

MapReduce

Classroom example

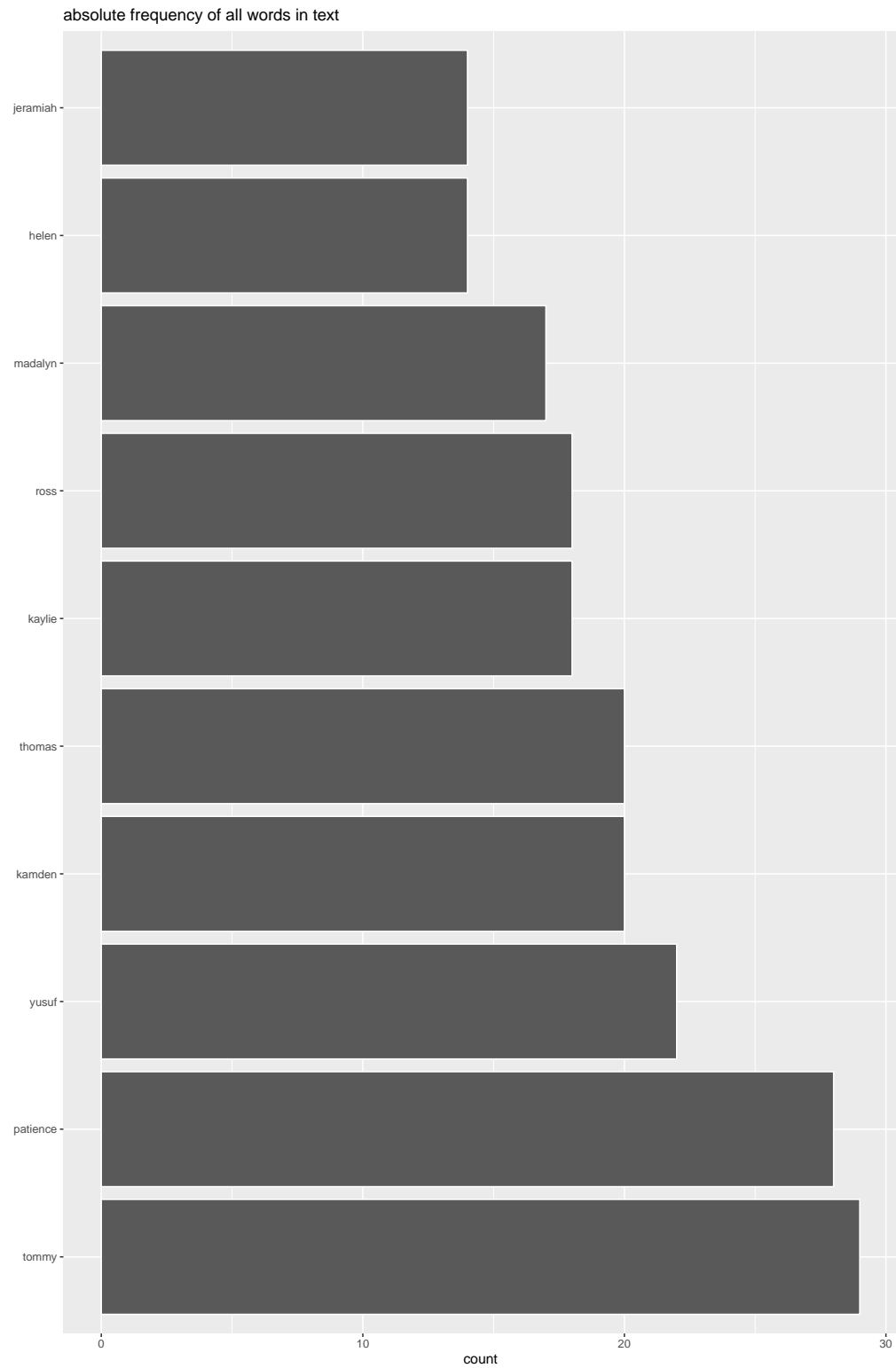
This is the file to create a map reduce classroom example. The setup is as follows

