

MapReduce

Classroom example

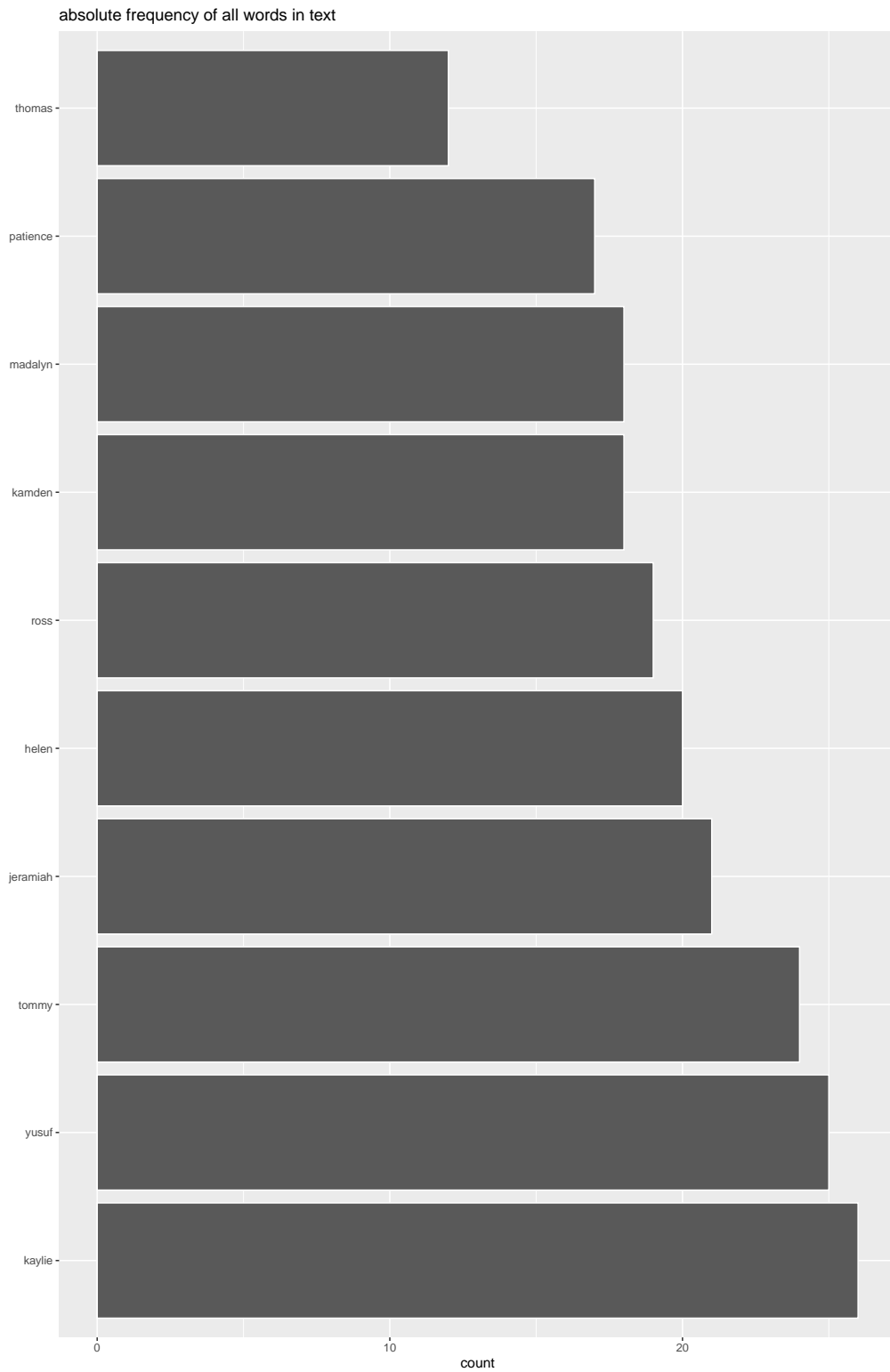
This is the file to create a map reduce classroom example. The setup is as follows

