jeramiah thomas ross ross thomas kamden tommy kamden helen kamden