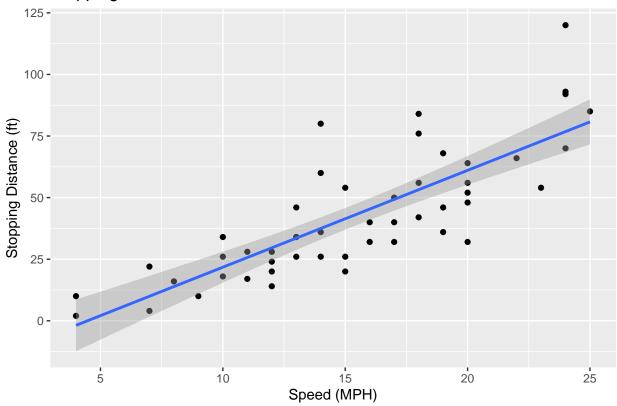
class 05 sript. R

${\it zaida rod riguez}$

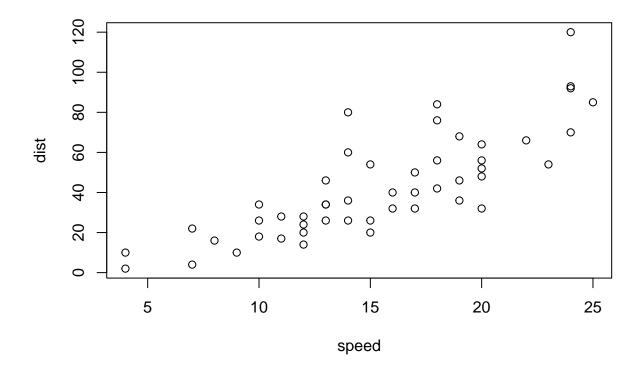
2021-10-13

'geom_smooth()' using formula 'y ~ x'

Stopping Distance of Old Cars



sidenote: other graphic systems available in R ("base" R graphics)
plot(cars)



```
# workbook data
url <- "https://bioboot.github.io/bimm143_S20/class-material/up_down_expression.txt"
genes <- read.delim(url)
head(genes)</pre>
```

```
## Gene Condition1 Condition2 State
## 1 A4GNT -3.6808610 -3.4401355 unchanging
## 2 AAAS 4.5479580 4.3864126 unchanging
## 3 AASDH 3.7190695 3.4787276 unchanging
## 4 AATF 5.0784720 5.0151916 unchanging
## 5 AATK 0.4711421 0.5598642 unchanging
## 6 AB015752.4 -3.6808610 -3.5921390 unchanging
```

```
# how many genes in this dataset?
nrow(genes)
```

[1] 5196

```
# how many genes are "up"?
#this looks at the state column
genes$State
```

```
## [1] "unchanging" "unchanging" "unchanging" "unchanging"
## [6] "unchanging" "unchanging" "unchanging" "up"
```

```
##
     [11] "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
     [16] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [21] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [26] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [31] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [36] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
     [51]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [61] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [66] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
     [71] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
     [76] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
     [91] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
     [96] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [101] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [106] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [111] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [116] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [121] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [126] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [131] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [136] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [141] "unchanging" "unchanging" "unchanging" "unchanging"
    [146] "unchanging" "unchanging" "unchanging" "unchanging"
    [151] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [156] "unchanging" "unchanging" "unchanging" "unchanging"
    [161] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [166] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [171] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [176] "unchanging" "unchanging" "unchanging" "unchanging"
    [181] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [186] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [191] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [196] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [201]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [206] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [211] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [216] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [221] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [226] "unchanging" "unchanging" "unchanging" "unchanging"
    [231] "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [236]
##
    [241] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [246] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [251] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [256] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [261] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [266] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [271] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [276] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
```

```
[281] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [286] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [291] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [296] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [301] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [306] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [311] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
    [316]
##
    [321] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [326] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [331] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [336] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [341] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [346] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [351] "unchanging" "unchanging" "unchanging" "unchanging"
    [356] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [361] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [366] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [371] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [376] "unchanging" "unchanging" "down"
                                                 "unchanging" "unchanging"
##
    [381] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [386] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
    [391]
    [396]
          "down"
                       "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
##
    [401] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [406] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                              "unchanging"
##
    [411]
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
         "unchanging" "unchanging" "unchanging" "up"
##
    [416]
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
    [421] "up"
    [426] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [431] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [436] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [441] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [446] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [451] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [456] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [461] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [466] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
    [471] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging'
##
    [476] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [481] "unchanging" "unchanging" "unchanging"
                                                 "down"
                                                              "unchanging"
##
    [486] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
    [491] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [496] "up"
                       "unchanging" "unchanging" "unchanging"
                                                              "up"
    [501] "unchanging" "unchanging" "up"
                                                 "unchanging"
                                                              "unchanging"
    [506] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging"
                                                              "unchanging"
##
    [511] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [516] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
    [521] "unchanging" "unchanging" "unchanging"
                                                 "down"
                                                              "up"
    [526] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                              "unchanging"
##
    [531] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [536] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [541] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [546] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
```

```
##
    [551] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [556] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [561] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [566] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [571] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [576] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [581] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
    Г5861
                                                 "unchanging"
##
    [591] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [596] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [601] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [606] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [611] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [616] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [621] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [626] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [631] "unchanging" "down"
                                    "unchanging" "unchanging" "unchanging"
##
    [636] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
    [641] "unchanging" "unchanging" "unchanging"
##
    [646] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [651] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [656] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
    [661] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
##
    [666] "unchanging" "down"
                                    "down"
                                                  "unchanging" "unchanging"