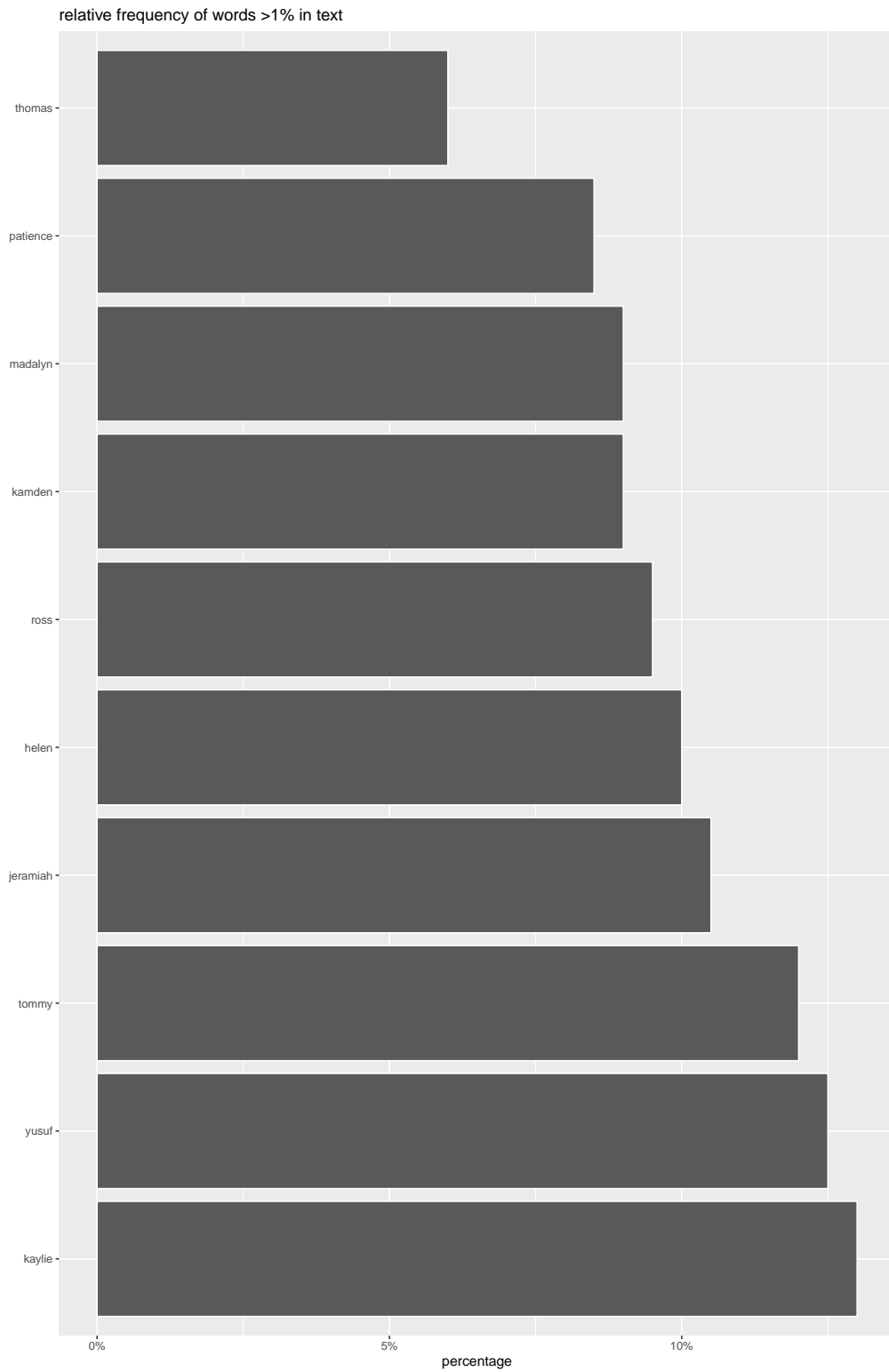
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

