

MapReduce

Classroom example

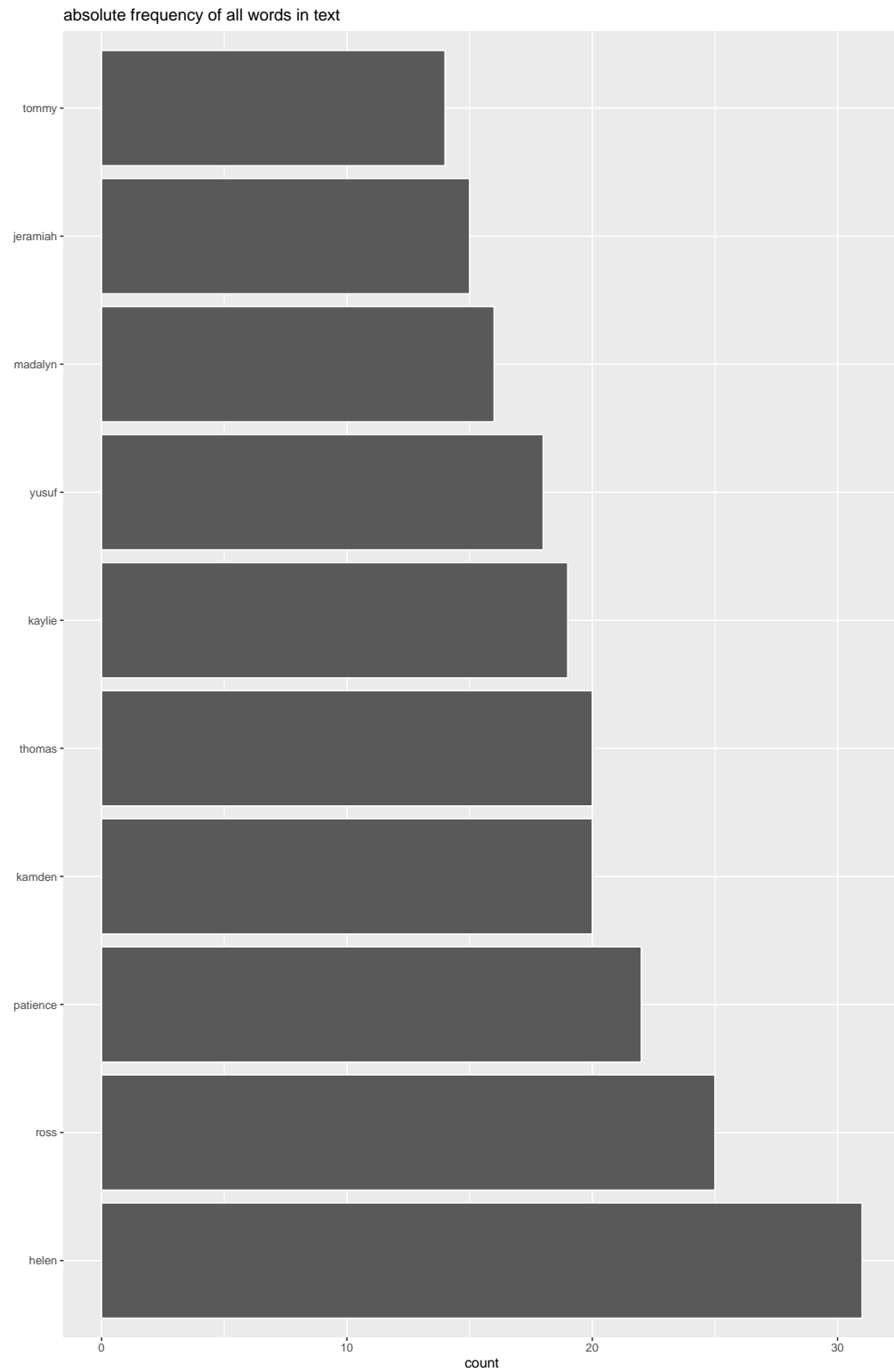
This is the file to create a map reduce classroom example. The setup is as follows

