

Question 1

Question 2

Question 3

Question 4

Question 5

Question 6

Question 7

Question 8

Question 9

36-290 – Statistical Research Methodology
Week 11 Thursday – Fall 2021

Below we read in Joe Biden's 2021 inauguration speech as formatted by the White House on its website (with one exception: I concatenated the lines containing a poem together into one line).

Question 1

```
## [1] 12717
```

How many spaces are there in the speech, as formatted? (Don't worry about the fact that there would be spaces between the lines if they were all concatenated together.) If you haven't taken 350, then one way to do this is to use one of the functions from later in the notes to identify every place where there are spaces, then use a for-loop to loop over the output from that function and count the number of spaces. For instance:

On the other hand, if you have taken 350, you could just use `sapply()` to help you.

[illegible]

[illegible]

[illegible]

```
total = 0
for ( ii in 1:length(lines) ) {
  total = total+length(matches[[ii]])
}

total
```

```
## [1] 2176
```

Question 3

Create a table showing how many words are on each line of the speech. For our purposes, words are separated by spaces. Utilize `strsplit()`. The output will be a list, where each element shows the individual words from a speech line. Determine the total number of words for each line, put the results in a vector, and run `table()` with that vector as input. You should find that nine of the lines have one word, etc. (Note that you'll utilize a for-loop again, in a manner similar to the last question.)

```
splitword <- strsplit(lines[1:211],split=" ")
splitword
```

```
## [[1]]
## [1] "Chief"          "Justice"        "Roberts,"       "Vice"
## [5] "President"      "Harris,"        "Speaker"        "Pelosi,"
## [9] "Leader"        "Schumer,"       "Leader"         "McConnell,"
## [13] "Vice"          "President"       "Pence,"         "distinguished"
## [17] "guests,"       "and"            "my"             "fellow"
## [21] "Americans."
##
## [[2]]
## [1] "This"          "is"             "America's" "day."
##
## [[3]]
## [1] "This"          "is"             "democracy's" "day."
##
## [[4]]
## [1] "A"             "day"           "of"            "history" "and"          "hope."
##
## [[5]]
```

```

## [1] "Of" "renewal" "and" "resolve."
##
## [[6]]
## [1] "Through" "a" "crucible" "for" "the"
## [6] "ages" "America" "has" "been" "tested"
## [11] "anew" "and" "America" "has" "risen"
## [16] "to" "the" "challenge."
##
## [[7]]
## [1] "Today," "we" "celebrate" "the" "triumph"
## [6] "not" "of" "a" "candidate," "but"
## [11] "of" "a" "cause," "the" "cause"
## [16] "of" "democracy."
##
## [[8]]
## [1] "The" "will" "of" "the" "people" "has" "been"
## [8] "heard" "and" "the" "will" "of" "the" "people"
## [15] "has" "been" "heeded."
##
## [[9]]
## [1] "We" "have" "learned" "again" "that" "democracy"
## [7] "is" "precious."
##
## [[10]]
## [1] "Democracy" "is" "fragile."
##
## [[11]]
## [1] "And" "at" "this" "hour," "my"
## [6] "friends," "democracy" "has" "prevailed."
##
## [[12]]
## [1] "So" "now," "on" "this" "hallowed"
## [6] "ground" "where" "just" "days" "ago"
## [11] "violence" "sought" "to" "shake" "this"
## [16] "Capitol's" "very" "foundation," "we" "come"
## [21] "together" "as" "one" "nation," "under"
## [26] "God," "indivisible," "to" "carry" "out"
## [31] "the" "peaceful" "transfer" "of" "power"
## [36] "as" "we" "have" "for" "more"
## [41] "than" "two" "centuries."
##
## [[13]]
## [1] "We" "look" "ahead" "in" "our"
## [6] "uniquely" "American" "way" "- " "restless,"
## [11] "bold," "optimistic" "- " "and" "set"
## [16] "our" "sights" "on" "the" "nation"
## [21] "we" "know" "we" "can" "be"
## [26] "and" "we" "must" "be."
##
## [[14]]
## [1] "I" "thank" "my" "predecessors" "of"
## [6] "both" "parties" "for" "their" "presence"
## [11] "here."
##
## [[15]]
## [1] "I" "thank" "them" "from" "the" "bottom" "of" "my"
## [9] "heart."
##
## [[16]]
## [1] "You" "know" "the" "resilience" "of"
## [6] "our" "Constitution" "and" "the" "strength"
## [11] "of" "our" "nation."
##
## [[17]]
## [1] "As" "does" "President" "Carter," "who" "I"
## [7] "spoke" "to" "last" "night" "but" "who"
## [13] "cannot" "be" "with" "us" "today," "but"
## [19] "whom" "we" "salute" "for" "his" "lifetime"
## [25] "of" "service."
##
## [[18]]
## [1] "I" "have" "just" "taken" "the"
## [6] "sacred" "oath" "each" "of" "these"
## [11] "patriots" "took" "- " "an" "oath"
## [16] "first" "sworn" "by" "George" "Washington."
##
## [[19]]
## [1] "But" "the" "American" "story" "depends" "not"
## [7] "on" "any" "one" "of" "us," "not"

```

```

## [13] "on"      "some"    "of"      "us,"     "but"     "on"
## [19] "all"     "of"      "us."
##
## [[20]]
## [1] "On"      "\We"     "the"     "People\" "who"     "seek"
## [7] "a"       "more"    "perfect" "Union."
##
## [[21]]
## [1] "This"    "is"      "a"       "great"   "nation"  "and"    "we"
## [8] "are"     "a"       "good"    "people."
##
## [[22]]
## [1] "Over"    "the"     "centuries" "through"  "storm"   "and"
## [7] "strife," "in"      "peace"    "and"      "in"      "war,"
## [13] "we"      "have"    "come"     "so"       "far."    "But"
## [19] "we"      "still"   "have"     "far"      "to"      "go."
##
## [[23]]
## [1] "We"      "will"    "press"    "forward"  "with"
## [6] "speed"   "and"     "urgency," "for"      "we"
## [11] "have"    "much"    "to"       "do"       "in"
## [16] "this"    "winter"  "of"       "peril"    "and"
## [21] "possibility."
##
## [[24]]
## [1] "Much"    "to"      "repair."
##
## [[25]]
## [1] "Much"    "to"      "restore."
##
## [[26]]
## [1] "Much"    "to"      "heal."
##
## [[27]]
## [1] "Much"    "to"      "build."
##
## [[28]]
## [1] "And"     "much"    "to"      "gain."
##
## [[29]]
## [1] "Few"     "periods" "in"      "our"      "nation's"
## [6] "history" "have"    "been"    "more"     "challenging"
## [11] "or"      "difficult" "than"    "the"      "one"
## [16] "we're"   "in"      "now."
##
## [[30]]
## [1] "A"                "once-in-a-century" "virus"
## [4] "silently"         "stalks"            "the"
## [7] "country."
##
## [[31]]
## [1] "It's"    "taken"    "as"      "many"    "lives"   "in"      "one"
## [8] "year"    "as"      "America" "lost"    "in"      "all"     "of"
## [15] "World"   "War"     "II."
##
## [[32]]
## [1] "Millions" "of"      "jobs"    "have"    "been"    "lost."
##
## [[33]]
## [1] "Hundreds" "of"      "thousands" "of"      "businesses"
## [6] "closed."
##
## [[34]]
## [1] "A"       "cry"     "for"     "racial"  "justice" "some"
## [7] "400"     "years"   "in"      "the"     "making"  "moves"
## [13] "us."     "The"     "dream"   "of"      "justice" "for"
## [19] "all"     "will"    "be"      "deferred" "no"      "longer."
##
## [[35]]
## [1] "A"       "cry"     "for"     "survival" "comes"   "from"
## [7] "the"     "planet"  "itself." "A"        "cry"     "that"
## [13] "can't"   "be"      "any"     "more"     "desperate" "or"
## [19] "any"     "more"    "clear."
##
## [[36]]
## [1] "And"     "now,"    "a"       "rise"     "in"
## [6] "political" "extremism," "white"   "supremacy," "domestic"
## [11] "terrorism" "that"    "we"      "must"     "confront"
## [16] "and"     "we"      "will"    "defeat."

