

MapReduce

Classroom example

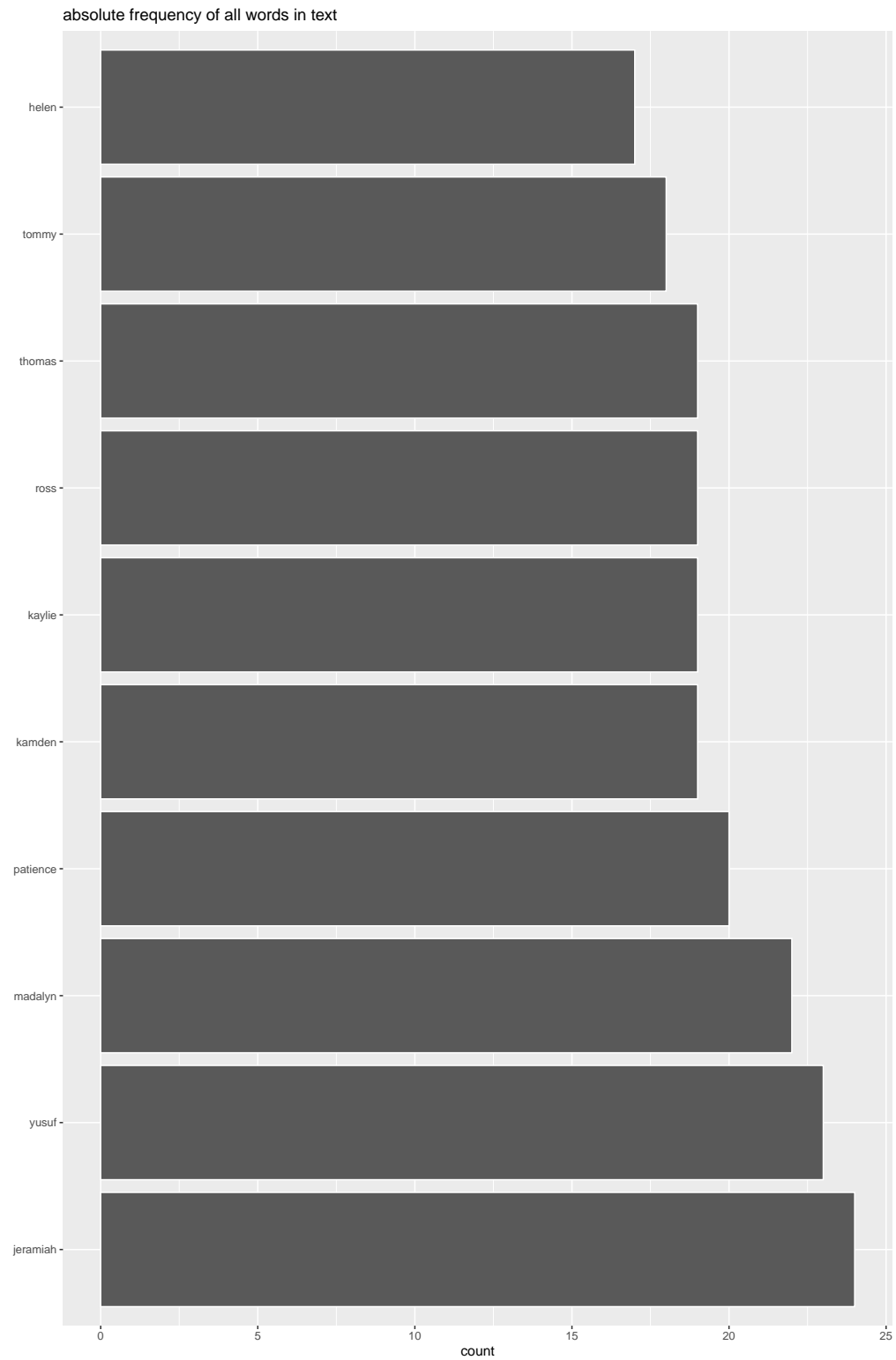
This is the file to create a map reduce classroom example. The setup is as follows

