# Homework 5

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```
library("devtools")

if(!require(neonDivData)) devtools::install_github("daijiang/neonDivData")

library("neonDivData")

library("tidyverse")
```

## Question 1:

```
#sort(unique(data_plant$taxon_name))

## Pulls the genus for each plant
data_plant$genus = sub(" .*", "", data_plant$taxon_name)

## Selects a random number 100 times between 1 and the length of data_plant
i = sample(1:nrow(data_plant), 100, replace=FALSE)

## Records the genus at the random
genus_samp = data_plant$genus[i]

## Prints out 100 genus
print(genus_samp)
```

```
##   [1] "Callicarpa"      "Bromus"          "Oxalis"          "Smilax"
##   [5] "Lespedeza"       "Dichanthelium"   "Vaccinium"       "Veratrum"
##   [9] "Pentagramma"     "Acer"            "Thelesperma"     "Rosa"
##  [13] "Betula"          "Goodyera"        "Andropogon"      "Aristida"
##  [17] "Houstonia"       "Toxicodendron"   "Rubus"           "Carex"
##  [21] "Aristida"        "Rhexia"          "Liriodendron"    "Coprosma"
##  [25] "Physalis"        "Hieracium"       "Taraxacum"       "Poa"
##  [29] "Schizachyrium"   "Opuntia"         "Acer"            "Dryopteris"
##  [33] "Carya"           "Picea"           "Ulmus"           "Hamamelis"
##  [37] "Coptis"          "Acer"            "Cornus"          "Polygonatum"
##  [41] "Ceanothus"       "Rubus"           "Sanicula"        "Conyza"
##  [45] "Acer"            "Ulmus"           "Dasiphora"       "Uvularia"
##  [49] "Carex"           "Aristida"        "Opuntia"         "Mikania"
##  [53] "Lyonia"          "Galium"          "Corylus"         "Cynodon"
```

```
##  [57] "Aira"            "Brachyelytrum"   "Amorpha"         "Campsis"
##  [61] "Chapmannia"      "Botrychium"      "Acer"            "Agrimonia"
##  [65] "Chamerion"       "Cirsium"         "Ilex"            "Acalypha"
##  [69] "Sorghastrum"     "Potentilla"      "Rubus"           "Tillandsia"
##  [73] "Isocoma"         "Leersia"         "Viburnum"        "Quercus"
##  [77] "Cornus"          "Dimorphocarpa"   "Dicentra"        "Acer"
##  [81] "Fraxinus"        "Pseudoroegneria" "Sorghum"         "Parthenocissus"
##  [85] "Cinna"           "Quercus"         "Malachra"        "Bouteloua"
##  [89] "Vitis"           "Cornus"          "Penstemon"       "Celtis"
##  [93] "Tridens"         "Gaultheria"      "Setaria"         "Panicum"
##  [97] "Liatris"         "Scutellaria"     "Symphyotrichum"  "Physalis"
```

## Question 2:

```
data_plant$taxon_name2 = sub("(\\w\\s\\w+).*", "\\1", data_plant$taxon_name)

## Selects a random number 100 times between 1 and the length of data_plant
i = sample(1:nrow(data_plant), 100, replace=FALSE)

## Records the genus and species name at the random
taxon2_samp = data_plant$taxon_name2[i]

## Prints out data
print(taxon2_samp)
```

```
##   [1] "Uvularia sessilifolia"       "Gaylussacia baccata"
##   [3] "Bromus tectorum"             "Empetrum nigrum"
##   [5] "Botrychium virginianum"      "Rhynchosia tomentosa"
##   [7] "Desmodium pauciflorum"       "Bouteloua curtipendula"
##   [9] "Pyrola elliptica"            "Asimina reticulata"
##  [11] "Hieracium scouleri"          "Fagus grandifolia"
##  [13] "Panicum virgatum"            "Diospyros sp"
##  [15] "Nassella viridula"           "Vitis rotundifolia"
##  [17] "Amsinckia menziesii"         "Acer negundo"
##  [19] "Erigeron strigosus"          "Smilax rotundifolia"
##  [21] "Crotalaria rotundifolia"     "Alnus sp"
##  [23] "Impatiens pallida"           "Heterotheca canescens"
##  [25] "Schizachne sp"               "Parthenocissus quinquefolia"
##  [27] "Gutierrezia sarothrae"       "Stellaria sp"
##  [29] "Pteridium aquilinum"         "Petasites frigidus"
##  [31] "Solidago canadensis"         "Polygonum amphibium"
##  [33] "Polygonatum biflorum"        "Artemisia tridentata"
##  [35] "Empetrum nigrum"             "Campsis radicans"
##  [37] "Smilax rotundifolia"         "Panicum virgatum"
##  [39] "Psoralidium tenuiflorum"     "Picea mariana"
##  [41] "Pilea pumila"                "Acer rubrum"
##  [43] "Picea sp"                    "Vitis riparia"
##  [45] "Bouteloua dactyloides"       "Carphephorus corymbosus"
##  [47] "Ligustrum sinense"           "Brachyelytrum aristosum"
##  [49] "Salvia azurea"               "Taraxacum sp"
##  [51] "Torilis arvensis"            "Sphaeralcea coccinea"
```