```

```

##
## [[37]]
## [1] "To"           "overcome"  "these"     "challenges" "- "
## [6] "to"           "restore"   "the"       "soul"       "and"
## [11] "to"           "secure"    "the"       "future"     "of"
## [16] "America"     "- "        "requires"  "more"       "than"
## [21] "words."
##
## [[38]]
## [1] "It"           "requires"  "that"      "most"       "elusive"
## [6] "of"           "things"    "in"        "a"          "democracy:"
##
## [[39]]
## [1] "Unity."
##
## [[40]]
## [1] "Unity."
##
## [[41]]
## [1] "In"           "another"   "January"   "in"
## [5] "Washington," "on"        "New"       "Year's"
## [9] "Day"          "1863,"    "Abraham"   "Lincoln"
## [13] "signed"       "the"      "Emancipation" "Proclamation."
##
## [[42]]
## [1] "When"        "he"        "put"       "pen"        "to"        "paper,"
## [7] "the"         "President"  "said,"    "\If"        "my"        "name"
## [13] "ever"        "goes"      "down"     "into"       "history"   "it"
## [19] "will"        "be"        "for"      "this"       "act"       "and"
## [25] "my"          "whole"     "soul"     "is"         "in"        "it.\\""
##
## [[43]]
## [1] "My"          "whole"     "soul"     "is"         "in"        "it."
##
## [[44]]
## [1] "Today,"     "on"        "this"     "January"   "day,"     "my"        "whole"
## [8] "soul"       "is"        "in"       "this:"
##
## [[45]]
## [1] "Bringing"   "America"   "together."
##
## [[46]]
## [1] "Uniting"    "our"       "people."
##
## [[47]]
## [1] "And"        "uniting"   "our"      "nation."
##
## [[48]]
## [1] "I"          "ask"       "every"    "American"  "to"        "join"
## [7] "me"         "in"        "this"     "cause."
##
## [[49]]
## [1] "Uniting"    "to"        "fight"    "the"       "common"    "foes"     "we"
## [8] "face:"
##
## [[50]]
## [1] "Anger,"     "resentment," "hatred."
##
## [[51]]
## [1] "Extremism," "lawlessness," "violence."
##
## [[52]]
## [1] "Disease,"   "joblessness," "hopelessness."
##
## [[53]]
## [1] "With"       "unity"     "we"       "can"       "do"        "great"
## [7] "things."    "Important" "things."
##
## [[54]]
## [1] "We"         "can"       "right"    "wrongs."
##
## [[55]]
## [1] "We"         "can"       "put"      "people"    "to"        "work"     "in"       "good"
## [9] "jobs."
##
## [[56]]
## [1] "We"         "can"       "teach"    "our"       "children"  "in"       "safe"
## [8] "schools."
##

```

```

## [[57]]
## [1] "We"          "can"          "overcome" "this"          "deadly" "virus."
##
## [[58]]
## [1] "We"          "can"          "reward" "work," "rebuild" "the" "middle"
## [8] "class," "and"          "make"      "health" "care" "secure" "for"
## [15] "all."
##
## [[59]]
## [1] "We"          "can"          "deliver" "racial" "justice."
##
## [[60]]
## [1] "We"          "can"          "make"      "America," "once" "again,"
## [7] "the"          "leading" "force"      "for" "good" "in"
## [13] "the"          "world."
##
## [[61]]
## [1] "I"          "know"          "speaking" "of" "unity" "can"
## [7] "sound"      "to"          "some"      "like" "a" "foolish"
## [13] "fantasy."
##
## [[62]]
## [1] "I"          "know" "the" "forces" "that" "divide" "us" "are"
## [9] "deep" "and" "they" "are" "real."
##
## [[63]]
## [1] "But" "I" "also" "know" "they" "are" "not" "new."
##
## [[64]]
## [1] "Our"          "history" "has" "been" "a"
## [6] "constant" "struggle" "between" "the" "American"
## [11] "ideal" "that" "we" "are" "all"
## [16] "created" "equal" "and" "the" "harsh,"
## [21] "ugly" "reality" "that" "racism," "nativism,"
## [26] "fear," "and" "demonization" "have" "long"
## [31] "torn" "us" "apart."
##
## [[65]]
## [1] "The"          "battle" "is" "perennial."
##
## [[66]]
## [1] "Victory" "is" "never" "assured."
##
## [[67]]
## [1] "Through" "the" "Civil" "War," "the"
## [6] "Great" "Depression," "World" "War," "9/11,"
## [11] "through" "struggle," "sacrifice," "and" "setbacks,"
## [16] "our" "\better" "angels\" "have" "always"
## [21] "prevailed."
##
## [[68]]
## [1] "In"          "each" "of" "these" "moments," "enough"
## [7] "of" "us" "came" "together" "to" "carry"
## [13] "all" "of" "us" "forward."
##
## [[69]]
## [1] "And," "we" "can" "do" "so" "now."
##
## [[70]]
## [1] "History," "faith," "and" "reason" "show" "the"
## [7] "way," "the" "way" "of" "unity."
##
## [[71]]
## [1] "We"          "can" "see" "each" "other"
## [6] "not" "as" "adversaries" "but" "as"
## [11] "neighbors."
##
## [[72]]
## [1] "We"          "can" "treat" "each" "other" "with" "dignity"
## [8] "and" "respect."
##
## [[73]]
## [1] "We"          "can" "join" "forces," "stop"
## [6] "the" "shouting," "and" "lower" "the"
## [11] "temperature."
##
## [[74]]
## [1] "For"          "without" "unity," "there" "is"
## [6] "no" "peace," "only" "bitterness" "and"