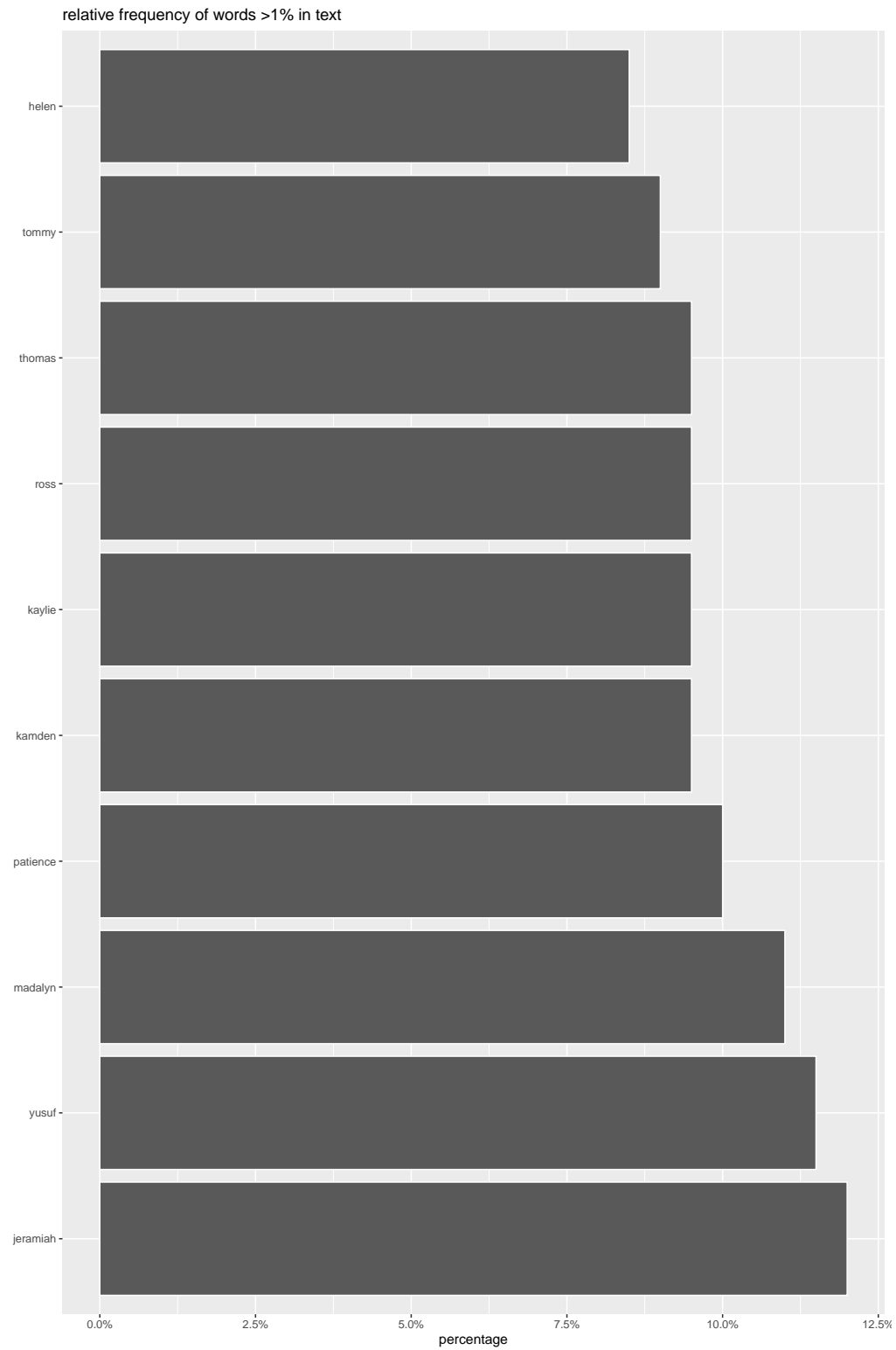
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

