

Assignment 2 (Undergraduate version)

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General instruction

If you take this course as an undergraduate, please use this version of the assignment. Assignment 2 is based on text-as-data, explained in these two demo codes: Text as data (1)

(https://weaiwayne.github.io/teaching_dacss/Text_analytics_1_2024.html) and Text as data (2)

(https://weaiwayne.github.io/teaching_dacss/Text_analytics_2_2024.html)

Dependencies

```
library(rsconnect)
library(readr)
library(dplyr)
library(quanteda)
library(quanteda.textstats)
library(quanteda.textplots)
library(ggplot2)
library(readxl)
```

Step 1: Load the dataset.

We will work with a subset of tweets about the war in Ukraine, collected on June 7-9, 2023.

- Use the following link (<https://www.dropbox.com/scl/fi/copc2kgi14yghvt623m3n/UKR-tweets.xlsx?rlkey=9v8lbt9fqy8n1hgic0w2mo1in&st=dycsqaic&dl=0>) (<https://www.dropbox.com/scl/fi/copc2kgi14yghvt623m3n/UKR-tweets.xlsx?rlkey=9v8lbt9fqy8n1hgic0w2mo1in&st=dycsqaic&dl=0>) to download UKR-tweets.xlsx. Move the file to your working directory.
- Select English tweets

```
tweets <- read_excel("/Users/beyoncaademulegun/Downloads/UKR-tweets.xlsx")
```

```
## Warning: Expecting logical in 06070 / R6070C15: got '{"type": "Point",
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 06081 / R6081C15: got '{"type": "Point",
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 06388 / R6388C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 06459 / R6459C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 06942 / R6942C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 06943 / R6943C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 07271 / R7271C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 07368 / R7368C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 08848 / R8848C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 09310 / R9310C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 010089 / R10089C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011712 / R11712C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011717 / R11717C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011724 / R11724C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011729 / R11729C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011734 / R11734C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011739 / R11739C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011747 / R11747C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011751 / R11751C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011756 / R11756C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 011765 / R11765C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 013734 / R13734C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 014635 / R14635C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 014637 / R14637C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 014697 / R14697C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 014702 / R14702C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 015524 / R15524C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 015797 / R15797C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 017739 / R17739C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 020188 / R20188C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 022716 / R22716C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 039491 / R39491C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 040666 / R40666C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 042231 / R42231C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 043671 / R43671C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 044151 / R44151C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 045760 / R45760C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 046581 / R46581C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 046650 / R46650C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 048466 / R48466C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 049210 / R49210C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 049577 / R49577C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 049723 / R49723C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 050414 / R50414C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 051024 / R51024C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 051670 / R51670C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 051937 / R51937C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 052570 / R52570C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 052571 / R52571C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 052824 / R52824C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 053300 / R53300C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 055911 / R55911C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 055912 / R55912C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 056626 / R56626C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 057029 / R57029C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 058631 / R58631C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 059582 / R59582C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 060262 / R60262C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 061429 / R61429C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 061432 / R61432C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 061434 / R61434C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 061686 / R61686C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 063195 / R63195C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 064139 / R64139C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 066376 / R66376C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066381 / R66381C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066389 / R66389C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066392 / R66392C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066394 / R66394C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066396 / R66396C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 066483 / R66483C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 068621 / R68621C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 069256 / R69256C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 070964 / R70964C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 070966 / R70966C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 070971 / R70971C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 070973 / R70973C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 072589 / R72589C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 072772 / R72772C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 074616 / R74616C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 075477 / R75477C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 077034 / R77034C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 079082 / R79082C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 079184 / R79184C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 079968 / R79968C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 080800 / R80800C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 081953 / R81953C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 082212 / R82212C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 084738 / R84738C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 084745 / R84745C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 084842 / R84842C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 085641 / R85641C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 086945 / R86945C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 089397 / R89397C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 089706 / R89706C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 089710 / R89710C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 089715 / R89715C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 090642 / R90642C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 092720 / R92720C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 092928 / R92928C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```



```
## Warning: Expecting logical in 092941 / R92941C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 093365 / R93365C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 094703 / R94703C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 095093 / R95093C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 096893 / R96893C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 098400 / R98400C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 098845 / R98845C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0101277 / R101277C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0101289 / R101289C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0102861 / R102861C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0103369 / R103369C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0105027 / R105027C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0106266 / R106266C15: got '{"type": "Point",  
## "coordinates": [88.83689402, 58.82184922]}'
```

```
## Warning: Expecting logical in 0106517 / R106517C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0107211 / R107211C15: got '{"type": "Point",  
## "coordinates": [75.86416312, 57.68284846]}'
```