```

```

## [11] "fury."
##
## [[75]]
## [1] "No"          "progress," "only"          "exhausting" "outrage."
##
## [[76]]
## [1] "No"          "nation," "only"          "a"          "state"      "of"          "chaos."
##
## [[77]]
## [1] "This"        "is"         "our"         "historic"   "moment"
## [6] "of"          "crisis"     "and"         "challenge," "and"
## [11] "unity"       "is"         "the"         "path"       "forward."
##
## [[78]]
## [1] "And,"        "we"         "must"        "meet"       "this"       "moment"
## [7] "as"          "the"        "United"      "States"     "of"         "America."
##
## [[79]]
## [1] "If"          "we"         "do"          "that,"      "I"          "guarantee"
## [7] "you,"        "we"         "will"        "not"        "fail."
##
## [[80]]
## [1] "We"          "have"       "never,"      "ever,"      "ever"       "failed"
## [7] "in"          "America"    "when"        "we"         "have"       "acted"
## [13] "together."
##
## [[81]]
## [1] "And"         "so"         "today,"     "at"         "this"       "time"     "and"
## [8] "in"          "this"       "place,"     "let"        "us"         "start"    "afresh."
##
## [[82]]
## [1] "All"         "of"         "us."
##
## [[83]]
## [1] "Let"         "us"         "listen"     "to"         "one"        "another."
##
## [[84]]
## [1] "Hear"        "one"        "another."
##
## [[85]]
## [1] "See"         "one"        "another."
##
## [[86]]
## [1] "Show"        "respect"    "to"         "one"        "another."
##
## [[87]]
## [1] "Politics"    "need"       "not"        "be"         "a"
## [6] "raging"      "fire"       "destroying" "everything" "in"
## [11] "its"         "path."
##
## [[88]]
## [1] "Every"       "disagreement" "doesn't"    "have"       "to"
## [6] "be"          "a"          "cause"     "for"        "total"
## [11] "war."
##
## [[89]]
## [1] "And,"        "we"         "must"       "reject"
## [5] "a"           "culture"    "in"         "which"
## [9] "facts"       "themselves" "are"        "manipulated"
## [13] "and"         "even"       "manufactured."
##
## [[90]]
## [1] "My"          "fellow"     "Americans," "we"         "have"
## [6] "to"          "be"         "different"  "than"       "this."
##
## [[91]]
## [1] "America"     "has"        "to"         "be"         "better"     "than"     "this."
##
## [[92]]
## [1] "And,"        "I"          "believe"   "America"    "is"         "better"   "than"
## [8] "this."
##
## [[93]]
## [1] "Just"        "look"       "around."
##
## [[94]]
## [1] "Here"        "we"         "stand,"     "in"         "the"        "shadow"
## [7] "of"          "a"          "Capitol"    "dome"       "that"       "was"
## [13] "completed"   "amid"       "the"        "Civil"      "War,"       "when"

```



```
## [19] "the"      "Union"      "itself"      "hung"      "in"      "the"
## [25] "balance."
##
## [[95]]
## [1] "Yet"      "we"      "endured"      "and"      "we"
## [6] "prevailed."
##
## [[96]]
## [1] "Here"      "we"      "stand"      "looking"      "out"      "to"      "the"
## [8] "great"      "Mall"      "where"      "Dr."      "King"      "spoke"      "of"
## [15] "his"      "dream."
##
## [[97]]
## [1] "Here"      "we"      "stand,"      "where"      "108"
## [6] "years"      "ago"      "at"      "another"      "inaugural,"
## [11] "thousands"      "of"      "protestors"      "tried"      "to"
## [16] "block"      "brave"      "women"      "from"      "marching"
## [21] "for"      "the"      "right"      "to"      "vote."
##
## [[98]]
## [1] "Today,"      "we"      "mark"      "the"      "swearing-in"
## [6] "of"      "the"      "first"      "woman"      "in"
## [11] "American"      "history"      "elected"      "to"      "national"
## [16] "office"      "-"      "Vice"      "President"      "Kamala"
## [21] "Harris."
##
## [[99]]
## [1] "Don't"      "tell"      "me"      "things"      "can't"      "change."
##
## [[100]]
## [1] "Here"      "we"      "stand"      "across"      "the"      "Potomac"
## [7] "from"      "Arlington"      "National"      "Cemetery,"      "where"      "heroes"
## [13] "who"      "gave"      "the"      "last"      "full"      "measure"
## [19] "of"      "devotion"      "rest"      "in"      "eternal"      "peace."
##
## [[101]]
## [1] "And"      "here"      "we"      "stand,"      "just"
## [6] "days"      "after"      "a"      "riotous"      "mob"
## [11] "thought"      "they"      "could"      "use"      "violence"
## [16] "to"      "silence"      "the"      "will"      "of"
## [21] "the"      "people,"      "to"      "stop"      "the"
## [26] "work"      "of"      "our"      "democracy,"      "and"
## [31] "to"      "drive"      "us"      "from"      "this"
## [36] "sacred"      "ground."
##
## [[102]]
## [1] "That"      "did"      "not"      "happen."
##
## [[103]]
## [1] "It"      "will"      "never"      "happen."
##
## [[104]]
## [1] "Not"      "today."
##
## [[105]]
## [1] "Not"      "tomorrow."
##
## [[106]]
## [1] "Not"      "ever."
##
## [[107]]
## [1] "To"      "all"      "those"      "who"      "supported"      "our"
## [7] "campaign"      "I"      "am"      "humbled"      "by"      "the"
## [13] "faith"      "you"      "have"      "placed"      "in"      "us."
##
## [[108]]
## [1] "To"      "all"      "those"      "who"      "did"      "not"
## [7] "support"      "us,"      "let"      "me"      "say"      "this:"
## [13] "Hear"      "me"      "out"      "as"      "we"      "move"
## [19] "forward."      "Take"      "a"      "measure"      "of"      "me"
## [25] "and"      "my"      "heart."
##
## [[109]]
## [1] "And"      "if"      "you"      "still"      "disagree,"      "so"
## [7] "be"      "it."
##
## [[110]]
## [1] "That's"      "democracy."      "That's"      "America."      "The"
## [6] "right"      "to"      "dissent"      "peaceably,"      "within"
```

```

## [11] "the"          "guardrails" "of"          "our"          "Republic,"
## [16] "is"           "perhaps"    "our"          "nation's"     "greatest"
## [21] "strength."
##
## [[111]]
## [1] "Yet"          "hear"        "me"          "clearly:"     "Disagreement"
## [6] "must"         "not"         "lead"        "to"           "disunion."
##
## [[112]]
## [1] "And"          "I"           "pledge"      "this"         "to"
## [6] "you:"         "I"           "will"        "be"           "a"
## [11] "President"    "for"         "all"         "Americans."
##
## [[113]]
## [1] "I"           "will"        "fight"       "as"           "hard"        "for"         "those"
## [8] "who"         "did"         "not"         "support"      "me"          "as"          "for"
## [15] "those"      "who"         "did."
##
## [[114]]
## [1] "Many"         "centuries"   "ago,"        "Saint"        "Augustine,"
## [6] "a"            "saint"       "of"          "my"           "church,"
## [11] "wrote"        "that"        "a"           "people"       "was"
## [16] "a"            "multitude"   "defined"     "by"           "the"
## [21] "common"      "objects"     "of"          "their"        "love."
##
## [[115]]
## [1] "What"         "are"         "the"         "common"       "objects"
## [6] "we"           "love"        "that"        "define"       "us"
## [11] "as"           "Americans?"
##
## [[116]]
## [1] "I"           "think" "I"          "know."
##
## [[117]]
## [1] "Opportunity."
##
## [[118]]
## [1] "Security."
##
## [[119]]
## [1] "Liberty."
##
## [[120]]
## [1] "Dignity."
##
## [[121]]
## [1] "Respect."
##
## [[122]]
## [1] "Honor."
##
## [[123]]
## [1] "And," "yes," "the" "truth."
##
## [[124]]
## [1] "Recent" "weeks" "and" "months" "have" "taught" "us"
## [8] "a"      "painful" "lesson."
##
## [[125]]
## [1] "There" "is" "truth" "and" "there" "are" "lies."
##
## [[126]]
## [1] "Lies" "told" "for" "power" "and" "for" "profit."
##
## [[127]]
## [1] "And"          "each"          "of"          "us"
## [5] "has"          "a"             "duty"        "and"
## [9] "responsibility," "as"           "citizens,"  "as"
## [13] "Americans,"   "and"          "especially"  "as"
## [17] "leaders"      "-"           "leaders"     "who"
## [21] "have"         "pledged"      "to"          "honor"
## [25] "our"          "Constitution" "and"         "protect"
## [29] "our"          "nation"       "-"          "to"
## [33] "defend"       "the"          "truth"       "and"
## [37] "to"           "defeat"       "the"         "lies."
##
## [[128]]
## [1] "I"           "understand"   "that"        "many"         "Americans"
## [6] "view"        "the"          "future"      "with"         "some"