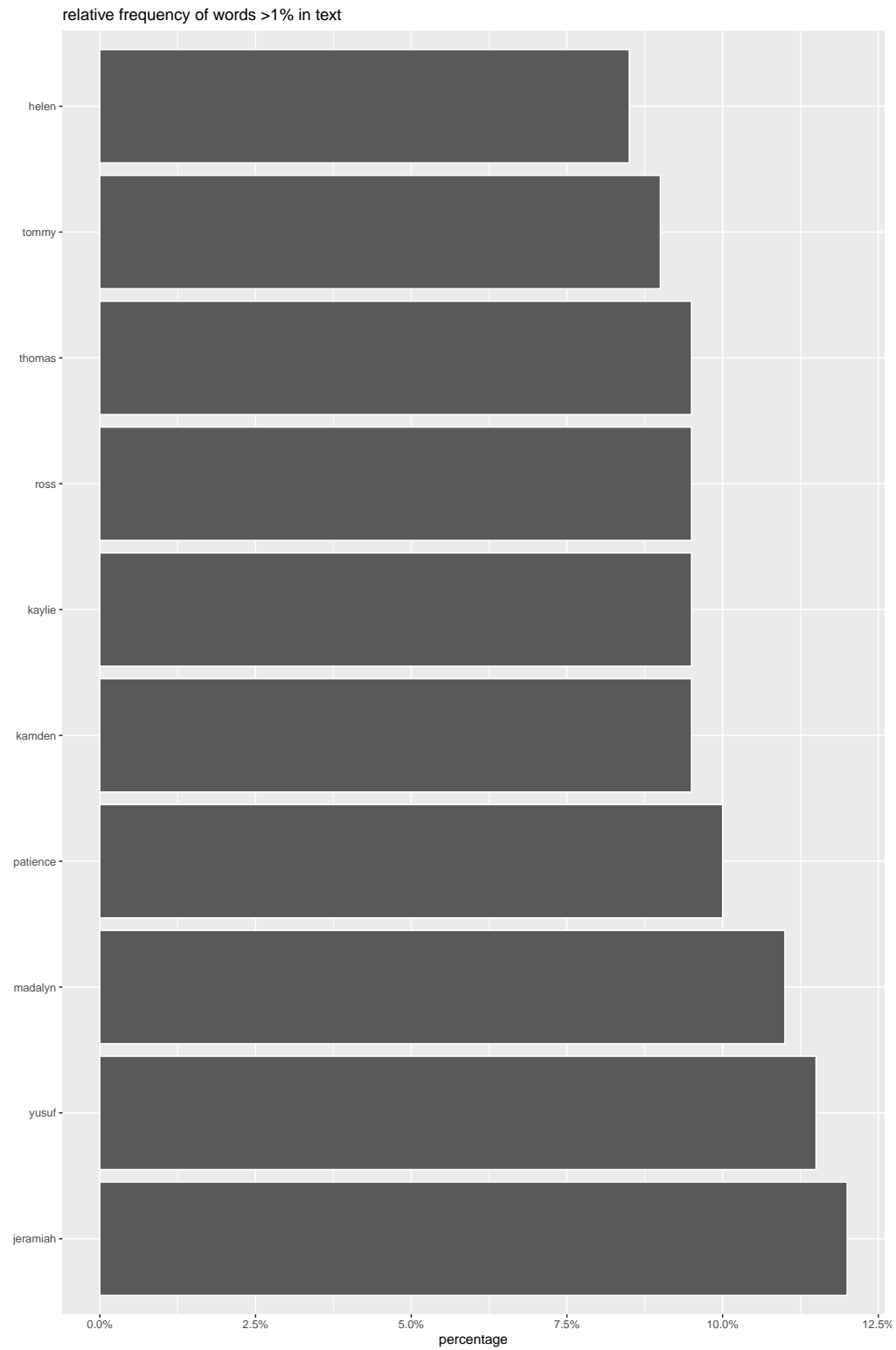
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
jeramiah	24	12.00%	12.00%
yusuf	23	11.50%	11.50%
madalyn	22	11.00%	11.00%
patience	20	10.00%	10.00%
kamden	19	9.50%	9.50%
kaylie	19	9.50%	9.50%
ross	19	9.50%	9.50%
thomas	19	9.50%	9.50%
tommy	18	9.00%	9.00%
helen	17	8.50%	8.50%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