##
    [671] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [676] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                              "unchanging"
                                                 "unchanging" "unchanging"
##
    [681] "unchanging" "unchanging" "unchanging"
    [686] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
    [691] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
    [696] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
    [701] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
##
    [706] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [711] "unchanging" "unchanging" "up"
                                                 "unchanging" "unchanging"
    [716] "unchanging" "unchanging" "down"
                                                 "unchanging" "unchanging"
##
    [721] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
##
    [726] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [731] "unchanging" "down"
                                                 "unchanging" "unchanging"
##
    [736] "up"
                       "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
    [741]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
    [746] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
    [751] "unchanging" "unchanging" "unchanging"
##
    [756] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
    [761] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [766] "unchanging" "unchanging" "unchanging" "unchanging" "down"
    [771] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [776] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [781] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [786] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [791] "unchanging" "unchanging" "unchanging" "down"
    [796] "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [801] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [806] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [811] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [816] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
```

```
##
    [821] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [826] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [831] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [836] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [841] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [846] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [851] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [856]
##
    [861] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [866] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [871] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [876] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [881] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [886] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [891] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [896] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [901] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [906] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [911] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [916] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [921] "unchanging" "unchanging" "unchanging" "unchanging"
##
    [926] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [931] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [936] "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [941] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [946] "unchanging" "unchanging" "up"
                                                              "unchanging"
    [951] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                              "unchanging"
    [956] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [961] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [966] "unchanging" "unchanging" "unchanging" "unchanging"
##
##
    [971] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [976] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
    [981] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
    [986] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [991] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
    [996] "unchanging" "unchanging" "unchanging" "unchanging"
##
   [1001] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1006] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1011] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1016] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [1021] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1026] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1031] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1036] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1041] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1046] "unchanging" "down"
                                    "unchanging" "unchanging" "up"
##
##
   [1051] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1056] "unchanging"
                                    "unchanging" "unchanging" "unchanging"
   [1061] "unchanging"
                                    "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [1066] "unchanging"
   [1071] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
   [1076] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1081] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
## [1086] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [1091] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1096] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1101] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1106] "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
  [1111] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1116] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1121] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
                                                  "unchanging"
## [1126] "unchanging" "down"
                                    "unchanging"
                                                               "unchanging"
   [1131] "unchanging" "unchanging" "unchanging"
                                                 "up"
                                                               "unchanging"
                                                 "unchanging" "unchanging"
   [1136] "unchanging" "unchanging" "unchanging"
   [1141] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [1146] "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "down"
   [1151] "up"
                                                  "unchanging" "unchanging"
##
                       "down"
                                    "down"
                       "unchanging" "up"
   [1156] "down"
                                                  "unchanging" "unchanging"
  [1161] "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
   [1166]
          "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
   [1171] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [1176] "unchanging" "unchanging" "unchanging"
  [1181] "unchanging" "unchanging" "up"
##
                                                  "unchanging" "unchanging"
  [1186]
                       "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
  [1191]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [1196]
## [1201]
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
  [1206] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1211] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1216] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1221]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1226] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1231] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1236] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1241] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [1246] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1251] "unchanging" "unchanging" "unchanging" "unchanging"
  [1256] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [1261]
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [1266] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [1271] "unchanging" "unchanging" "unchanging" "up"
                                                               "unchanging"
## [1276] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
## [1281]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [1286] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
  [1291] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
  [1296] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [1301] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1306] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1311] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
## [1316]
                                                 "unchanging" "unchanging"
##
   [1321] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1326] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
  [1331] "unchanging" "unchanging" "up"
  [1336]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
## [1341] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1346] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1351] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1356] "up"
                                                  "unchanging" "unchanging"
                       "unchanging" "up"
```

```
"unchanging"