```
## Warning: Expecting logical in 0107481 / R107481C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0108648 / R108648C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0108652 / R108652C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0109569 / R109569C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0110195 / R110195C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0111865 / R111865C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0112783 / R112783C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0114544 / R114544C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0114546 / R114546C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0116761 / R116761C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0117038 / R117038C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0120125 / R120125C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0120628 / R120628C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0120630 / R120630C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0120636 / R120636C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0121997 / R121997C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0122755 / R122755C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0123023 / R123023C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0123544 / R123544C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0124194 / R124194C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0124451 / R124451C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0125446 / R125446C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0126935 / R126935C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0127295 / R127295C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0128566 / R128566C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0130020 / R130020C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0132397 / R132397C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0135782 / R135782C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0141612 / R141612C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0142043 / R142043C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0146373 / R146373C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0151643 / R151643C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0151645 / R151645C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0157359 / R157359C15: got '{"type": "Point",  
## "coordinates": [163.093, 55.322]}'
```

```
## Warning: Expecting logical in 0167934 / R167934C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0169531 / R169531C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0170800 / R170800C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0170997 / R170997C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0172394 / R172394C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0173822 / R173822C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0173825 / R173825C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0174919 / R174919C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0174948 / R174948C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0175288 / R175288C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0177187 / R177187C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0177286 / R177286C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0177468 / R177468C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0177537 / R177537C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0178773 / R178773C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0179305 / R179305C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0179898 / R179898C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0179996 / R179996C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0181488 / R181488C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0182582 / R182582C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0182586 / R182586C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0183740 / R183740C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0183803 / R183803C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0186564 / R186564C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0186863 / R186863C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0187823 / R187823C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0188802 / R188802C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0188869 / R188869C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0190800 / R190800C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0191042 / R191042C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0191893 / R191893C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0191894 / R191894C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0191897 / R191897C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0191901 / R191901C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0193579 / R193579C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0193606 / R193606C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0195452 / R195452C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0195490 / R195490C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0196215 / R196215C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0196217 / R196217C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0197617 / R197617C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0201333 / R201333C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0201560 / R201560C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0202079 / R202079C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0202082 / R202082C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0202084 / R202084C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0202598 / R202598C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0206134 / R206134C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0206893 / R206893C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0206905 / R206905C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0208136 / R208136C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0209521 / R209521C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0209530 / R209530C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0210821 / R210821C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0210825 / R210825C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0213129 / R213129C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0213130 / R213130C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0214499 / R214499C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0215469 / R215469C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0216364 / R216364C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0218438 / R218438C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0218440 / R218440C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0219044 / R219044C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```



```
## Warning: Expecting logical in 0219680 / R219680C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0220076 / R220076C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0220975 / R220975C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0221060 / R221060C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0223398 / R223398C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0223492 / R223492C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0225325 / R225325C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0225332 / R225332C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0225834 / R225834C15: got {'type': 'Point',  
## 'coordinates': [30.74114621, 46.48809664]}
```

```
## Warning: Expecting logical in 0226847 / R226847C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0227370 / R227370C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0227463 / R227463C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0229154 / R229154C15: got {'type': 'Point',  
## 'coordinates': [30.74114621, 46.48809664]}
```

```
## Warning: Expecting logical in 0230716 / R230716C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0230820 / R230820C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0230827 / R230827C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0231226 / R231226C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0233546 / R233546C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0234979 / R234979C15: got {'type': 'Point',  
## 'coordinates': [30.74114621, 46.48809664]}
```

```
## Warning: Expecting logical in 0235093 / R235093C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0236345 / R236345C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0236922 / R236922C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0237534 / R237534C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0237539 / R237539C15: got {'type': 'Point',  
## 'coordinates': [30.52349099, 50.45034932]}
```

```
## Warning: Expecting logical in 0237740 / R237740C15: got {'type': 'Point',  
## 'coordinates': [30.74114621, 46.48809664]}
```

```
## Warning: Expecting logical in 0238578 / R238578C15: got {'type': 'Point',  
## 'coordinates': [30.74197769, 46.48858348]}
```

```
## Warning: Expecting logical in 0240067 / R240067C15: got {'type': 'Point',  
## 'coordinates': [30.74115694, 46.4881188]}
```

```
## Warning: Expecting logical in 0240348 / R240348C15: got {'type': 'Point',  
## 'coordinates': [30.74114621, 46.48809664]}
```

```
## Warning: Expecting logical in 0242394 / R242394C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0242400 / R242400C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0242408 / R242408C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0243078 / R243078C15: got '{"type": "Point",  
## "coordinates": [30.74114621, 46.48809664]}'
```

```
## Warning: Expecting logical in 0244220 / R244220C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0244304 / R244304C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0248815 / R248815C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0251177 / R251177C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0253500 / R253500C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0255076 / R255076C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0255483 / R255483C15: got '{"type": "Point",  
## "coordinates": [30.74115694, 46.4881188]}'
```

```
## Warning: Expecting logical in 0258330 / R258330C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
## Warning: Expecting logical in 0260275 / R260275C15: got '{"type": "Point",  
## "coordinates": [30.52349099, 50.45034932]}'
```

```
## Warning: Expecting logical in 0261933 / R261933C15: got '{"type": "Point",  
## "coordinates": [30.74197769, 46.48858348]}'
```

```
tweets <- tweets[tweets$language== "en",]

tweets$tweetid <- as.character(tweets$tweetid)
```