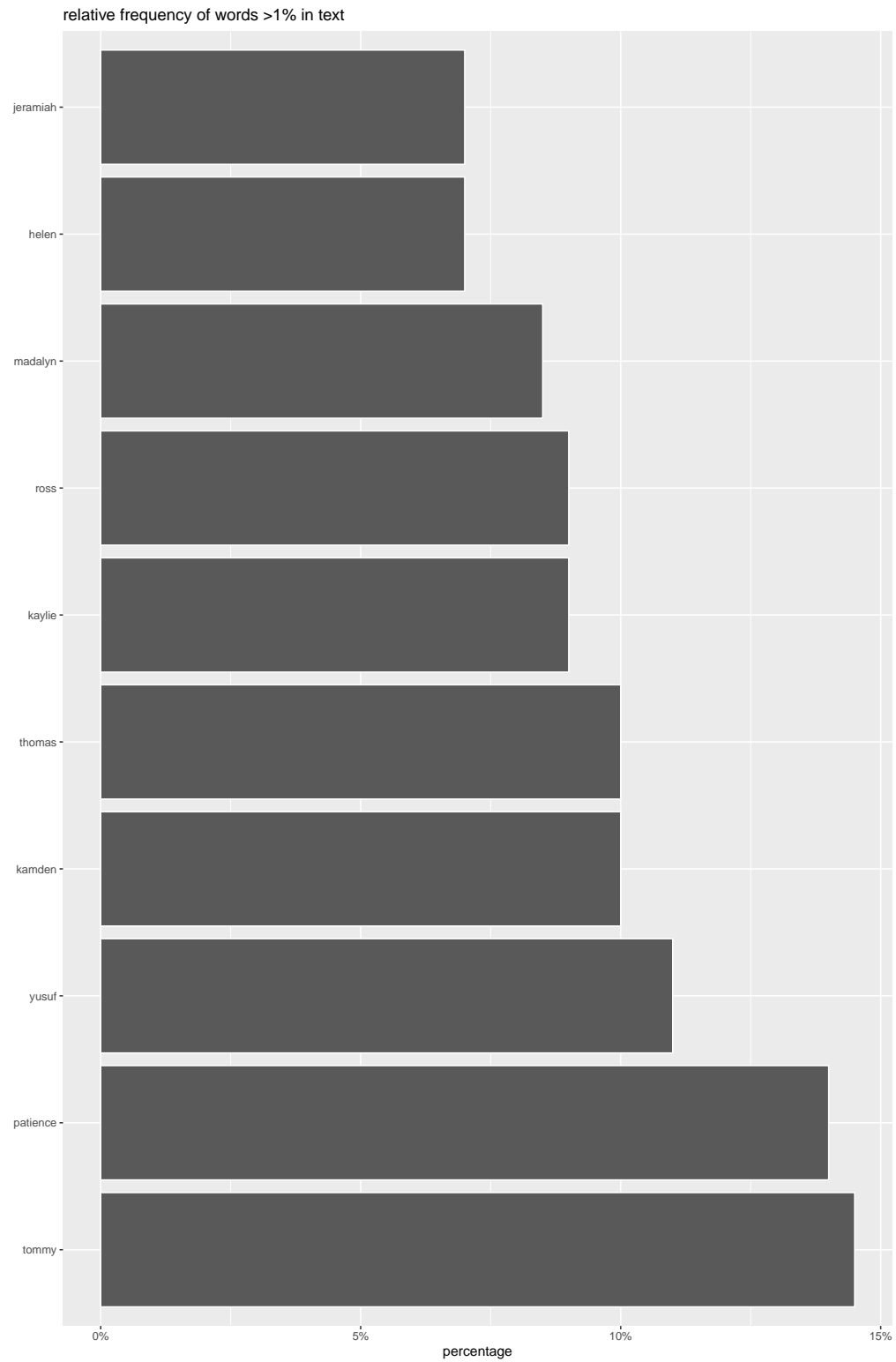
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