## [1361] "unchanging" "unchanging" "up"
   [1366] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1371] "unchanging" "unchanging" "unchanging" "unchanging"
  [1376] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1381] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1386] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
   Г1391]
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging"
  [1396]
                                                              "unchanging"
   Γ1401]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1406]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1411] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1416]
   [1421]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1426] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1431]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1436]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [1441] "unchanging" "down"
                                    "unchanging" "unchanging" "unchanging"
   [1446] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1451]
         "unchanging" "unchanging" "unchanging" "unchanging"
  [1456]
##
  [1461]
         "up"
                       "up"
                                    "unchanging" "unchanging" "unchanging"
  [1466]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
## [1471]
   Γ1476]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  Γ1481]
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  Г14867
         "unchanging"
                      "unchanging" "unchanging"
                                                "unchanging" "unchanging"
  [1491]
         "unchanging"
                      "up"
                                    "down"
                                                 "unchanging" "unchanging"
   [1496] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1501] "down"
                       "down"
                                    "unchanging" "unchanging" "unchanging"
   [1506] "unchanging" "unchanging" "unchanging"
                                                "unchanging" "unchanging"
   [1511]
          "unchanging" "unchanging"
                                   "unchanging" "unchanging" "unchanging"
   [1516] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1521] "unchanging"
                      "unchanging" "up"
                                                 "unchanging" "unchanging"
   [1526]
                      "unchanging" "unchanging" "unchanging"
         "unchanging"
   [1531]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "up"
##
   [1536]
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [1541]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1546]
          "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [1551]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1556]
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1561] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1566]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1571] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1576] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1581]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1586]
##
   [1591] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1596] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1601] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
   [1606]
   [1611] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1616] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1621] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1626] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [1631] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1636] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1641] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1646] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1651] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1656] "unchanging" "unchanging" "unchanging" "up"
                                                              "unchanging"
                       "unchanging" "unchanging" "unchanging"
   [1661] "up"
                                                              "unchanging"
  [1666]
##
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1671] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1676] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1681] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1686] "unchanging" "unchanging" "unchanging" "unchanging"
                                                             "unchanging"
##
   [1691] "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
   [1696] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1701] "unchanging" "unchanging" "unchanging" "up"
  [1706] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [1711] "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
   [1716] "unchanging"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [1721] "unchanging" "unchanging" "down"
                                                 "unchanging" "unchanging"
  [1726] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [1731] "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [1736]
         "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
## [1741] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [1746] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1751] "unchanging" "unchanging" "up"
                                                              "unchanging"
  [1756] "unchanging" "unchanging" "unchanging"
                                                 "down"
                                                              "down"
  [1761] "unchanging" "unchanging" "down"
                                                 "unchanging"
                                                              "unchanging"
   [1766] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1771] "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
  [1776] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                              "unchanging"
## [1781] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
   [1786] "unchanging" "unchanging" "up"
                                                 "unchanging" "unchanging"
   [1791] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [1796] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [1801] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [1806] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1811] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
## [1816] "unchanging" "unchanging" "up"
                                                              "unchanging"
## [1821]
         "up"
                                    "unchanging" "unchanging" "unchanging"
  [1826] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                              "unchanging"
  [1831] "unchanging" "unchanging" "unchanging" "up"
                                                              "unchanging"
  [1836] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [1841] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1846] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
## [1851] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
## [1856] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
  [1861] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1866] "unchanging" "unchanging" "up"
                                                              "unchanging"
  [1871] "unchanging" "unchanging" "unchanging" "unchanging"
  [1876] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1881] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1886] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1891] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1896] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [1901] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1906] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1911] "unchanging"
                       "unchanging" "unchanging" "unchanging" "unchanging"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [1916] "unchanging"
   [1921]
         "unchanging" "up"
                                    "unchanging" "unchanging" "up"
   [1926]
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
         "up"
   Γ1931]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [1936]
          "up"
                       "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   Γ19417
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1946] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1951] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1956] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1961] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1966] "unchanging" "unchanging" "up"
                                                 "unchanging" "unchanging"
  [1971]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1976]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [1981] "up"
##
                       "unchanging" "unchanging" "unchanging" "unchanging"
   [1986]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [1991]
         "unchanging" "unchanging" "unchanging" "unchanging" "down"
## [1996]
                                    "unchanging" "unchanging" "unchanging"