```
##  [53] "Daucus pusillus"             "Pinus palustris"
##  [55] "Maianthemum canadense"       "Hieracium aurantiacum"
##  [57] "Betula alleghaniensis"       "Nassella viridula"
##  [59] "Eriogonum ovalifolium"       "Gymnanthes lucida"
##  [61] "Celtis tenuifolia"           "Rubus argutus"
##  [63] "Galium uniflorum"            "Carya tomentosa"
##  [65] "Bromus inermis"              "Medeola virginiana"
##  [67] "Acer rubrum"                 "Acer rubrum"
##  [69] "Brachyelytrum erectum"       "Chamaesyce micromera"
##  [71] "Aristida ternipes"           "Dupontia fisheri"
##  [73] "Amphicarpaea bracteata"      "Eriogonum longifolium"
##  [75] "Chaetopappa ericoides"       "Coptis trifolia"
##  [77] "Yucca glauca"                "Smilax herbacea"
##  [79] "Brachyelytrum aristosum"     "Crotalaria purshii"
##  [81] "Andromeda polifolia"         "Chamaecrista nictitans"
##  [83] "Smilax herbacea"             "Trientalis sp"
##  [85] "Balduina sp"                 "Acer rubrum"
##  [87] "Lygodesmia juncea"           "Rubus idaeus"
##  [89] "Arundinaria gigantea"        "Sporobolus spp"
##  [91] "Carex sp"                    "Quercus montana"
##  [93] "Prosopis velutina"           "Parthenocissus quinquefolia"
##  [95] "Carex spp"                   "Vitis rotundifolia"
##  [97] "Smilax rotundifolia"         "Serenoa repens"
##  [99] "Amelanchier sp"              "Chamaesyce hyssopifolia"
```

## Question 3

```
## Creates data frame n_1 that counts the number of sample_areas with a size of 1 m2 in data_plant
n_1 = data_plant %>%
  group_by(siteID) %>%
  summarise(richness_1m2 = sum(sample_area_m2 == "1"))

## Creates data frame n_10 that counts the number of sample_areas with a size of 1 and 10 m2 in data_pl
n_10 = data_plant %>%
  group_by(siteID) %>%
  summarise(richness_10m2 = sum(sample_area_m2 %in% c("1","10")))

## Creates data frame n_100 that counts the number of sample_areas with a size of 1, 10, and 100 m2 in
n_100 = data_plant %>%
  group_by(siteID) %>%
  summarise(richness_100m2 = sum(sample_area_m2 %in% c("1","10","100")))