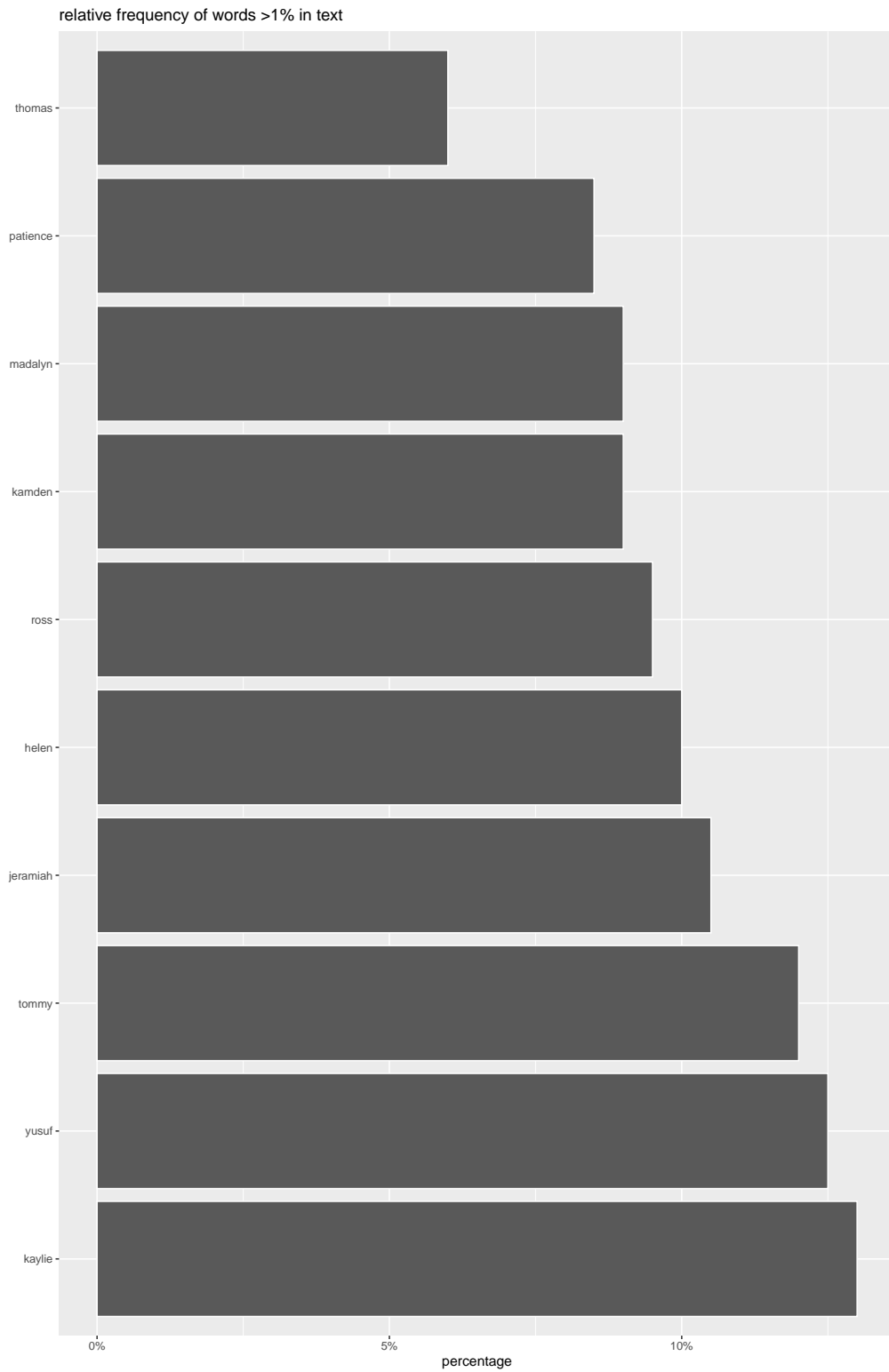
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
kaylie	26	13.00%	13.00%
yusuf	25	12.50%	12.50%
tommy	24	12.00%	12.00%
jeramiah	21	10.50%	10.50%
helen	20	10.00%	10.00%
ross	19	9.50%	9.50%
kamden	18	9.00%	9.00%
madalyn	18	9.00%	9.00%
patience	17	8.50%	8.50%
thomas	12	6.00%	6.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