  [2001]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2006]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2011]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2016]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2021] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2026] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2031] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2036] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2041] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2046] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2051] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2056] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2061] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2066] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2071]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2076] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2081] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2086]
         "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
## [2091]
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2096] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2101]
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
  [2106]
                                                              "unchanging"
  [2111]
         "up"
                       "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
  [2116]
                                                              "unchanging"
  [2121]
          "unchanging" "unchanging" "up"
                                                               "unchanging"
## [2126]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [2131] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2136] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                              "unchanging"
  [2141] "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
  [2146]
                                                              "unchanging"
  [2151] "unchanging" "unchanging" "up"
                                                              "unchanging"
## [2156] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2161] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2166] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [2171] "up"
                                    "unchanging" "unchanging" "unchanging"
   [2176] "unchanging" "down"
                                    "unchanging" "unchanging" "unchanging"
  [2181] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2186] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2191]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2196] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2201]
## [2206]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [2211]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2216] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2221] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2226] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [2231]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2236] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2241]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2246]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2251] "up"
                       "unchanging" "up"
##
                                                 "unchanging" "unchanging"
   [2256] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [2261]
## [2266]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2271]
         "unchanging" "unchanging" "down"
                                                 "unchanging" "unchanging"
  [2276]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
## [2281]
                                                 "unchanging" "unchanging"
  Γ22861
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2291] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [2296] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [2301] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [2306] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2311] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2316]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2321]
   [2326] "unchanging" "unchanging" "unchanging" "down"
   [2331] "up"
                                    "unchanging" "unchanging" "unchanging"
  [2336]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2341]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2346] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2351] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2356]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2361]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2366] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2371]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   Γ23761
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2381]
          "down"
                       "unchanging" "unchanging" "unchanging" "unchanging'
   [2386]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2391]
                       "unchanging" "unchanging" "unchanging" "unchanging"
## [2396]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2401] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2406] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2411]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2416]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2421]
## [2426] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2431] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2436] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [2441] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2446] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2451] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2456] "unchanging"
                       "up"
                                    "unchanging" "unchanging" "unchanging"
##
   [2461] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2466] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2471] "up"
                                    "unchanging" "unchanging"
                       "up"
  [2476]
##
          "down"
                       "unchanging" "unchanging"
                                                 "unchanging"
                                                              "up"
   [2481] "unchanging" "unchanging" "unchanging" "unchanging"
   [2486] "unchanging"
                       "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2491] "unchanging"
                       "up"
                                    "unchanging" "unchanging"
                                                              "unchanging"
  [2496] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2501] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2506] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2511] "unchanging" "unchanging" "down"
                                                 "unchanging" "unchanging"
## [2516] "unchanging" "unchanging"
                                   "unchanging" "down"
                                                              "unchanging"
   [2521] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2526] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2531] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
                                    "unchanging" "unchanging" "unchanging"
  [2536] "unchanging" "up"
##
  [2541] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2546] "unchanging" "down"
                                    "unchanging" "unchanging"
                                                              "unchanging"
## [2551] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [2556] "unchanging" "unchanging" "unchanging" "down"
                                                              "unchanging"
  [2561] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2566] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2571] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [2576] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2581] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [2586] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2591] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2596] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2601] "unchanging" "unchanging" "unchanging" "up"
   [2606] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2611] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2616] "unchanging" "unchanging" "up"
##
                                                 "unchanging" "unchanging"
  [2621] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2626] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2631] "unchanging" "unchanging" "unchanging" "unchanging" "up"
  [2636] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [2641] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2646] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2651] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2656] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2661] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2666] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [2671] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2676] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [2681] "unchanging" "unchanging" "up"