```

```

## [11] "fear"          "and"          "trepidation."
##
## [[129]]
## [1] "I"              "understand"  "they"        "worry"       "about"
## [6] "their"          "jobs,"       "about"        "taking"       "care"
## [11] "of"             "their"       "families,"    "about"        "what"
## [16] "comes"          "next."
##
## [[130]]
## [1] "I"      "get" "it."
##
## [[131]]
## [1] "But"          "the"          "answer"       "is"          "not"
## [6] "to"           "turn"         "inward,"     "to"          "retreat"
## [11] "into"         "competing"    "factions,"   "distrusting" "those"
## [16] "who"          "don't"        "look"        "like"        "you"
## [21] "do,"          "or"           "worship"     "the"         "way"
## [26] "you"          "do,"          "or"          "don't"       "get"
## [31] "their"        "news"         "from"        "the"         "same"
## [36] "sources"      "you"          "do."
##
## [[132]]
## [1] "We"          "must"         "end"          "this"         "uncivil"
## [6] "war"         "that"         "pits"         "red"          "against"
## [11] "blue,"       "rural"        "versus"       "urban,"       "conservative"
## [16] "versus"      "liberal."
##
## [[133]]
## [1] "We"          "can"          "do"           "this"         "if"          "we"
## [7] "open"        "our"          "souls"        "instead"      "of"          "hardening"
## [13] "our"         "hearts."
##
## [[134]]
## [1] "If"          "we"           "show"         "a"            "little"      "tolerance"
## [7] "and"         "humility."
##
## [[135]]
## [1] "If"          "we're"        "willing"      "to"           "stand"       "in"
## [7] "the"         "other"        "person's"    "shoes"        "just"        "for"
## [13] "a"           "moment."
##
## [[136]]
## [1] "Because"     "here"         "is"           "the"          "thing"
## [6] "about"       "life:"        "There"        "is"           "no"
## [11] "accounting" "for"          "what"         "fate"         "will"
## [16] "deal"        "you."
##
## [[137]]
## [1] "There" "are"  "some" "days" "when" "we"  "need" "a"  "hand."
##
## [[138]]
## [1] "There" "are"  "other" "days" "when" "we're" "called" "on"
## [9] "to"    "lend" "one."
##
## [[139]]
## [1] "That"  "is"      "how"      "we"      "must"    "be"      "with"
## [8] "one"   "another."
##
## [[140]]
## [1] "And,"  "if"      "we"      "are"      "this"
## [6] "way,"  "our"     "country" "will"     "be"
## [11] "stronger," "more"   "prosperous," "more"   "ready"
## [16] "for"    "the"    "future."
##
## [[141]]
## [1] "My"      "fellow"  "Americans," "in"      "the"
## [6] "work"    "ahead"   "of"         "us,"     "we"
## [11] "will"    "need"    "each"       "other."
##
## [[142]]
## [1] "We"      "will"    "need"      "all"      "our"      "strength"
## [7] "to"      "persevere" "through"   "this"     "dark"     "winter."
##
## [[143]]
## [1] "We"      "are"      "entering"  "what"     "may"      "well"
## [7] "be"      "the"      "toughest"  "and"      "deadliest" "period"
## [13] "of"      "the"      "virus."
##
## [[144]]