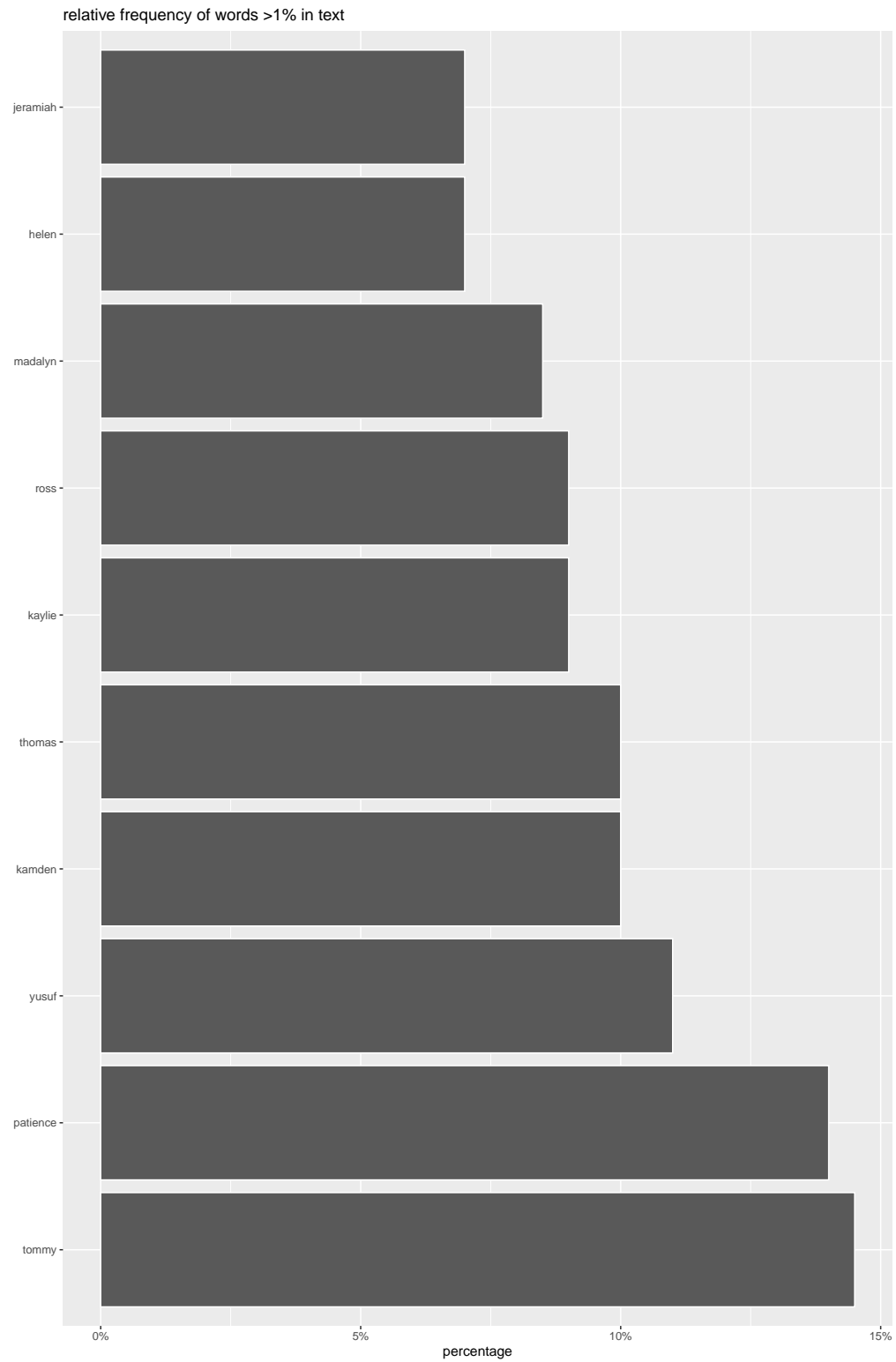
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
tommy	29	14.50%	14.50%
patience	28	14.00%	14.00%
yusuf	22	11.00%	11.00%
kamden	20	10.00%	10.00%
thomas	20	10.00%	10.00%
kaylie	18	9.00%	9.00%
ross	18	9.00%	9.00%
madalyn	17	8.50%	8.50%
helen	14	7.00%	7.00%
jeramiah	14	7.00%	7.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

jeramiah helen yusuf thomas jeramiah patience thomas jeramiah tommy tommy yusuf yusuf
tommy patience tommy patience helen yusuf thomas madalyn

Twenty Groups

Part 1 of 20 (10 words)

kaylie tommy patience patience ross tommy thomas tommy ross jeramiah

Part 2 of 20 (10 words)

patience kaylie patience tommy jeramiah tommy ross ross kaylie tommy

Part 3 of 20 (10 words)

kamden helen thomas patience patience thomas helen tommy kaylie kaylie

Part 4 of 20 (10 words)

jeramiah patience tommy jeramiah thomas tommy kamden patience helen helen

Part 5 of 20 (10 words)

kamden yusuf kaylie patience tommy kaylie ross kaylie thomas kaylie

Part 6 of 20 (10 words)

madalyn tommy thomas jeramiah thomas ross tommy kamden madalyn tommy

Part 7 of 20 (10 words)

thomas yusuf patience ross madalyn patience madalyn ross tommy madalyn

Part 8 of 20 (10 words)

thomas yusuf yusuf yusuf patience helen madalyn yusuf ross patience

Part 9 of 20 (10 words)

kamden kaylie tommy tommy kamden tommy ross patience jeramiah kamden

Part 10 of 20 (10 words)

jeramiah yusuf jeramiah thomas tommy yusuf tommy tommy helen thomas

Part 11 of 20 (10 words)

patience thomas helen yusuf tommy helen jeramiah madalyn tommy yusuf

Part 12 of 20 (10 words)

tommy helen patience thomas kamden kamden patience jeramiah yusuf patience

Part 13 of 20 (10 words)

thomas tommy thomas yusuf madalyn yusuf ross kaylie kaylie madalyn

Part 14 of 20 (10 words)

kaylie kaylie yusuf patience patience jeramiah madalyn thomas jeramiah patience

Part 15 of 20 (10 words)

kamden ross kaylie kamden helen tommy yusuf kaylie tommy thomas

Part 16 of 20 (10 words)

kamden ross tommy yusuf kamden yusuf kamden kamden kaylie madalyn

Part 17 of 20 (10 words)

helen patience kamden kamden thomas helen jeramiah patience ross madalyn

Part 18 of 20 (10 words)

ross kamden patience helen ross kamden ross thomas madalyn kaylie

Part 19 of 20 (10 words)

yusuf madalyn patience madalyn kamden yusuf yusuf tommy madalyn ross

Part 20 of 20 (10 words)

helen thomas patience jeramiah tommy yusuf patience patience yusuf madalyn