Homework 5

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```
library("devtools")

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

library("neonDivData")

library("tidyverse")
```

Question 1:

```
## 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] "Acer"           "Dactylis"       "Anemone"        "Elymus"
##   [5] "Quercus"        "Acer"           "Rhus"           "Helianthus"
##   [9] "Smilax"         "Pseudotsuga"    "Empetrum"       "Salsola"
##  [13] "Conyza"         "Vulpia"         "Liriodendron"   "Lespedeza"
##  [17] "Galium"         "Galium"         "Pinus"          "Cercis"
##  [21] "Vaccinium"      "Bromus"         "Aristida"       "Carex"
##  [25] "Brunnichia"     "Proboscidea"    "Rosa"           "Bouteloua"
##  [29] "Toxicodendron"  "Carex"          "Cercis"         "Eriophorum"
##  [33] "Chimaphila"     "Euphorbia"      "Amsinckia"      "Dalea"
##  [37] "Amyris"         "Quercus"        "Smilax"         "Sporobolus"
##  [41] "Symphoricarpos" "Euthamia"       "Ribes"          "Osmunda"
##  [45] "Melilotus"      "Mahonia"        "Celastrus"      "Pyrola"
##  [49] "Thysanocarpus"  "Plantago"       "Gaura"          "Panicum"
##  [53] "Liriodendron"   "Oligoneuron"    "Eriogonum"      "Quercus"
##  [57] "Bouteloua"      "Crataegus"      "Boerhavia"      "Lithospermum"
##  [61] "Rubus"          "Thelesperma"    "Sabatia"        "Pterocaulon"
```

```
##  [65] "Selaginella"    "Perilla"        "Eupatorium"     "Carex"
##  [69] "Gymnanthes"     "Smilax"         "Toxicodendron"  "Croton"
##  [73] "Chamerion"      "Dryopteris"     "Amphicarpaea"   "Dichanthelium"
##  [77] "Dyschoriste"    "Hypericum"      "Mitchella"      "Carex"
##  [81] "Digitaria"      "Paspalum"       "Abies"          "Vaccinium"
##  [85] "Halesia"        "Lyonia"         "Lithospermum"   "Conyza"
##  [89] "Opuntia"        "Geum"           "Brachyelytrum"  "Conoclinium"
##  [93] "Noccaea"        "Bouteloua"      "Parthenocissus" "Eragrostis"
##  [97] "Amelanchier"    "Physalis"       "Desmodium"      "Pityopsis"
```

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] "Vitis rotundifolia"         "Diospyros virginiana"
##   [3] "Cercis sp"                  "Symphyotrichum adnatum"
##   [5] "Betula alleghaniensis"      "Fraxinus nigra"
##   [7] "Microstegium vimineum"      "Bromus tectorum"
##   [9] "Ailanthus altissima"        "Fraxinus americana"
##  [11] "Fimbristylis puberula"      "Rubus ursinus"
##  [13] "Ledum palustre"             "Calamagrostis canadensis"
##  [15] "Polystichum acrostichoides" "Ostrya virginiana"
##  [17] "Scutellaria integrifolia"   "Trifolium dasyphyllum"
##  [19] "Andropogon spp"             "Asimina parviflora"
##  [21] "Rumex crispus"              "Thelesperma filifolium"
##  [23] "Ilex decidua"               "Botrychium virginianum"
##  [25] "Alliaria petiolata"         "Pascopyrum smithii"
##  [27] "Tetradymia glabrata"        "Bouteloua gracilis"
##  [29] "Populus tremuloides"        "Scleria sp"
##  [31] "Cornus florida"             "Muhlenbergia sp"
##  [33] "Clitoria mariana"           "Thelypteris sp"
##  [35] "Castanea sp"                "Apocynum cannabinum"
##  [37] "Stigmaphyllon emarginatum"  "Justicia ovata"
##  [39] "Fraxinus americana"         "Amaranthus palmeri"
##  [41] "Diervilla sp"               "Arenaria serpyllifolia"
##  [43] "Achillea millefolium"       "Pityopsis aspera"
##  [45] "Acer saccharum"             "Triticum aestivum"
##  [47] "Adiantum pedatum"           "Solidago sp"
##  [49] "Holcus lanatus"             "Ampelopsis arborea"
##  [51] "Phleum pratense"            "Smilax glauca"
##  [53] "Acalypha sp"                "Pediomelum argophyllum"
##  [55] "Chenopodium leptophyllum"   "Ambrosia artemisiifolia"
```

```
##  [57] "Oxalis stricta"             "Maianthemum canadense"
##  [59] "Astragalus nuttallianus"    "Viola sororia"
##  [61] "Opuntia polyacantha"        "Pteridium aquilinum"
##  [63] "Ratibida columnifera"       "Tragia ramosa"
##  [65] "Pinus sp"                   "Acer rubrum"
##  [67] "Quercus michauxii"          "Brachyelytrum aristosum"
##  [69] "Carex sp"                   "Krameria ixine"
##  [71] "Salix bebbiana"             "Polygonatum sp"
##  [73] "Cyperus sp"                 "Viola sp"
##  [75] "Sorghastrum nutans"         "Arctostaphylos viscida"
##  [77] "Lomatium foeniculaceum"     "Physalis pumila"
##  [79] "Ambrosia artemisiifolia"    "Smilax glauca"
##  [81] "Aristida purpurea"          "Clintonia uniflora"
##  [83] "Halesia sp"                 "Linum pratense"
##  [85] "Acer rubrum"                "Scleria sp"
##  [87] "Festuca subverticillata"    "Lonicera japonica"
##  [89] "Populus tremuloides"        "Polygonatum biflorum"
##  [91] "Cercis canadensis"          "Vitis aestivalis"
##  [93] "Quercus velutina"           "Ledum groenlandicum"
##  [95] "Solidago sp"                "Pediomelum argophyllum"
##  [97] "Eriogonum effusum"          "Hieracium scouleri"
##  [99] "Dioscorea villosa"          "Ranunculus lapponicus"
```