```

```
## [1] "We" "must" "set" "aside" "the" "politics"
## [7] "and" "finally" "face" "this" "pandemic" "as"
## [13] "one" "nation."
##
## [[145]]
## [1] "I" "promise" "you" "this:" "as" "the"
## [7] "Bible" "says" "weeping" "may" "endure" "for"
## [13] "a" "night" "but" "joy" "cometh" "in"
## [19] "the" "morning."
##
## [[146]]
## [1] "We" "will" "get" "through" "this," "together"
##
## [[147]]
## [1] "The" "world" "is" "watching" "today."
##
## [[148]]
## [1] "So" "here" "is" "my" "message" "to"
## [7] "those" "beyond" "our" "borders:" "America" "has"
## [13] "been" "tested" "and" "we" "have" "come"
## [19] "out" "stronger" "for" "it."
##
## [[149]]
## [1] "We" "will" "repair" "our" "alliances" "and"
## [7] "engage" "with" "the" "world" "once" "again."
##
## [[150]]
## [1] "Not" "to" "meet" "yesterday's" "challenges,"
## [6] "but" "today's" "and" "tomorrow's."
##
## [[151]]
## [1] "We" "will" "lead" "not" "merely" "by"
## [7] "the" "example" "of" "our" "power" "but"
## [13] "by" "the" "power" "of" "our" "example."
##
## [[152]]
## [1] "We" "will" "be" "a" "strong" "and"
## [7] "trusted" "partner" "for" "peace," "progress," "and"
## [13] "security."
##
## [[153]]
## [1] "We" "have" "been" "through" "so" "much" "in"
## [8] "this" "nation."
##
## [[154]]
## [1] "And," "in" "my" "first" "act"
## [6] "as" "President," "I" "would" "like"
## [11] "to" "ask" "you" "to" "join"
## [16] "me" "in" "a" "moment" "of"
## [21] "silent" "prayer" "to" "remember" "all"
## [26] "those" "we" "lost" "this" "past"
## [31] "year" "to" "the" "pandemic."
##
## [[155]]
## [1] "To" "those" "400,000" "fellow" "Americans"
## [6] "-" "mothers" "and" "fathers," "husbands"
## [11] "and" "wives," "sons" "and" "daughters,"
## [16] "friends," "neighbors," "and" "co-workers."
##
## [[156]]
## [1] "We" "will" "honor" "them" "by" "becoming"
## [7] "the" "people" "and" "nation" "we" "know"
## [13] "we" "can" "and" "should" "be."
##
## [[157]]
## [1] "Let" "us" "say" "a" "silent" "prayer"
## [7] "for" "those" "who" "lost" "their" "lives,"
## [13] "for" "those" "they" "left" "behind," "and"
## [19] "for" "our" "country."
##
## [[158]]
## [1] "Amen."
##
## [[159]]
## [1] "This" "is" "a" "time" "of" "testing."
##
## [[160]]
## [1] "We" "face" "an" "attack" "on" "democracy"
## [7] "and" "on" "truth."
```

```

##
## [[161]]
## [1] "A"          "raging" "virus."
##
## [[162]]
## [1] "Growing"    "inequity."
##
## [[163]]
## [1] "The"        "sting"    "of"        "systemic" "racism."
##
## [[164]]
## [1] "A"          "climate" "in"        "crisis."
##
## [[165]]
## [1] "America's" "role"     "in"        "the"       "world."
##
## [[166]]
## [1] "Any"        "one"      "of"        "these"     "would"     "be"
## [7] "enough"    "to"       "challenge" "us"        "in"        "profound"
## [13] "ways."
##
## [[167]]
## [1] "But"                "the"                "fact"
## [4] "is"                 "we"                 "face"
## [7] "them"              "all"                "at"
## [10] "once,"             "presenting"         "this"
## [13] "nation"            "with"               "the"
## [16] "gravest"           "of"                 "responsibilities."
##
## [[168]]
## [1] "Now"  "we"    "must" "step" "up."
##
## [[169]]
## [1] "All" "of"  "us."
##
## [[170]]
## [1] "It"      "is"      "a"      "time"    "for"      "boldness,"
## [7] "for"     "there"   "is"     "so"      "much"     "to"
## [13] "do."
##
## [[171]]
## [1] "And,"    "this"    "is"      "certain."
##
## [[172]]
## [1] "We"      "will"    "be"      "judged," "you"      "and"
## [7] "I,"      "for"     "how"     "we"      "resolve"  "the"
## [13] "cascading" "crises" "of"      "our"     "era."
##
## [[173]]
## [1] "Will"    "we"      "rise"    "to"      "the"      "occasion?"
##
## [[174]]
## [1] "Will"    "we"      "master"  "this"    "rare"     "and"
## [7] "difficult" "hour?"
##
## [[175]]
## [1] "Will"    "we"      "meet"    "our"      "obligations"
## [6] "and"     "pass"    "along"   "a"        "new"
## [11] "and"     "better"  "world"   "for"      "our"
## [16] "children?"
##
## [[176]]
## [1] "I"      "believe" "we"      "must"    "and"      "I"        "believe"
## [8] "we"     "will."
##
## [[177]]
## [1] "And"     "when"    "we"      "do,"     "we"      "will"
## [7] "write"   "the"     "next"    "chapter" "in"      "the"
## [13] "American" "story."
##
## [[178]]
## [1] "It's"    "a"       "story"   "that"    "might"   "sound"
## [7] "something" "like"    "a"       "song"    "that"    "means"
## [13] "a"       "lot"     "to"      "me."
##
## [[179]]
## [1] "It's"    "called"   "\"American" "Anthem\""" "and"
## [6] "there"   "is"       "one"       "verse"     "stands"
## [11] "out"     "for"      "me:"

```

```

##
## [[180]]
## [1] "\"The"      "work"      "and"      "prayers"   "of"        "centuries"
## [7] "have"      "brought"   "us"       "to"        "this"      "day"
## [13] "/"         "What"      "shall"    "be"        "our"       "legacy?"
## [19] "/"         "What"      "will"     "our"       "children"  "say?"
## [25] "/"         "Let"       "me"       "know"      "in"        "my"
## [31] "heart"     "/"         "When"     "my"        "days"     "are"
## [37] "through"   "/"         "America"  "/"         "America"   "/"
## [43] "I"         "gave"      "my"       "best"      "to"        "you.\""
##
## [[181]]
## [1] "Let"      "us"      "add"      "our"      "own"      "work"
## [7] "and"      "prayers" "to"       "the"      "unfolding" "story"
## [13] "of"       "our"     "nation."
##
## [[182]]
## [1] "If"      "we"      "do"      "this"    "then"
## [6] "when"    "our"     "days"   "are"     "through"
## [11] "our"     "children" "and"     "our"     "children's"
## [16] "children" "will"    "say"     "of"      "us"
## [21] "they"    "gave"    "their"   "best."
##
## [[183]]
## [1] "They"  "did"  "their" "duty."
##
## [[184]]
## [1] "They"  "healed" "a"      "broken" "land."
##
## [[185]]
## [1] "My"      "fellow"  "Americans," "I"      "close"
## [6] "today"   "where"   "I"         "began," "with"
## [11] "a"       "sacred"  "oath."
##
## [[186]]
## [1] "Before" "God"     "and"     "all"     "of"      "you"     "I"      "give"
## [9] "you"    "my"      "word."
##
## [[187]]
## [1] "I"      "will"    "always" "level"  "with"    "you."
##
## [[188]]
## [1] "I"      "will"      "defend"      "the"
## [5] "Constitution."
##
## [[189]]
## [1] "I"      "will"      "defend"      "our"      "democracy."
##
## [[190]]
## [1] "I"      "will"      "defend"      "America."
##
## [[191]]
## [1] "I"      "will"      "give"        "my"
## [5] "all"    "in"        "your"        "service"
## [9] "thinking" "not"      "of"          "power,"
## [13] "but"    "of"        "possibilities."
##
## [[192]]
## [1] "Not"      "of"      "personal" "interest," "but"      "of"
## [7] "the"     "public"  "good."
##
## [[193]]
## [1] "And"      "together," "we"      "shall"    "write"    "an"
## [7] "American" "story"     "of"      "hope,"    "not"     "fear."
##
## [[194]]
## [1] "Of"      "unity,"    "not"     "division."
##
## [[195]]
## [1] "Of"      "light,"    "not"     "darkness."
##
## [[196]]
## [1] "An"      "American" "story"   "of"      "decency" "and"     "dignity."
##
## [[197]]
## [1] "Of"      "love"     "and"     "of"      "healing."
##
## [[198]]
## [1] "Of"      "greatness" "and"     "of"      "goodness."

