

MapReduce

Classroom example

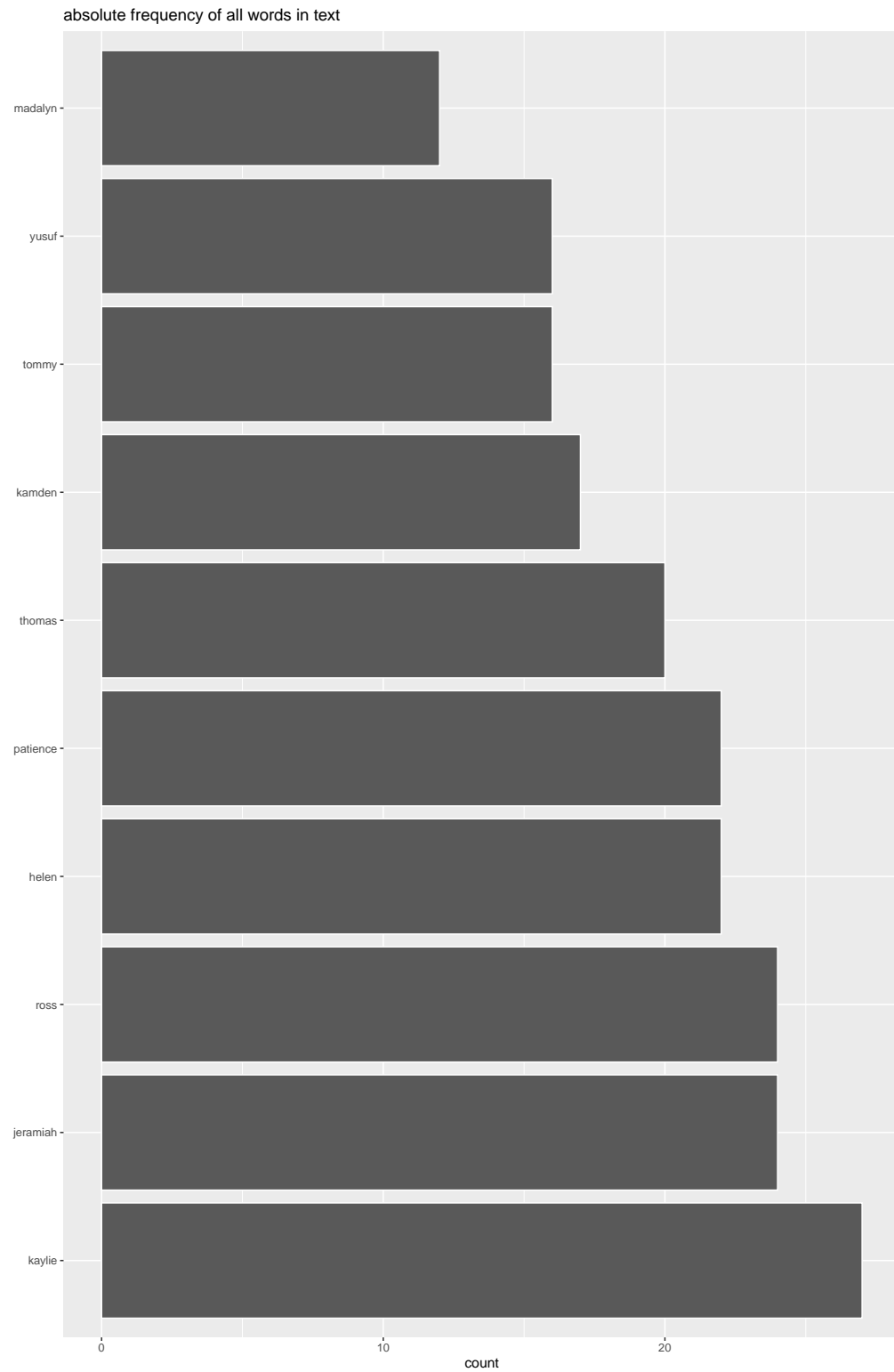
This is the file to create a map reduce classroom example. The setup is as follows