## Joins n_1, n_10, n_100
n_all = left_join(n_1 ,n_10) %>%
  left_join(n_100)
```

```
## Joining, by = "siteID"
## Joining, by = "siteID"
```

```
## prints n_all
print(n_all)
```

```
## # A tibble: 47 x 4
##    siteID richness_1m2 richness_10m2 richness_100m2
##    <chr>         <int>         <int>          <int>
##  1 ABBY           7587         13603          16946
##  2 BARR           4615          6041           6616
##  3 BART           5875         10659          13354
##  4 BLAN           8803         15270          19798
##  5 BONA           4091          5925           6983
##  6 CLBJ          10226         15656          18328
##  7 CPER          23663         37876          44284
##  8 DCFS          12067         16649          19622
##  9 DEJU           8673         13000          14918
## 10 DELA          12012         22521          29326
## # ... with 37 more rows
```

## Question 4

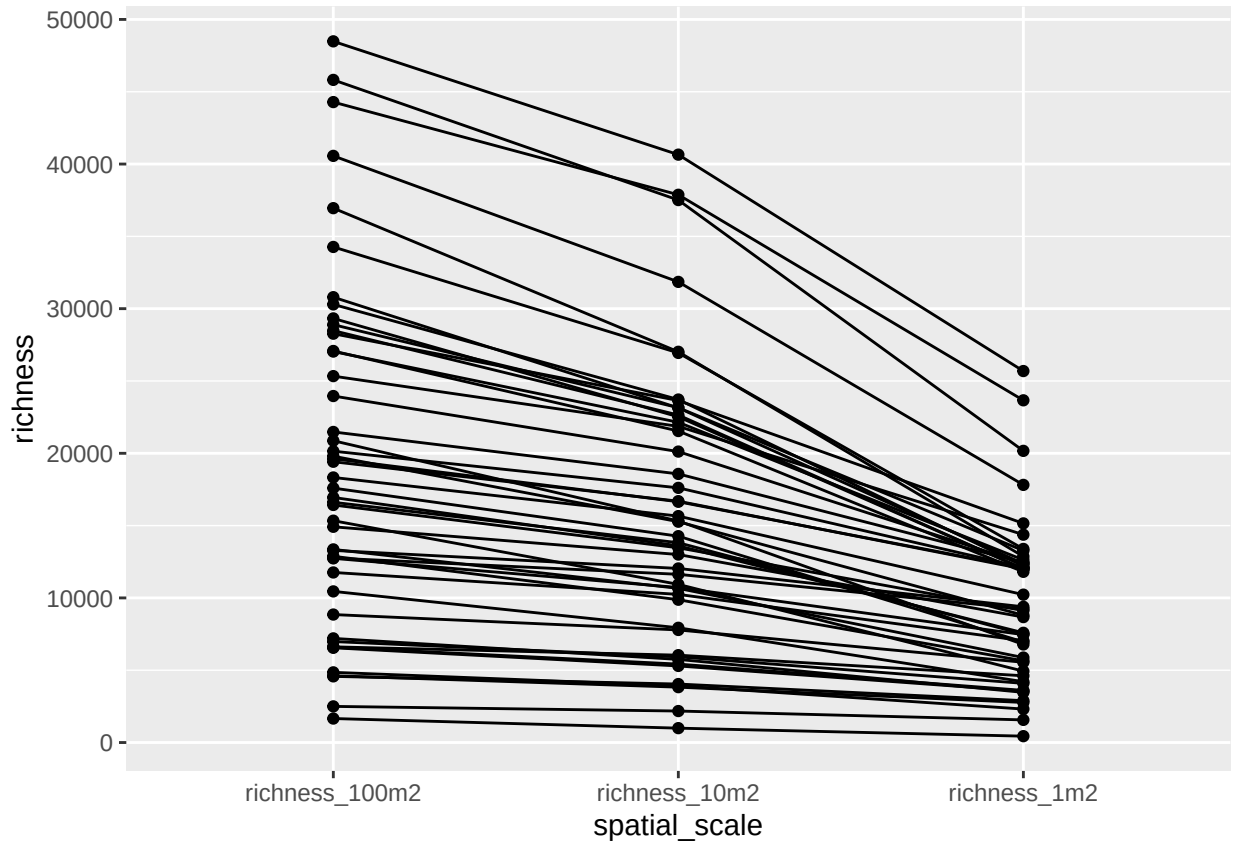
```
## creates n_all_longer that records site richness based off spatial scale.
n_all_longer = n_all %>%
  pivot_longer(!siteID, names_to = "spatial_scale", values_to = "richness")

## Prints dataframe
print(n_all_longer)
```

```
## # A tibble: 141 x 3
##    siteID spatial_scale  richness
##    <chr>  <chr>             <int>
##  1 ABBY   richness_1m2       7587
##  2 ABBY   richness_10m2     13603
##  3 ABBY   richness_100m2    16946
##  4 BARR   richness_1m2       4615
##  5 BARR   richness_10m2      6041
##  6 BARR   richness_100m2     6616
##  7 BART   richness_1m2       5875
##  8 BART   richness_10m2     10659
##  9 BART   richness_100m2    13354
## 10 BLAN   richness_1m2       8803
## # ... with 131 more rows
```

## Question 5

```
## Graphs n_all_longer
ggplot(data = n_all_longer, aes(x = spatial_scale, y = richness,  group = siteID))+
  geom_point()+
  geom_line()
```


50000
40000
30000
20000
10000
0
richness
richness_100m2
richness_10m2
richness_1m2
spatial_scale