```

```
##
## [[199]]
## [1] "May"      "this"    "be"      "the"     "story"   "that"    "guides"  "us."
##
## [[200]]
## [1] "The"      "story"   "that"    "inspires" "us."
##
## [[201]]
## [1] "The"      "story"   "that"    "tells"    "ages"    "yet"
## [7] "to"       "come"    "that"    "we"       "answered" "the"
## [13] "call"     "of"      "history."
##
## [[202]]
## [1] "We"      "met"     "the"     "moment."
##
## [[203]]
## [1] "That"      "democracy" "and"      "hope,"    "truth"    "and"
## [7] "justice," "did"       "not"      "die"      "on"       "our"
## [13] "watch"     "but"      "thrived."
##
## [[204]]
## [1] "That"      "our"      "America" "secured" "liberty" "at"      "home"
## [8] "and"       "stood"    "once"    "again"   "as"       "a"       "beacon"
## [15] "to"        "the"      "world."
##
## [[205]]
## [1] "That"      "is"       "what"     "we"       "owe"
## [6] "our"       "forebearers," "one"      "another," "and"
## [11] "generations" "to"       "follow."
##
## [[206]]
## [1] "So,"      "with"     "purpose" "and"      "resolve" "we"      "turn"
## [8] "to"       "the"      "tasks"   "of"       "our"     "time."
##
## [[207]]
## [1] "Sustained" "by"       "faith."
##
## [[208]]
## [1] "Driven"     "by"       "conviction."
##
## [[209]]
## [1] "And,"      "devoted" "to"      "one"      "another" "and"     "to"
## [8] "this"      "country" "we"      "love"     "with"    "all"     "our"
## [15] "hearts."
##
## [[210]]
## [1] "May"      "God"      "bless"   "America" "and"      "may"     "God"
## [8] "protect" "our"      "troops."
##
## [[211]]
## [1] "Thank"     "you,"     "America."
```

Question 4

Define a variable called `america` which is true if the word “America” is observed in a speech line, and false otherwise. Run `sum()` on that variable to see how many lines have “America” in it. Don't overthink this: you can do this in one line utilizing a function in the notes.

```
america <- grepl("America",lines[1:211])

sum(america)
```

```
## [1] 36
```

Question 5

Concatenate Biden's inaugural speech into a single line. Call the output `speech`. Make sure that you insert a space between the end of each of the old lines and the beginning of the next lines.

```
speech <-paste(lines[1:211],collapse=" ")
speech
```

```
## [1] "Chief Justice Roberts, Vice President Harris, Speaker Pelosi, Leader Schumer, Leader McConnell, Vice President Pence, distinguished guests, and my fellow Americans. This is America's day. This is democracy's day. A day of history and hope. Of renewal and resolve. Through a crucible for the ages America has been tested anew and America
```

has risen to the challenge. Today, we celebrate the triumph not of a candidate, but of a cause, the cause of democracy. The will of the people has been heard and the will of the people has been heeded. We have learned again that democracy is precious. Democracy is fragile. And at this hour, my friends, democracy has prevailed. So now, on this hallowed ground where just days ago violence sought to shake this Capitol's very foundation, we come together as one nation, under God, indivisible, to carry out the peaceful transfer of power as we have for more than two centuries. We look ahead in our uniquely American way - restless, bold, optimistic - and set our sights on the nation we know we can be and we must be. I thank my predecessors of both parties for their presence here. I thank them from the bottom of my heart. You know the resilience of our Constitution and the strength of our nation. As does President Carter, who I spoke to last night but who cannot be with us today, but whom we salute for his lifetime of service. I have just taken the sacred oath each of these patriots took - an oath first sworn by George Washington. But the American story depends not on any one of us, not on some of us, but on all of us. On "We the People" who seek a more perfect Union. This is a great nation and we are a good people. Over the centuries through storm and strife, in peace and in war, we have come so far. But we still have far to go. We will press forward with speed and urgency, for we have much to do in this winter of peril and possibility. Much to repair. Much to restore. Much to heal. Much to build. And much to gain. Few periods in our nation's history have been more challenging or difficult than the one we're in now. A once-in-a-century virus silently stalks the country. It's taken as many lives in one year as America lost in all of World War II. Millions of jobs have been lost. Hundreds of thousands of businesses closed. A cry for racial justice some 400 years in the making moves us. The dream of justice for all will be deferred no longer. A cry for survival comes from the planet itself. A cry that can't be any more desperate or any more clear. And now, a rise in political extremism, white supremacy, domestic terrorism that we must confront and we will defeat. To overcome these challenges - to restore the soul and to secure the future of America - requires more than words. It requires that most elusive of things in a democracy: Unity. Unity. In another January in Washington, on New Year's Day 1863, Abraham Lincoln signed the Emancipation Proclamation. When he put pen to paper, the President said, "If my name ever goes down into history it will be for this act and my whole soul is in it." My whole soul is in it. Today, on this January day, my whole soul is in this: Bringing America together. Uniting our people. And uniting our nation. I ask every American to join me in this cause. Uniting to fight the common foes we face: Anger, resentment, hatred. Extremism, lawlessness, violence. Disease, joblessness, hopelessness. With unity we can do great things. Important things. We can right wrongs. We can put people to work in good jobs. We can teach our children in safe schools. We can overcome this deadly virus. We can reward work, rebuild the middle class, and make health care secure for all. We can deliver racial justice. We can make America, once again, the leading force for good in the world. I know speaking of unity can sound to some like a foolish fantasy. I know the forces that divide us are deep and they are real. But I also know they are not new. Our history has been a constant struggle between the American ideal that we are all created equal and the harsh, ugly reality that racism, nativism, fear, and demonization have long torn us apart. The battle is perennial. Victory is never assured. Through the Civil War, the Great Depression, World War, 9/11, through struggle, sacrifice, and setbacks, our "better angels" have always prevailed. In each of these moments, enough of us came together to carry all of us forward. And, we can do so now. History, faith, and reason show the way, the way of unity. We can see each other not as adversaries but as neighbors. We can treat each other with dignity and respect. We can join forces, stop the shouting, and lower the temperature. For without unity, there is no peace, only bitterness and fury. No progress, only exhausting outrage. No nation, only a state of chaos. This is our historic moment of crisis and challenge, and unity is the path forward. And, we must meet this moment as the United States of America. If we do that, I guarantee you, we will not fail. We have never, ever, ever failed in America when we have acted together. And so today, at this time and in this place, let us start afresh. All of us. Let us listen to one another. Hear one another. See one another. Show respect to one another. Politics need not be a raging fire destroying everything in its path. Every disagreement doesn't have to be a cause for total war. And, we must reject a culture in which facts themselves are manipulated and even manufactured. My fellow Americans, we have to be different than this. America has to be better than this. And, I believe America is better than this. Just look around. Here we stand, in the shadow of a Capitol dome that was completed amid the Civil War, when the Union itself hung in the balance. Yet we endured and we prevailed. Here we stand looking out to the great Mall where Dr. King spoke of his dream. Here we stand, where 108 years ago at another inaugural, thousands of protestors tried to block brave women from marching for the right to vote. Today, we mark the swearing-in of the first woman in American history elected to national office - Vice President Kamala Harris. Don't tell me things can't change. Here we stand across the Potomac from Arlington National Cemetery, where heroes who gave the last full measure of devotion rest in eternal peace. And here we stand, just days after a riotous mob thought they could use violence to silence the will of the people, to stop the work of our democracy, and to drive us from this sacred ground. That did not happen. It will never happen. Not today. Not tomorrow. Not ever. To all those who supported our campaign I am humbled by the faith you have placed in us. To all those who did not support us, let me say this: Hear me out as we move forward. Take a measure of me and my heart. And if you still disagree, so be it. That's democracy. That's America. The right to dissent peaceably, within the guardrails of our Republic, is perhaps our nation's greatest strength. Yet hear me clearly: Disagreement must not lead to disunion. And I pledge this to you: I will be a President for all Americans. I will fight as hard for those who did not support me as for those who did. Many centuries ago, Saint Augustine, a saint of my church, wrote that a people was a multitude defined by the common objects of their love. What are the common objects we love that define us as Americans? I think I know. Opportunity. Security. Liberty. Dignity. Respect. Honor. And, yes, the truth. Recent weeks and months have taught us a painful lesson. There is truth and there are lies. Lies told for power and for profit. And each of us has a duty and responsibility, as citizens, as Americans, and especially as leaders - leaders who have pledged to honor our Constitution and protect our nation - to defend the truth and to defeat the lies. I understand that many Americans view the future with some fear and trepidation. I understand they worry about their jobs, about taking care of their families, about what comes next. I get it. But the answer is not to turn inward, to retreat into competing factions, distrusting those who don't look like you do, or worship the way you do, or don't get their news from the same sources you do. We must end this uncivil war that pits red against blue, rural versus urban, conservative versus liberal. We can do this if we open our souls instead of hardening our hearts. If we show a little tolerance and humility. If we're willing to stand in the other person's shoes just for a moment. Because here is the thing about life: There is no accounting for what fate will deal you. There are some days when we need a hand. There are other days when we're called on to lend one. That is how we must be with one another. And, if we are this way, our country will be stronger, more prosperous, more ready for the future. My fellow Americans, in the work ahead of us, we will need each other. We will need all our strength to persevere through this dark winter. We are entering what may well be the toughest and deadliest period of the virus. We must set aside the politics and finally face this pandemic as one nation. I promise you this: as the Bible says weeping may endure for a night but joy cometh in the morning. We will get through this, together. The world is watching today. So here is my message to those beyond our borders: America has been tested and we have come out stronger for