kaylie patience madalyn madalyn madalyn yusuf kamden jeramiah tommy madalyn helen
kaylie tommy jeramiah helen yusuf helen kaylie helen kamden madalyn yusuf ross jeramiah
kaylie ross tommy yusuf helen kaylie helen yusuf jeramiah tommy patience tommy helen
thomas yusuf thomas yusuf ross tommy tommy tommy kaylie tommy jeramiah madalyn pa-
tience helen thomas kaylie jeramiah thomas yusuf madalyn ross thomas helen ross kaylie yusuf
madalyn yusuf kamden kaylie kamden tommy tommy tommy yusuf patience kaylie helen pa-
tience kamden jeramiah yusuf kaylie yusuf kamden ross kamden tommy patience jeramiah
ross ross madalyn tommy yusuf yusuf kamden tommy kaylie kaylie jeramiah tommy kaylie

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

yusuf ross kaylie patience yusuf patience jeramiah madalyn yusuf patience jeramiah yusuf
kaylie kaylie madalyn jeramiah helen madalyn kaylie kaylie

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

yusuf kaylie yusuf jeramiah yusuf jeramiah kaylie madalyn helen kaylie

Part 2 of 20 (10 words)

kaylie helen madalyn helen yusuf helen ross tommy yusuf tommy

Part 3 of 20 (10 words)

tommy ross ross jeramiah patience jeramiah kaylie patience tommy madalyn

Part 4 of 20 (10 words)

patience kaylie yusuf yusuf ross thomas kaylie yusuf kamden yusuf

Part 5 of 20 (10 words)

jeramiah jeramiah kamden patience ross thomas helen madalyn kamden helen

Part 6 of 20 (10 words)

madalyn tommy ross jeramiah tommy kaylie yusuf patience ross yusuf

Part 7 of 20 (10 words)

helen kaylie yusuf thomas kaylie thomas tommy ross kaylie tommy

Part 8 of 20 (10 words)

madalyn jeramiah jeramiah tommy tommy jeramiah madalyn kaylie kamden kamden

Part 9 of 20 (10 words)

kamden yusuf jeramiah ross tommy thomas ross helen madalyn ross

Part 10 of 20 (10 words)

madalyn helen kaylie patience tommy thomas yusuf helen tommy tommy

Part 11 of 20 (10 words)

ross patience patience madalyn patience yusuf kaylie jeramiah madalyn kaylie

Part 12 of 20 (10 words)

yusuf yusuf ross tommy kaylie yusuf kamden patience patience kaylie

Part 13 of 20 (10 words)

helen thomas madalyn kaylie thomas helen helen helen yusuf tommy

Part 14 of 20 (10 words)

kamden helen tommy helen tommy madalyn kaylie kamden jeramiah kaylie

Part 15 of 20 (10 words)

yusuf jeramiah patience yusuf kamden patience jeramiah kamden patience ross

Part 16 of 20 (10 words)

jeramiah kaylie yusuf thomas jeramiah ross kamden jeramiah ross jeramiah

Part 17 of 20 (10 words)

tommy thomas patience ross madalyn tommy jeramiah kamden patience jeramiah

Part 18 of 20 (10 words)

tommy helen helen yusuf madalyn thomas tommy yusuf ross tommy

Part 19 of 20 (10 words)

kamden helen kaylie kamden kamden madalyn kamden yusuf ross kaylie

Part 20 of 20 (10 words)

madalyn kamden kaylie thomas patience helen tommy kaylie madalyn kaylie