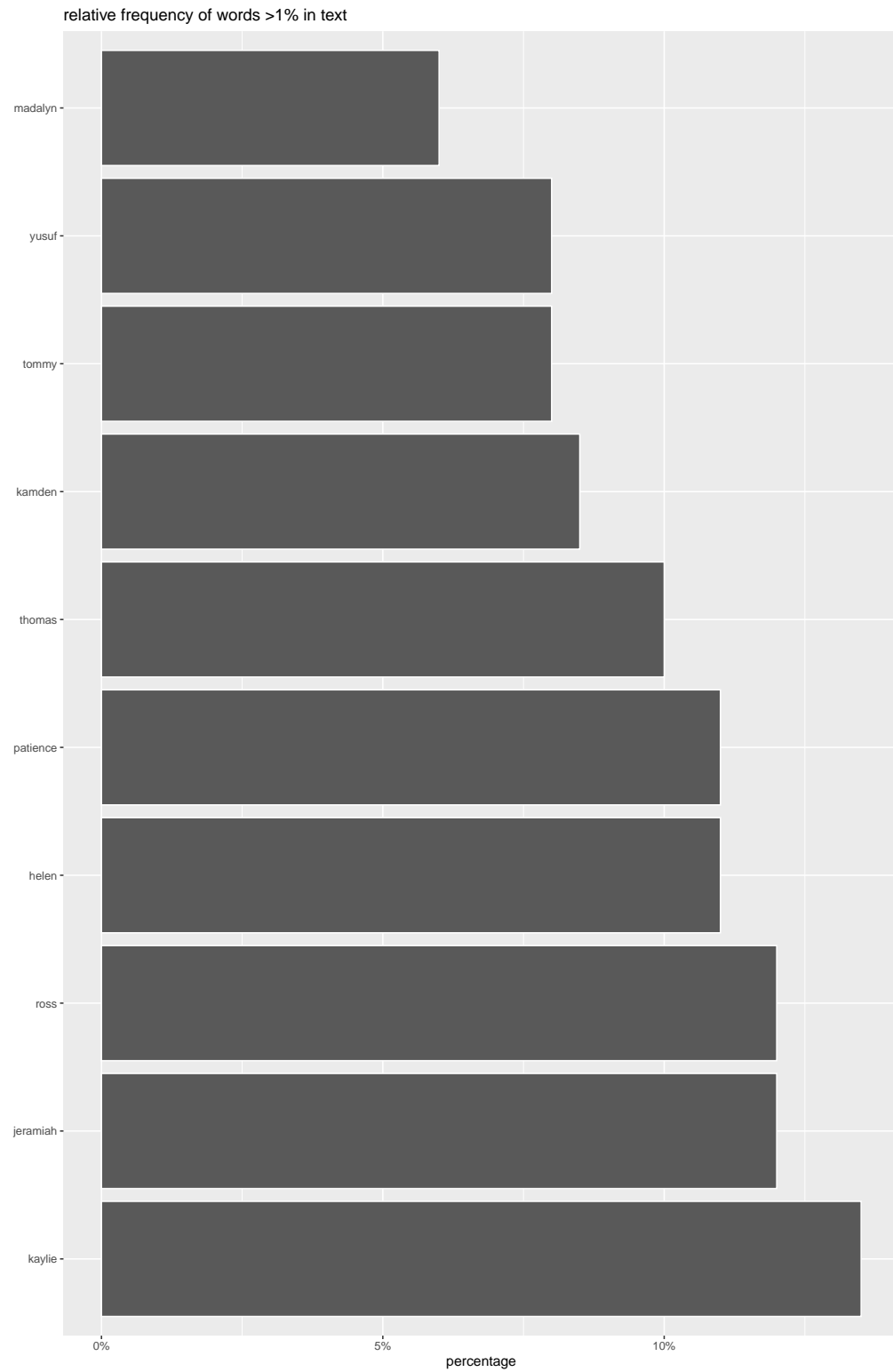
1. print this file
2. give the raw file to 1-4 students, they shall count the words. Measure the time. This is sequential processing.
3. give the chunked file to the respective number of students. There are $n = 2, 4, 5, 10$ groups available. The number of students is the chunk server.
4. one student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