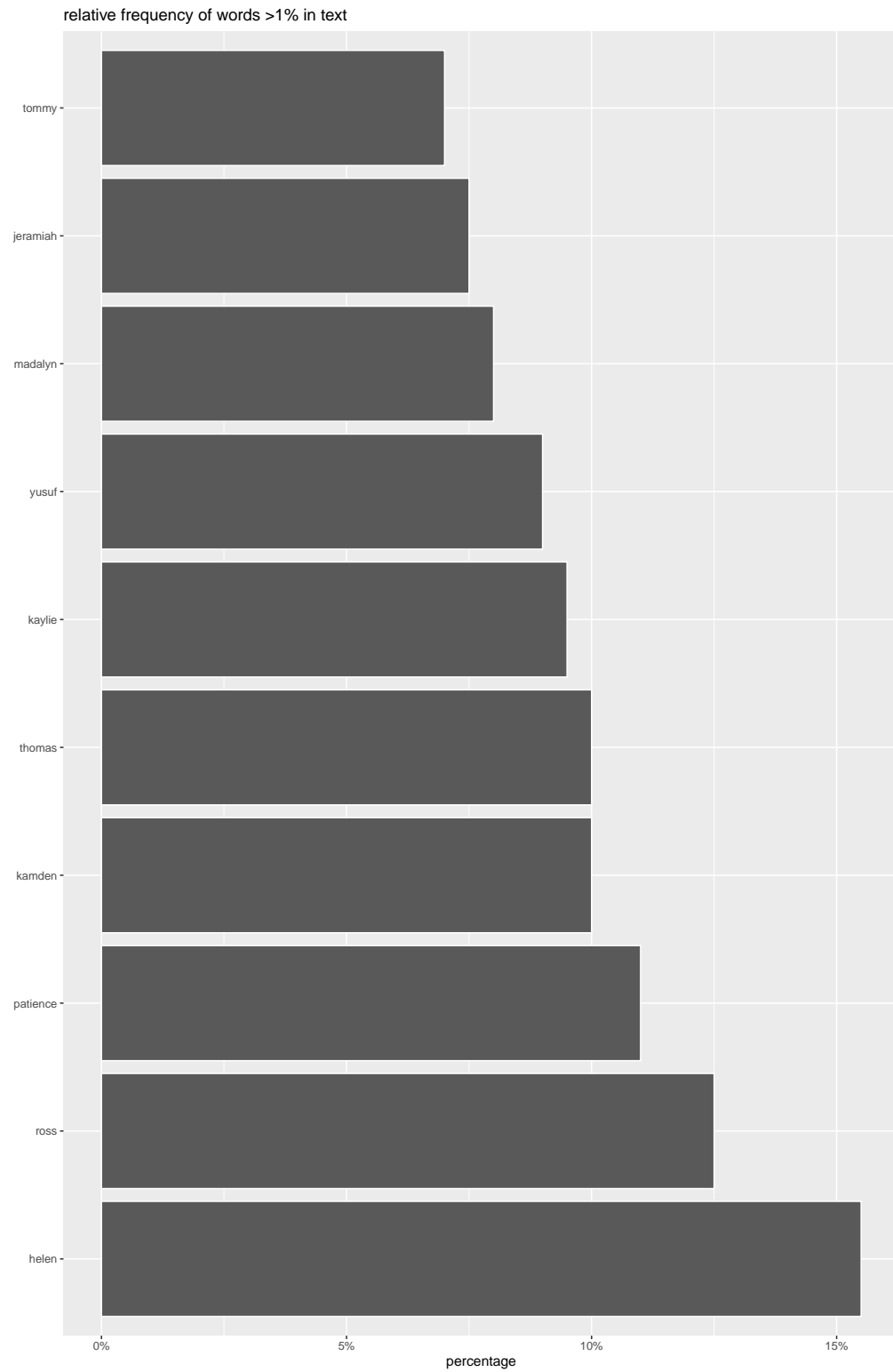
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