  [2686] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2691] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2696] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2701] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2706] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [2711] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2716] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2721] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2726] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
##
   [2731]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2736] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
   [2741]
  [2746]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [2751] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "down"
   [2756] "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [2761] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [2766] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                 "unchanging"
##
   [2771] "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
   [2776] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
   [2781]
          "unchanging" "unchanging" "up"
   [2786]
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
   [2791] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
                                                  "unchanging"
   [2796] "up"
                       "unchanging" "unchanging"
                                                               "unchanging"
   [2801]
          "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging"
   [2806]
          "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
##
  Γ2811]
          "down"
                       "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [2816]
          "unchanging" "unchanging" "down"
                                                  "unchanging"
  [2821]
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [2826]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
  [2831] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging"
                                                               "unchanging"
   [2836] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging"
  [2841]
                                                  "unchanging"
                                                               "unchanging"
   [2846] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
   [2851] "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
                                                 "unchanging"
   [2856] "unchanging" "unchanging" "unchanging"
                                                  "up"
                                                               "unchanging"
   [2861] "unchanging" "unchanging"
                                    "unchanging"
                                                  "unchanging"
                                                               "unchanging"
##
   [2866] "unchanging" "unchanging" "up"
                                                  "unchanging" "unchanging"
   [2871] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [2876] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [2881]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2886] "unchanging" "unchanging" "down"
##
                                                  "unchanging" "unchanging"
  [2891] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2896]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
  [2901]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2906] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging"
   [2911]
                                                 "unchanging"
                                                               "unchanging"
  [2916]
          "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging"
   [2921]
         "unchanging" "unchanging" "unchanging" "up"
                                                               "down"
   [2926] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2931] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
## [2936]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
##
   [2941] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [2946] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                               "unchanging"
  [2951] "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [2956]
   [2961] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
## [2966] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2971] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [2976] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [2981] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2986] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2991] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [2996] "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
##
   [3001]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3006] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging"
   Γ3011]
                                                  "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
   [3016]
                                                  "unchanging"
                                                               "unchanging"
   Γ3021]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
   [3026] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [3031] "unchanging" "unchanging" "unchanging"
                                                  "down"
                                                               "unchanging"
   [3036] "unchanging" "unchanging" "unchanging"
                                                 "up"
                                                               "unchanging"
##
   [3041] "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
   [3046] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [3051] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging"
   [3056] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                 "unchanging"
   [3061] "unchanging" "unchanging" "unchanging"
##
                                                 "unchanging" "unchanging"
   [3066] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3071] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [3076] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3081] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
   [3086]
                                                               "unchanging"
  [3091]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [3096] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3101] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3106] "unchanging" "down"
                                    "unchanging"
                                                 "up"
                                                               "unchanging"
   [3111] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "up"
   [3116] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                  "unchanging" "unchanging"
   [3121] "unchanging" "unchanging" "up"
   [3126] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3131] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3136] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3141] "unchanging" "unchanging" "unchanging" "unchanging"
   [3146] "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                               "unchanging"
   [3151]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3156] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
   [3161] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3166]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3171]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3176] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3181] "unchanging" "unchanging" "unchanging" "unchanging"
   [3186] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3191] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3196] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3201] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [3206]
##
   [3211] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3216] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3221] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3226]
   [3231] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [3236] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [3241] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [3246] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [3251] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3256] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   Г32611
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3266]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3271]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3276]
          "unchanging" "unchanging" "unchanging" "unchanging"
   Г3281<sub>1</sub>
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3286]
                                                               "unchanging"
   [3291]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3296]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3301]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3306]
##
   Γ33111
          "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
   [3316]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3321]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3326]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3331]