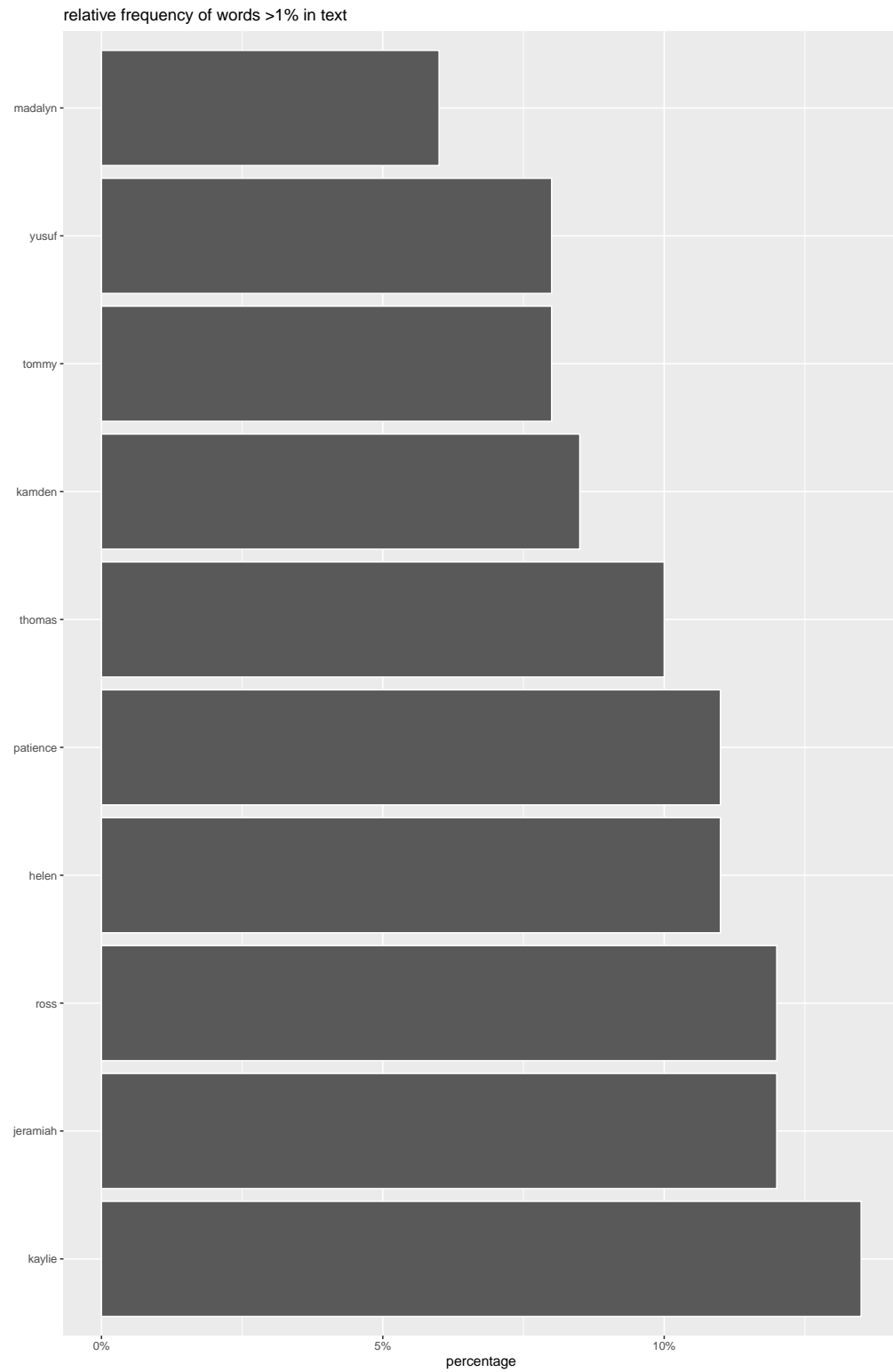
some summary statistics on the raw data

In total there are 200 words available.