it. We will repair our alliances and engage with the world once again. Not to meet yesterday's challenges, but today's and tomorrow's. We will lead not merely by the example of our power but by the power of our example. We will be a strong and trusted partner for peace, progress, and security. We have been through so much in this nation. And, in my first act as President, I would like to ask you to join me in a moment of silent prayer to remember all those we lost this past year to the pandemic. To those 400,000 fellow Americans - mothers and fathers, husbands and wives, sons and daughters, friends, neighbors, and co-workers. We will honor them by becoming the people and nation we know we can and should be. Let us say a silent prayer for those who lost their lives, for those they left behind, and for our country. Amen. This is a time of testing. We face an attack on democracy and on truth. A raging virus. Growing inequity. The sting of systemic racism. A climate in crisis. America's role in the world. Any one of these would be enough to challenge us in profound ways. But the fact is we face them all at once, presenting this nation with the gravest of responsibilities. Now we must step up. All of us. It is a time for boldness, for there is so much to do. And, this is certain. We will be judged, you and I, for how we resolve the cascading crises of our era. Will we rise to the occasion? Will we master this rare and difficult hour? Will we meet our obligations and pass along a new and better world for our children? I believe we must and I believe we will. And when we do, we will write the next chapter in the American story. It's a story that might sound something like a song that means a lot to me. It's called "American Anthem" and there is one verse that stands out for me: "The work and prayers of centuries have brought us to this day / What shall be our legacy? / What will our children say? / Let me know in my heart / When my days are through / America / America / I gave my best to you." Let us add our own work and prayers to the unfolding story of our nation. If we do this then when our days are through our children and our children's children will say of us they gave their best. They did their duty. They healed a broken land. My fellow Americans, I close today where I began, with a sacred oath. Before God and all of you I give you my word. I will always level with you. I will defend the Constitution. I will defend our democracy. I will defend America. I will give my all in your service thinking not of power, but of possibilities. Not of personal interest, but of the public good. And together, we shall write an American story of hope, not fear. Of unity, not division. Of light, not darkness. An American story of decency and dignity. Of love and of healing. Of greatness and of goodness. May this be the story that guides us. The story that inspires us. The story that tells ages yet to come that we answered the call of history. We met the moment. That democracy and hope, truth and justice, did not die on our watch but thrived. That our America secured liberty at home and stood once again as a beacon to the world. That is what we owe our forebearers, one another, and generations to follow. So, with purpose and resolve we turn to the tasks of our time. Sustained by faith. Driven by conviction. And, devoted to one another and to this country we love with all our hearts. May God bless America and may God protect our troops. Thank you, America."

Question 6

Working either with `lines` or with `speech`, utilize the framework on the last slide of the notes to remove punctuation and stopwords, leaving a single line speech in the end.

library(stopwords)

`head(stopwords("en"),10)`

##	[1]	"i"	"me"	"my"	"myself"	"we"	"our"
##	[7]	"ours"	"ourselves"	"you"	"your"		

```
speech<- tolower(unlist(strsplit(lines,split="[-/,!\\.]")))
w <- which(nchar(speech)==0)
speech <- speech[-w]
stopword.logical <- speech %in% stopwords("en")
paste(speech[stopword.logical==FALSE],collapse=" ")
```