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3336]
         "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3341]
                                                               "unchanging"
   [3346]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3351]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3361]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3366]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3371]
##
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3376]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3381]
                                                               "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3386]
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3391]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3396]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3401]
##
   [3406]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3411]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3416]
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3421]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3426]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [3436]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3441]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3446]
##
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3451]
   [3456]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   Г3461]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3466]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3471]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3476]
##
   [3481] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3486]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3491]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3496]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3501]
   [3506] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  Г3511]
## [3516] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
[3521] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3526] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   Г3531]
   [3536] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
   [3541]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3546]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3551]
          "unchanging" "unchanging" "unchanging"
   [3556]
                                                 "unchanging"
                                                               "unchanging"
   [3561]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3566]
##
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3571] "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3576]
                                                               "unchanging"
##
   [3581]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3586] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3591]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3596]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3601] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3606] "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3611] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [3616]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3621]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3626]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3631]
          "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
##
                                                 "unchanging"
   [3636]
##
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3641] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                              "unchanging"
   [3646] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3651]
                                                              "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3656]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3661]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3666]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3671]
##
   [3676] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3681] "unchanging" "unchanging" "unchanging" "unchanging"
   [3686] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
   [3691]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3696] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3701] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3706]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3711]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3716] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3721]
                                                               "unchanging"
   [3726]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   Γ3731
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3736]
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3741]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3746]
##
##
   [3751] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3756] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3761] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3766]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3771]
   [3776] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [3781] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [3786] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [3791] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3796] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3801] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3806]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3811]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3816]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3821]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging"
                                                              "unchanging"
   [3826]
   [3831]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3836]
##
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [3841]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3846]
##
   [3851]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3856]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3861]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3866]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3871] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3876] "unchanging" "unchanging" "unchanging" "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging"
   [3881]
                                                              "unchanging"
   [3886]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3891]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3896]
   [3901]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [3906]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3911]
##
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [3916]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging"
   [3921]
                                                              "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3926]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3931]
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3936]
   [3941]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3946] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3951]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
##
   [3956]
                                                              "unchanging"
   [3961]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3966] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [3976]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3981]
                                                              "unchanging"
   [3986]
##
         "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [3991]
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging"
   [3996]
                                                              "unchanging"
   Γ4001
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging"
   [4006]
          "unchanging" "unchanging" "unchanging" "unchanging"
   [4011]
                                                              "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [4016]
##
                                                              "unchanging"
##
   [4021] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4026]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
   [4031]
         "unchanging" "unchanging" "up"
          "unchanging" "unchanging" "unchanging" "unchanging"
   [4036]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4041]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4046]
## [4051] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4056] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

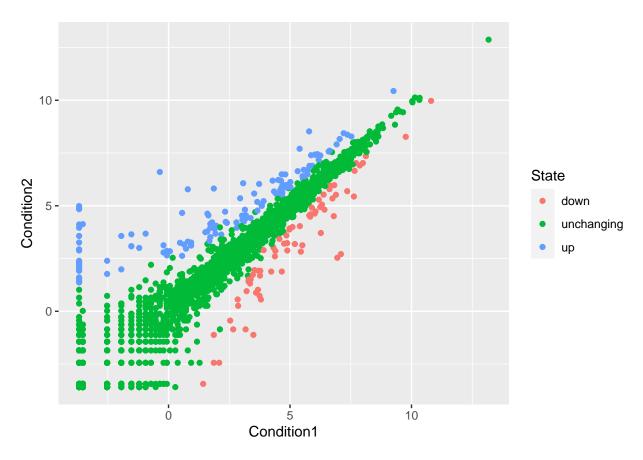
```
## [4061] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4066] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4071] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4076] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4081]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4086]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   Γ4091]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [4096]
   [4101]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4106]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4111] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4116]