madalyn jeramiah madalyn thomas jeramiah kamden kamden ross helen madalyn jeramiah
ross jeramiah yusuf jeramiah helen thomas tommy ross jeramiah thomas thomas thomas he-
len jeramiah ross tommy tommy yusuf jeramiah jeramiah patience jeramiah kamden patience
ross ross yusuf jeramiah yusuf kaylie helen kamden kamden kaylie patience helen ross thomas
ross patience kaylie kaylie jeramiah tommy thomas jeramiah kaylie ross kaylie yusuf helen
jeramiah helen kamden yusuf helen yusuf kaylie madalyn madalyn patience patience helen
tommy tommy patience madalyn kamden patience madalyn tommy helen patience yusuf
tommy kaylie kamden patience jeramiah helen kaylie tommy helen kaylie madalyn thomas
thomas kamden yusuf

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

kamden thomas kaylie kamden jeramiah yusuf helen yusuf madalyn thomas yusuf madalyn
kaylie madalyn kaylie madalyn jeramiah kamden kaylie jeramiah

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

patience patience madalyn tommy yusuf ross helen ross yusuf tommy

Part 2 of 20 (10 words)

madalyn jeramiah thomas jeramiah kaylie patience yusuf madalyn madalyn helen

Part 3 of 20 (10 words)

kamden kaylie jeramiah helen madalyn yusuf kaylie kaylie jeramiah kaylie

Part 4 of 20 (10 words)

jeramiah ross thomas patience helen kaylie helen patience tommy kaylie

Part 5 of 20 (10 words)

kaylie kaylie patience kamden ross yusuf tommy madalyn patience ross

Part 6 of 20 (10 words)

madalyn jeramiah thomas jeramiah kamden kaylie jeramiah patience helen tommy

Part 7 of 20 (10 words)

tommy kamden tommy thomas kaylie thomas patience kamden patience yusuf

Part 8 of 20 (10 words)

thomas yusuf helen kamden kamden jeramiah helen helen patience helen

Part 9 of 20 (10 words)

jeramiah kamden kamden thomas tommy helen patience jeramiah ross kamden

Part 10 of 20 (10 words)

jeramiah jeramiah jeramiah patience kaylie tommy kamden tommy yusuf kaylie

Part 11 of 20 (10 words)

kaylie thomas thomas jeramiah madalyn madalyn madalyn kamden jeramiah tommy

Part 12 of 20 (10 words)

kamden helen ross ross patience thomas yusuf tommy tommy madalyn

Part 13 of 20 (10 words)

thomas kamden yusuf yusuf thomas madalyn madalyn madalyn kamden jeramiah

Part 14 of 20 (10 words)

kamden thomas tommy ross helen jeramiah helen patience kaylie thomas

Part 15 of 20 (10 words)

jeramiah kaylie jeramiah madalyn yusuf yusuf yusuf yusuf thomas ross

Part 16 of 20 (10 words)

ross tommy tommy yusuf ross kaylie yusuf madalyn kamden thomas

Part 17 of 20 (10 words)

ross ross madalyn patience madalyn ross patience madalyn tommy helen

Part 18 of 20 (10 words)

helen ross yusuf jeramiah thomas ross kaylie kamden patience kamden

Part 19 of 20 (10 words)

thomas patience yusuf yusuf madalyn yusuf thomas tommy ross helen

Part 20 of 20 (10 words)

madalyn jeramiah jeramiah yusuf ross kaylie madalyn patience jeramiah yusuf