[1] "chief justice roberts vice president harris speaker pelosi leader schumer leader mcconnell vice president pence distinguished guests fellow americans america s day democracy s day day history hope renewal resolve crucible ages america tested anew america risen challenge today celebrate triumph candidate cause cause democracy people heard people heeded learned democracy precious democracy fragile hour friends democracy prevailed now hallowed ground just days ago violence sought shake capitol s foundation come together one nation god indivisible carry peaceful transfer power two centuries look ahead uniquely american way restless bold optimistic set sights nation know can must thank predecessors parties presence thank bottom heart know resilience constitution strength nation president carter spoke last night us today salute lifetime service just taken sacred oath patriots took oath first sworn george washington american story depends one us us us people seek perfect union great nation good people centuries storm s trife peace war come far still far go press forward speed urgency much winter peril possibility much repair much restore much heal much build much gain periods nation's history challenging difficult one re now century virus silently stalks country s taken many lives one year america lost world war ii millions jobs lost hundreds thousands businesses closed cry racial justice 400 years making moves us dream justice deferred longer cry survival comes planet cry can t desperate clear now rise political extremism white supremacy domestic terrorism must confront defeat overcome challenges restore soul secure future america requires words requires elusive things democracy: unity unity another january washington new year s day 1863 abraham lincoln signed emancipation proclamation put pen paper president said name ever goes history act whole soul whole soul today january day whole soul this: bringing america together uniting people uniting nation ask every american join cause uniting fight common foes face: anger resentment hatred extremism lawlessness violence disease joblessness hopelessness unity can great things important things can right wrongs can put people work good jobs can teach children safe schools can overcome deadly virus can reward work rebuild middle class make health care secure can deliver racial justice can make america leading force good world know speaking unity can sound like foolish fantasy know forces divide us deep real also know new history constant struggle american ideal created equal harsh ugly reality racism nativism fear demonization long torn us apart battle perennial victory never assured civil war great depression world war 9 11 struggle sacrifice setbacks better angels always prevailed moments enough us came together carry us forward can now history faith reason show way way unity can see adversaries neighbors can treat dignity respect can join forces stop shouting lower temperature without unity peace bitterness fury progress exhausting outrage nation state chaos historic moment crisis challenge unity path forward must meet moment united states america guarantee fail never ever ever failed america acted together today time place let us start afresh us let us listen one another hear one another see one another show respect one another politics need raging fire destroying everything path every disagreement doesn't cause total war must reject culture facts manipulated even manufactured fellow americans different america better believe america better just look around stand shadow capitol dome completed amid civil war union hung balance yet endured prevailed stand looking great mall dr king spoke dream stand 108 years ago another inaugural thousands protestors tried block brave women marching right vote today mark swearing first woman american history elected national office vice president kamala harris don t tell things can t change stand across potomac arlington national cemetery heroes gave last full measure devotion rest eternal peace stand just days riotous mob thought use violence silence people stop work democracy drive us sacred ground happen never happen today tomorrow ever supported campaign humbled faith placed us support us let say this: hear move forward take measure heart still disagree s democracy s america right dissent peaceably within guardrails republic perhaps nation s greatest strength yet hear clearly: disagreement must lead disunion pledge you: president americans fight hard support many centuries ago saint augustine saint church wrote people multitude defined common objects love common objects love define us americans? think know opportunity security liberty dignity respect honor yes truth recent weeks months taught us painful lesson truth lies lies told power profit us duty responsibility citizens americans especially leaders leaders pledged honor constitution protect nation defend truth defeat lies understand many americans view future fear trepidation understand worry jobs taking care families comes next get answer turn inward retreat competing factions distrusting don t look like worship way don t get news sources must end uncivil war pits red blue rural versus urban conservative versus liberal can open souls instead hardening hearts show little tolerance humility re willing stand person s shoes just moment thing life: accounting fate deal days needed hand days re called lend one must one another way country stronger prosperous ready future fellow americans work ahead us need need strength persevere dark winter entering may well toughest deadliest period virus must set aside politics finally face pandemic one nation promise this: bible says weeping may endure night joy cometh morning get together world watching today message beyond borders: america tested come stronger repair alliances engage world meet yesterday s challenges today s tomorrow s lead merely example power power example strong trusted partner peace progress security much nation first act president like ask join moment silent prayer remember lost past year pandemic 400 000 fellow americans mothers fathers husbands wives sons daughters friends neighbors co workers honor becoming people nation know can let us say silent prayer lost lives left behind country amen time testing face attack democracy truth raging virus growing inequity sting systemic racism climate crisis america s role world one enough challenge us profound ways fact face presenting nation gravest responsibilities now must step us time boldness much certain judged resolve cascading crises era rise occasion? master rare difficult hour? meet obligations pass along new better world children? believe must believe write next chapter american story s story might sound something like song means lot s called american anthem one verse stands me: work prayers centuries brought us day shall legacy? children say? let know heart days america america gave best let us add work prayers unfolding story nation days children children s children say us gave best duty healed broken land fellow americans close today began sacred oath god give word always level defend constitution defend democracy defend america give service thinking power possibilities personal interest public good together shall write american story hope fear unity division light darkness american story decency dignity love healing greatness goodness may story guides us story inspires us story tells ages yet come answered call history met moment democracy hope truth justice die watch thrived america secured liberty home stood beacon world owe forebearers one another generations follow purpose resolve turn tasks time sustained faith driven conviction devoted one another country love hearts may god bless america may god protect troops thank america"

Question 7

What are the top 20 words (meaning, non-stopwords) in Biden's speech? You might notice that “America” appears less than you'd expect, given your result above...but when you searched on “America” above, you probably also found “American” and “Americans,” etc. (Unless you crafted a really exact regex!)

```
sort(table(unlist(strsplit(lines,split="[ !\\.]"))),decreasing=TRUE)[1:20]
```

```
##
## the and of to we our in a for I this will is We us be
## 92 76 72 61 59 42 40 39 32 32 30 30 29 28 23 21
## have as not that
## 20 18 18 18
```

Question 8

How many digits (0 through 9) are there in the speech? To be clear, 2021 would be considered four digits.

```
z = grepl("[0-9]",lines[1:211])

sum(z)
```

```
## [1] 5
```

Question 9

We'll round this off by asking you to determine how many punctuation marks are left in the speech. (Hint: look in the notes for a notation that represent all punctuation marks!) This can include apostrophes, etc....anything considered a punctuation mark within the scope of regular expressions. Basically, you are doing the same thing here as for Question 8, except swapping in a new regex.

```
s <- gregexpr("[[:punct:]]",lines[1:211])
match <- regmatches(lines[1:211],s)# outputs a list, one for each line
unlist(match)
```

```
## [1] "," " " " " " " " " " " " " " " " " " " " "
## [16] "," " " " " " " " " " " " " " " " " " " " "
## [31] "," " " " " " " " " " " " " " " " " " " " "
## [46] "," " " " " " " " " " " " " " " " " " " " "
## [61] "." " " " " " " " " " " " " " " " " " " " "
## [76] "." " " " " " " " " " " " " " " " " " " " "
## [91] "." " " " " " " " " " " " " " " " " " " " "
## [106] "." " " " " " " " " " " " " " " " " " " " "
## [121] "." " " " " " " " " " " " " " " " " " " " "
## [136] "," " " " " " " " " " " " " " " " " " " " "
## [151] "," " " " " " " " " " " " " " " " " " " " "
## [166] "." " " " " " " " " " " " " " " " " " " " "
## [181] "," " " " " " " " " " " " " " " " " " " " "
## [196] "." " " " " " " " " " " " " " " " " " " " "
## [211] "-" " " " " " " " " " " " " " " " " " " " "
## [226] "." " " " " " " " " " " " " " " " " " " " "
## [241] "." " " " " " " " " " " " " " " " " " " " "
## [256] "." " " " " " " " " " " " " " " " " " " " "
## [271] "." " " " " " " " " " " " " " " " " " " " "
## [286] "." " " " " " " " " " " " " " " " " " " " "
## [301] "." " " " " " " " " " " " " " " " " " " " "
## [316] "," " " " " " " " " " " " " " " " " " " " "
## [331] "," " " " " " " " " " " " " " " " " " " " "
## [346] "." " " " " " " " " " " " " " " " " " " " "
## [361] "." " " " " " " " " " " " " " " " " " " " "
## [376] "?" "/" "?" "/" "/" "/" "/" "/" " " " " " " " " "
## [391] "," " " " " " " " " " " " " " " " " " " " "
## [406] "," " " " " " " " " " " " " " " " " " " " "
## [421] "," " " " " " " " " " " " " " " " " " " " "
```

```
total = 0
for ( ii in 1:length(lines) ) {
  total = total+length(match[[ii]])
}

total
```

```
## [1] 432
```