   [4121]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4126] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4131]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4136]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4141] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4146] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4151] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4156]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4161]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4171]
   [4176]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4181] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4186]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4191]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4196]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4201]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4206]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4211]
##
   [4216] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4221]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4226]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4231]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [4236]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4246]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4251]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4256]
##
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
  [4261]
                                                              "unchanging"
  [4266]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4271]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4276]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4281]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4286]
##
   [4291] "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
  [4296]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4301]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4306]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4311]
## [4316] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4321] "unchanging" "unchanging" "unchanging" "up"
## [4326] "unchanging" "unchanging" "unchanging" "down"
```

```
## [4331] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4336] "unchanging" "unchanging" "unchanging" "up"
                                                               "up"
  [4341] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4346] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
##
   [4351] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "down"
   [4356] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
          "unchanging" "unchanging" "down"
   Г4361]
                                                  "down"
                                                               "unchanging"
  [4366]
          "unchanging" "unchanging"
                                    "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4371] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
##
   [4376] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4381] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4386] "unchanging" "unchanging" "unchanging"
                                                  "up"
                                                               "unchanging"
##
   Γ4391]
         "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4396] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4401]
          "up"
                       "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
##
  [4406]
          "unchanging" "unchanging" "unchanging" "unchanging"
   [4411] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
  [4416] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
##
  [4421] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
## [4426]
          "unchanging" "unchanging" "unchanging" "up"
## [4431] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
  [4436]
## [4441]
          "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging"
   Γ4446]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4451] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
  [4456] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
  [4461] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4466] "unchanging" "unchanging" "unchanging"
##
                                                  "down"
                                                               "unchanging"
  [4471] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4476] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
## [4481] "unchanging" "unchanging"
                                    "up"
                                                  "unchanging"
                                                               "unchanging"
##
   [4486] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "up"
  [4491] "unchanging" "unchanging" "down"
                                                  "unchanging"
                                                               "unchanging"
  [4496] "unchanging" "unchanging" "unchanging"
                                                               "up"
##
                                                  "unchanging"
   [4501]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4506] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
  [4511] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
  [4516]
          "unchanging" "unchanging" "unchanging"
                                                  "down"
                                                               "unchanging"
##
  [4521]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4526] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging"
   [4531]
                                                  "unchanging"
                                                               "unchanging"
   [4536]
          "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging"
   [4541]
         "unchanging" "unchanging" "unchanging" "up"
                                                               "unchanging"
##
   [4546] "down"
                       "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging"
  [4551]
                                                  "unchanging"
                                                               "unchanging"
          "unchanging" "up"
  [4556]
                                     "unchanging"
##
                                                  "unchanging"
                                                               "unchanging"
##
   [4561] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4566] "unchanging" "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
                                                  "unchanging"
   [4571] "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "up"
   [4576]
                                                  "unchanging"
                                                               "unchanging"
   [4581] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
##
  [4586] "unchanging" "unchanging" "unchanging" "down"
                                                               "unchanging"
## [4591] "unchanging" "unchanging" "up"
                                                  "unchanging" "unchanging"
## [4596] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [4601] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4606] "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
   [4611] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4616]
          "unchanging" "unchanging" "unchanging"
                                                  "down"
                                                               "unchanging"
   [4621]
          "unchanging" "unchanging" "unchanging"
   [4626]
         "unchanging" "unchanging" "unchanging"
##
                                                               "unchanging"
                                                  "unchanging"
          "unchanging" "unchanging" "unchanging"
   Γ4631]
                                                  "unchanging"
                                                               "unchanging"
          "unchanging" "unchanging" "unchanging"
  [4636]
                                                  "unchanging"
                                                               "unchanging"
   [4641]
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4646]
         "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "up"
   [4651] "unchanging" "unchanging" "unchanging"
                                                  "unchanging"
                                                               "unchanging"
   [4656] "unchanging" "unchanging"
                                    "unchanging" "unchanging"
                                                               "unchanging"
                                                  "unchanging" "unchanging"
   Γ4661]
         "unchanging" "unchanging" "up"
   [4666] "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4671]
          "unchanging" "unchanging"
                                    "unchanging" "unchanging"
                                                               "unchanging"
   [4676]
          "unchanging" "up"
                                     "unchanging" "unchanging"
                                                               "unchanging"