Step 2: Random sampling

Revise the code below to draw a random sample of 10,000 English tweets.

```
tweets <- tweets %>% sample_n(10000)
```

Step 3: Create a corpus.

When creating corpus, you need to define the column that contains the text, and the column that indicates unique IDs of individual texts. See code comments for cues.

```
tweets_corpus <- corpus(tweets, docid_field = "tweetid", text_field = "text") # hints:
the 'text' column contains the text and each tweet has an unique ID which is stored in the 'tweetid' column.
```

```
duplicated_ids <- tweets[duplicated(tweets$tweetid) | duplicated(tweets$tweetid, fromLast = TRUE), ]
print(duplicated_ids)
```

```
## # A tibble: 0 × 28
## # i 28 variables: userid <dbl>, username <chr>, description <chr>,
## #   location <chr>, following <dbl>, followers <dbl>, totaltweets <dbl>,
## #   usercreatedts <dtm>, tweetid <chr>, tweetcreatedts <dtm>,
## #   retweetcount <dbl>, text <chr>, hashtags <chr>, language <chr>,
## #   coordinates <lgl>, favorite_count <dbl>, is_retweet <lgl>,
## #   original_tweet_id <dbl>, original_tweet_userid <dbl>,
## #   original_tweet_username <chr>, in_reply_to_status_id <dbl>, ...
```

```
tweets$tweetid <- make.unique(as.character(tweets$tweetid))
```

Step 4: Create a DFM.

Plug in the corpus object created in the previous step. The DFM should NOT contain punctuation, numbers, symbols, English stopwords, and urls.

```
text_dfm <- tokens(tweets_corpus, remove_punct = TRUE, remove_numbers = TRUE, remove_symbols = TRUE, remove_url=TRUE) %>% # hints: need to plug in the corpus object created from the previous step
  tokens_remove(stopwords("en")) %>%
  dfm()
```

Step 5:Inspect the DFM.

```
text_dfm
```

```
## Document-feature matrix of: 10,000 documents, 17,885 features (99.89% sparse) and 26
docvars.
##
##           features
## docs      @zelenskyyua #russians really hit time low shelling
## 1666770249918860032      1      1      1  1      1  1      1
## 1666818095745479936      0      0      0  0      0  0      0
## 1666539302182870016      1      0      0  0      0  0      0
## 1667113061637910016      0      0      0  0      0  0      0
## 1666563553296519936      0      0      0  0      0  0      0
## 1666963482900669952      0      0      0  0      0  0      0
##
##           features
## docs      already flooded city
## 1666770249918860032      1      1  1
## 1666818095745479936      0      0  0
## 1666539302182870016      0      0  0
## 1667113061637910016      0      0  0
## 1666563553296519936      0      1  1
## 1666963482900669952      0      0  0
## [ reached max_ndoc ... 9,994 more documents, reached max_nfeat ... 17,875 more features ]
```

— WRITE BELOW

Answer the questions: how many documents are included in this DFM? There are 10,00 documents How many features are included in this DFM? There are 17,606 features

—- WRITE ABOVE

Step 6:Check out the high-frequency words from the DFM

```
topfeatures(text_dfm) # plug in the DFM object created from the previous step.
```

```
## #ukraine      üá      #russia #kherson      dam      russian      russia ukrainian
##      6422      3839      2928      2456      1678      1603      1459      1302
##      ä      people
##      1244      1108
```