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

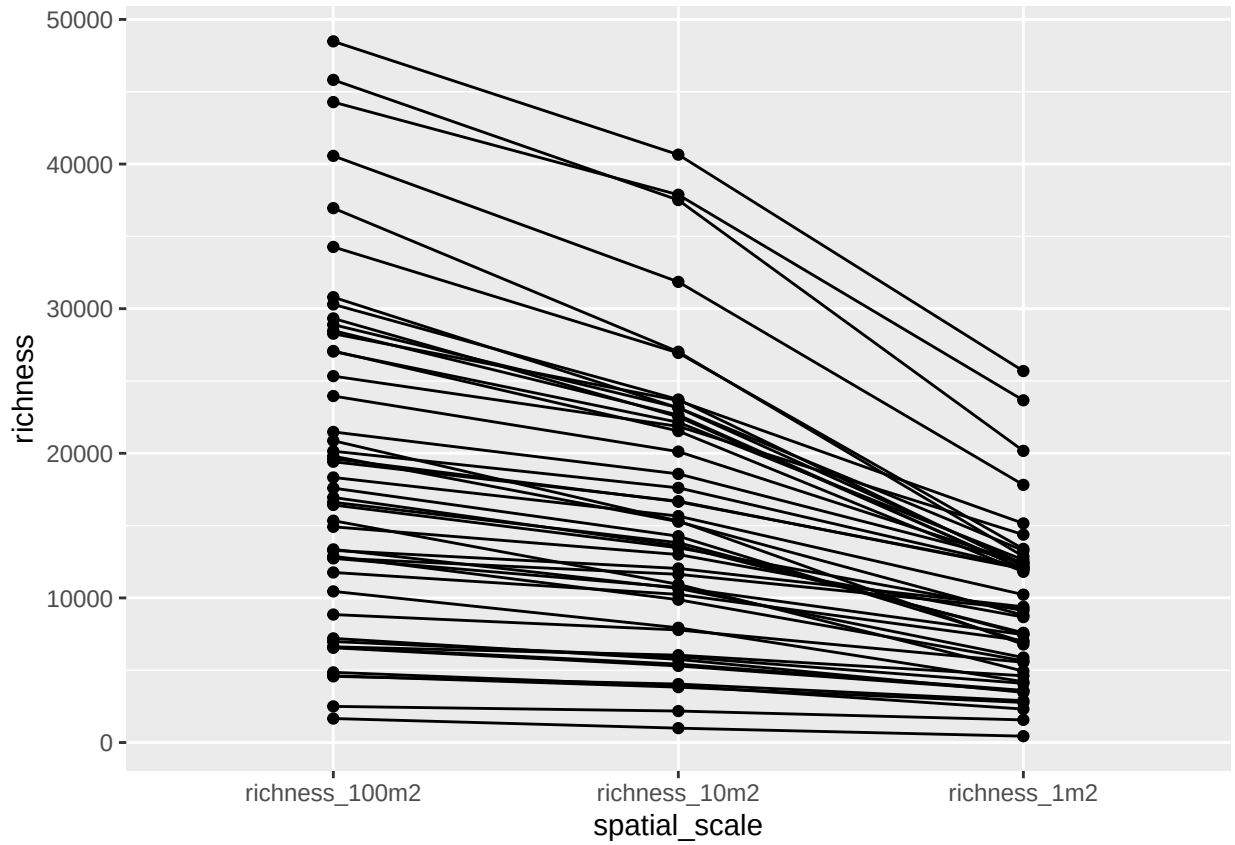
```
## creates n_all_longer that records site richness based off spatial scale.
n_all_longer = n_all %>%
  pivot_longer(!siteID, names_to = "spatial_scale", values_to = "richness")

## 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