words	Freq	percentage	percentage_round
kaylie	27	13.50%	13.50%
jeramiah	24	12.00%	12.00%
ross	24	12.00%	12.00%
helen	22	11.00%	11.00%
patience	22	11.00%	11.00%
thomas	20	10.00%	10.00%
kamden	17	8.50%	8.50%
tommy	16	8.00%	8.00%
yusuf	16	8.00%	8.00%
madalyn	12	6.00%	6.00%







The Raw data 01

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

The Raw data 02

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

The Raw data 03

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

The Raw data 04

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

Two Groups

Part 1 of 2 (100 words)

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

Part 2 of 2 (100 words)

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

Four Groups

Part 1 of 4 (50 words)

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

Part 2 of 4 (50 words)

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

Part 3 of 4 (50 words)

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

Part 4 of 4 (50 words)

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

Five Groups

Part 1 of 5 (40 words)

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

Part 2 of 5 (40 words)

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

Part 3 of 5 (40 words)

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

Part 4 of 5 (40 words)

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

Part 5 of 5 (40 words)

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

Ten Groups

Part 1 of 10 (20 words)

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

Part 2 of 10 (20 words)

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

Part 3 of 10 (20 words)

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

Part 4 of 10 (20 words)

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

Part 5 of 10 (20 words)

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

Part 6 of 10 (20 words)

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

Part 7 of 10 (20 words)

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

Part 8 of 10 (20 words)

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

Part 9 of 10 (20 words)

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

Part 10 of 10 (20 words)

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

Twenty Groups

Part 1 of 20 (10 words)

madalyn tommy ross helen madalyn jeramiah madalyn kamden kaylie kaylie

Part 2 of 20 (10 words)

ross jeramiah jeramiah thomas jeramiah kaylie patience jeramiah kaylie patience

Part 3 of 20 (10 words)

helen ross ross jeramiah tommy kaylie jeramiah tommy kaylie madalyn

Part 4 of 20 (10 words)

thomas kaylie ross thomas madalyn jeramiah helen jeramiah patience thomas

Part 5 of 20 (10 words)

ross madalyn tommy kamden madalyn madalyn ross yusuf kaylie yusuf

Part 6 of 20 (10 words)

helen ross helen yusuf kamden kamden patience ross ross madalyn

Part 7 of 20 (10 words)

kaylie jeramiah yusuf tommy kamden thomas patience jeramiah jeramiah jeramiah

Part 8 of 20 (10 words)

ross yusuf yusuf tommy helen kamden helen kaylie thomas helen

Part 9 of 20 (10 words)

ross helen ross tommy jeramiah kaylie kaylie tommy helen tommy

Part 10 of 20 (10 words)

kaylie thomas kamden helen kaylie kamden thomas kamden kaylie patience

Part 11 of 20 (10 words)

jeramiah jeramiah tommy helen helen helen helen thomas jeramiah kaylie

Part 12 of 20 (10 words)

patience thomas kamden jeramiah tommy thomas patience ross thomas ross

Part 13 of 20 (10 words)

kaylie helen ross jeramiah thomas ross yusuf yusuf patience patience

Part 14 of 20 (10 words)

yusuf kaylie tommy patience patience thomas jeramiah jeramiah tommy thomas

Part 15 of 20 (10 words)

patience thomas yusuf ross kaylie thomas ross patience patience patience

Part 16 of 20 (10 words)

kaylie ross kamden thomas kamden kaylie kaylie tommy helen tommy

Part 17 of 20 (10 words)

helen helen patience kamden kamden kaylie tommy patience kamden helen

Part 18 of 20 (10 words)

thomas madalyn jeramiah yusuf kaylie yusuf jeramiah patience yusuf helen

Part 19 of 20 (10 words)

kaylie kamden ross ross yusuf thomas ross jeramiah patience kaylie

Part 20 of 20 (10 words)

kamden kaylie ross yusuf yusuf patience madalyn patience helen madalyn