Step 7:Create a semantic network of hashtags based on hashtag co-occurrence in tweets

```

tag_dfm <- dfm_select(text_dfm, pattern = "#*") #plug in the dfm object

toptag <- names(topfeatures(tag_dfm, 200)) # Hints: to get the top 200 hashtags, enter the number 200

tag_fcm <- fcm(tag_dfm)

topgat_fcm <- fcm_select(tag_fcm, pattern = toptag)

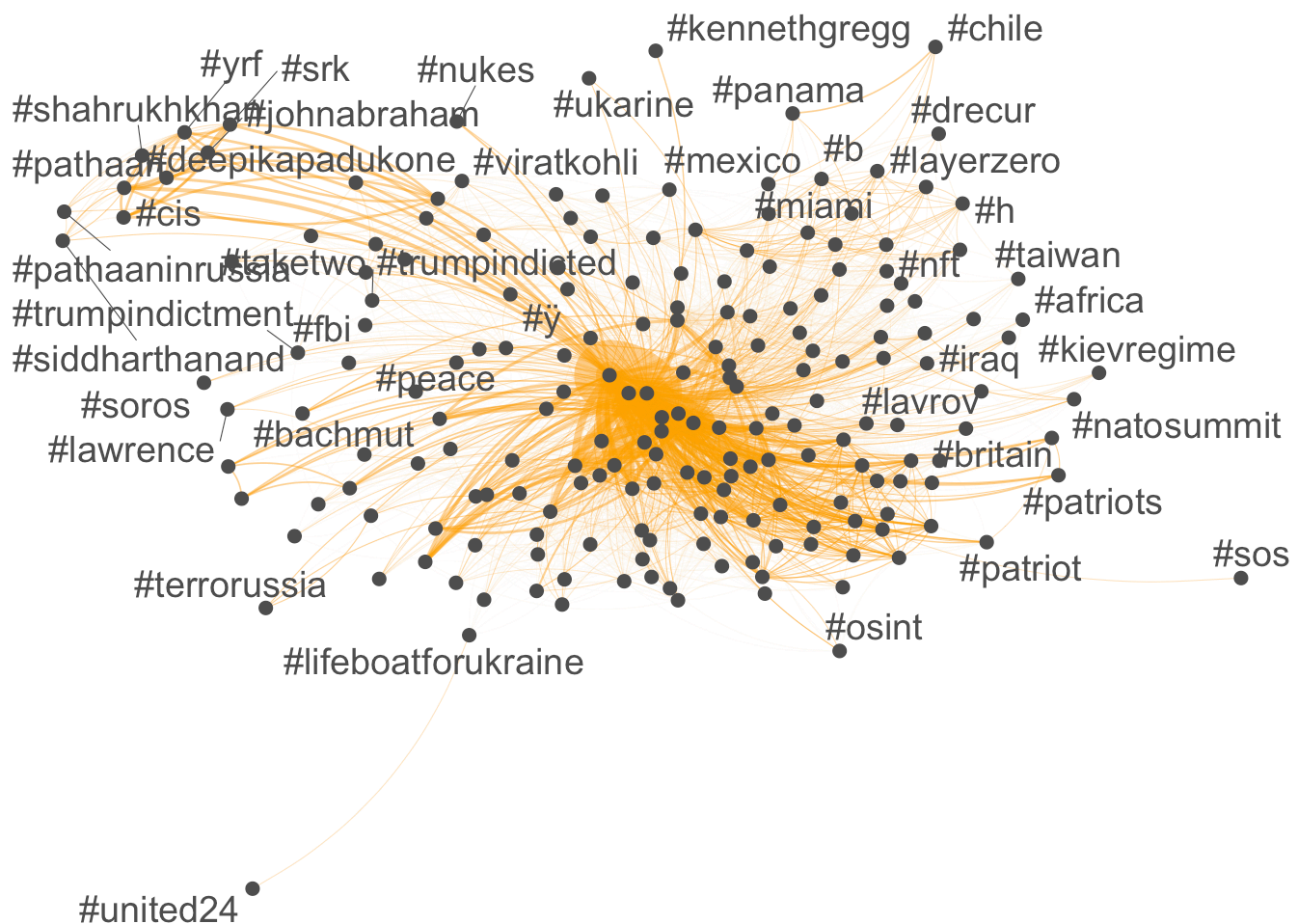
textplot_network(topgat_fcm, min_freq = 0.1, edge_alpha = 0.5, edge_size = 1, edge_color = "orange")

```

```

## Warning: ggrepel: 155 unlabeled data points (too many overlaps). Consider
## increasing max.overlaps

```



There are a few central hashtags, like #diplomacy, #icc, and #patriots, indicating that these are highly connected and frequently co-occur with other hashtags. This suggests that these topics are major themes or focal points in the conversation. Several clusters of hashtags are connected around specific topics like global affairs, entertainment and pop culture, and technology and finance. There are also hashtags that appear at the edges of the network, like #panama, #chile, and #boost, that have fewer connections. These may represent niche topics or less frequently discussed themes in the dataset. Some hashtags like #patriotfront and #osint suggest discussions related to social movements, military, or intelligence topics, which could imply that some users in the dataset are engaging with topics related to activism, national identity, or defense.