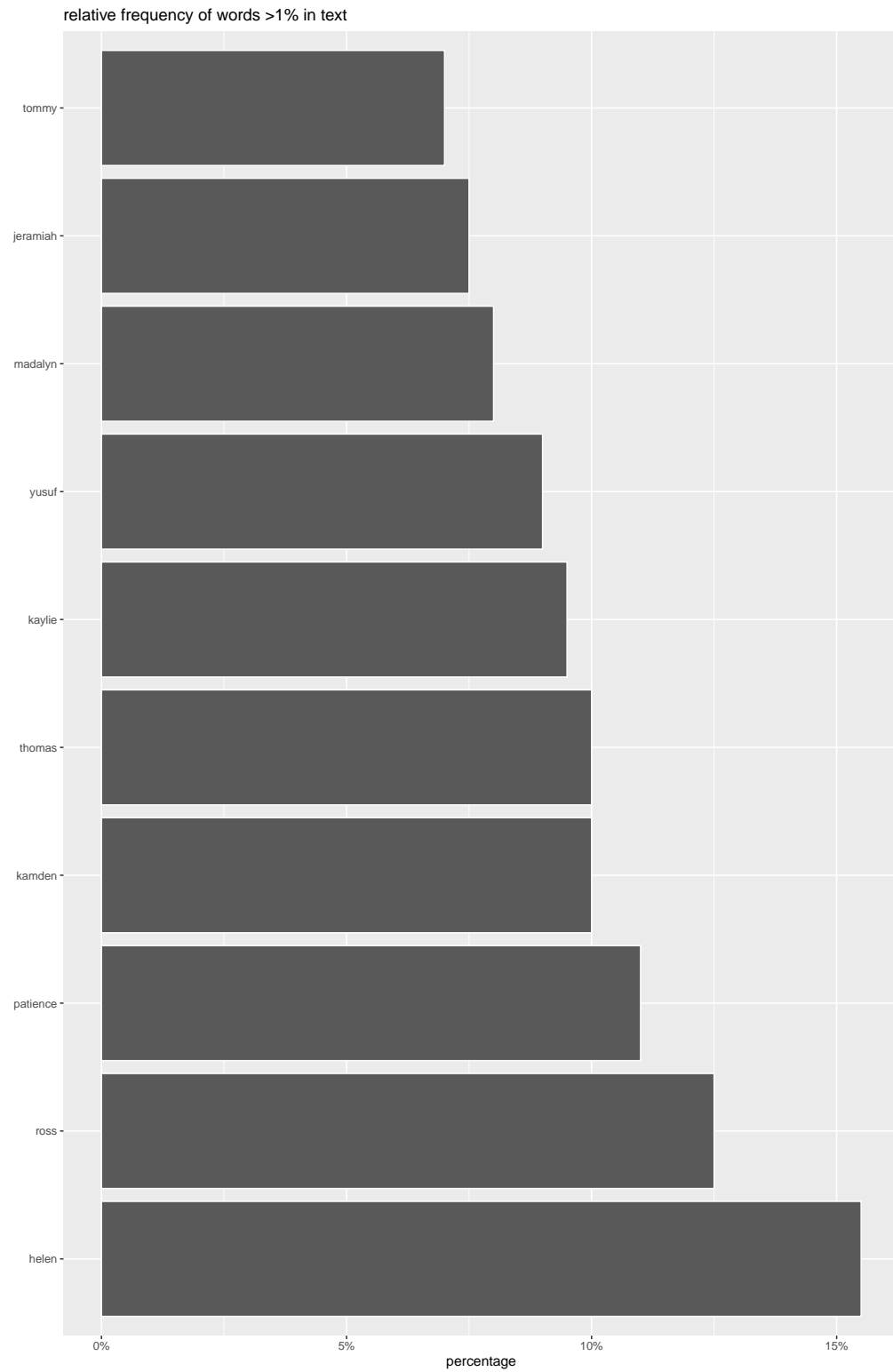
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
helen	31	15.50%	15.50%
ross	25	12.50%	12.50%
patience	22	11.00%	11.00%
kamden	20	10.00%	10.00%
thomas	20	10.00%	10.00%
kaylie	19	9.50%	9.50%
yusuf	18	9.00%	9.00%
madalyn	16	8.00%	8.00%
jeramiah	15	7.50%	7.50%
tommy	14	7.00%	7.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

kamden jeramiah yusuf thomas jeramiah helen jeramiah jeramiah yusuf jeramiah thomas kamden kaylie jeramiah yusuf thomas tommy yusuf yusuf kaylie

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

helen tommy thomas ross yusuf helen patience tommy helen madalyn

Part 2 of 20 (10 words)

thomas helen kamden kaylie ross kamden thomas madalyn yusuf thomas

Part 3 of 20 (10 words)

kamden helen helen jeramiah kaylie yusuf kaylie ross tommy patience

Part 4 of 20 (10 words)

helen madalyn ross patience tommy ross ross helen thomas kaylie

Part 5 of 20 (10 words)

kamden yusuf jeramiah jeramiah yusuf thomas kaylie yusuf tommy yusuf

Part 6 of 20 (10 words)

madalyn madalyn tommy patience patience ross kamden tommy ross yusuf

Part 7 of 20 (10 words)

helen patience ross ross tommy kamden yusuf madalyn ross yusuf

Part 8 of 20 (10 words)

helen thomas helen kaylie patience patience jeramiah ross ross kamden

Part 9 of 20 (10 words)

helen helen patience helen tommy kaylie madalyn patience madalyn jeramiah

Part 10 of 20 (10 words)

thomas madalyn tommy helen yusuf patience helen madalyn ross kaylie

Part 11 of 20 (10 words)

patience ross helen ross helen kamden thomas kaylie tommy yusuf

Part 12 of 20 (10 words)

helen patience kamden patience jeramiah kamden kaylie kamden patience helen

Part 13 of 20 (10 words)

yusuf helen thomas kaylie madalyn jeramiah jeramiah jeramiah patience patience

Part 14 of 20 (10 words)

kamden thomas thomas jeramiah tommy ross helen helen kamden thomas

Part 15 of 20 (10 words)

jeramiah thomas helen jeramiah jeramiah kamden jeramiah thomas yusuf kaylie

Part 16 of 20 (10 words)

kaylie kaylie ross helen helen kamden kamden helen kamden thomas

Part 17 of 20 (10 words)

helen kaylie patience madalyn thomas ross kamden madalyn ross kamden

Part 18 of 20 (10 words)

yusuf ross helen yusuf thomas thomas kaylie madalyn patience patience

Part 19 of 20 (10 words)

ross yusuf ross tommy madalyn kamden helen helen ross yusuf

Part 20 of 20 (10 words)

ross thomas jeramiah tommy kaylie madalyn patience kaylie patience kaylie