   [4681] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4686] "unchanging" "unchanging" "unchanging" "unchanging"
  Γ46917
                       "down"
                                     "unchanging" "unchanging"
##
          "down"
                                                               "unchanging"
   [4696]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4701]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
  [4706]
  [4711]
          "unchanging" "unchanging"
                                    "unchanging"
                                                  "unchanging" "unchanging"
   [4716]
          "unchanging" "unchanging" "unchanging" "up"
                                                               "unchanging"
  [4721]
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
          "down"
   [4726]
          "unchanging" "unchanging" "unchanging" "unchanging"
                                                               "unchanging"
   [4731]
          "unchanging" "up"
                                     "unchanging" "unchanging"
                                                               "unchanging"
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4736]
  [4741]
         "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
   [4746]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4751]
          "unchanging" "unchanging"
                                    "unchanging" "unchanging" "unchanging"
   [4756] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4761] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
  [4766]
                                                  "unchanging" "unchanging"
   [4771]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4776] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
## [4781] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  Γ4786]
          "unchanging" "unchanging" "down"
                                                  "unchanging" "unchanging"
  [4791]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [4796]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4801]
                       "unchanging" "unchanging"
          "up"
                                                  "unchanging" "unchanging"
   Γ48061
          "unchanging" "unchanging" "unchanging"
                                                  "unchanging" "unchanging"
   [4811]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4816]
  [4821]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4826]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4831] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4836] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4841]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4846]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4851]
## [4856] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4861] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [4866] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
```

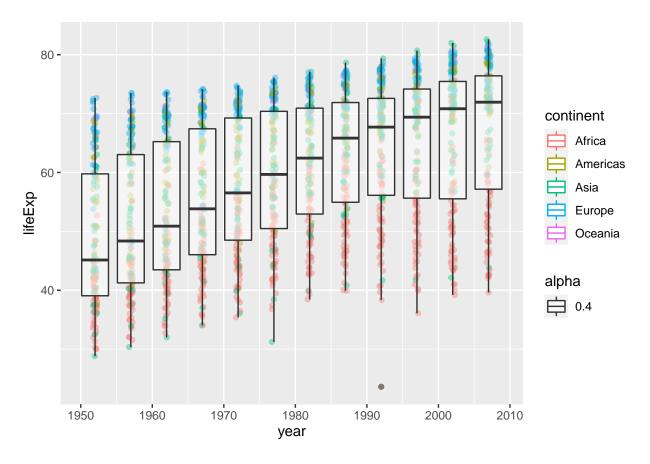
```
## [4871] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4876] "unchanging" "unchanging" "unchanging" "up"
  [4881] "unchanging" "unchanging" "unchanging" "unchanging"
                                                              "unchanging"
  [4886] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4891]
         "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4896] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   Γ4901]
          "unchanging" "unchanging" "unchanging"
  [4906]
                                                 "unchanging"
                                                              "unchanging"
   [4911] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4916] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4921] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4926] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4931] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4936] "down"
                       "unchanging" "unchanging" "unchanging" "unchanging"
  [4941]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4946]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [4951] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4956] "unchanging" "unchanging" "down"
                                                 "unchanging"
  [4961] "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
##
  [4966]
          "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
  [4971] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4976]
          "unchanging" "unchanging" "unchanging"
                                                 "unchanging" "unchanging"
          "unchanging" "unchanging" "unchanging"
  [4981]
                                                 "unchanging" "unchanging"
##
   [4986] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [4991] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [4996] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5001] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5006] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5011] "unchanging" "down"
                                    "unchanging" "unchanging" "down"
   [5016] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5021] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5026] "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
   [5031] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5036] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5041] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5046] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5051] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [5056] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5061] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5066] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5071] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5076] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5081] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5086] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5091] "unchanging" "up"
                                    "unchanging" "unchanging" "unchanging"
   [5096] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
##
   [5101] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5106] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5111] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5116] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
   [5121] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
##
   [5126] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
  [5131] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5136] "up"
                       "unchanging" "unchanging" "unchanging" "unchanging"
```

```
## [5141] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5146] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5151] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5156] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5161] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5166] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5171] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5176] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5181] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5186] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5191] "unchanging" "unchanging" "unchanging" "unchanging" "unchanging"
## [5196] "unchanging"
#to look at the specific numbers
table(genes$State)
##
##
         down unchanging
                                up
##
          72
              4997
                               127
# to see what percentage of genes are up?
table(genes$State)/nrow(genes) * 100
##
##
        down unchanging
                                 up
     1.385681 96.170131
##
                           2.444188
# to round up:
round(table(genes$State)/nrow(genes) * 100, 2)
##
##
         down unchanging
                               up
                96.17
         1.39
                               2.44
# make a figure
p <- ggplot(genes) +</pre>
 aes(x=Condition1, y=Condition2, col=State)+
 geom_point()
р
```

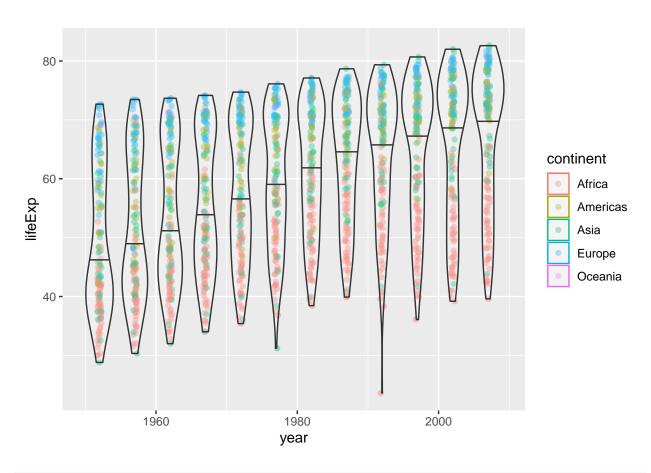


```
# change the colors
p <- p + scale_color_manual(values = c("orchid", "orange", "lightblue")) +</pre>
  labs(title = "Gene Expression Changes Upon Drug Treatment",
       x= "Control(no drug)", y= "Drug Treatment")
# time to work with gapminder
library(gapminder)
url <- "https://raw.githubusercontent.com/jennybc/gapminder/master/inst/extdata/gapminder.tsv"</pre>
gapminder <- read.delim(url)</pre>
library(dplyr)
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##
       filter, lag
## The following objects are masked from 'package:base':
##
##
       intersect, setdiff, setequal, union
head(gapminder)
```

```
pop gdpPercap
         country continent year lifeExp
## 1 Afghanistan
                      Asia 1952
                                 28.801 8425333
                                                  779.4453
                      Asia 1957
                                                  820.8530
## 2 Afghanistan
                                 30.332 9240934
## 3 Afghanistan
                                 31.997 10267083
                                                  853.1007
                      Asia 1962
## 4 Afghanistan
                      Asia 1967
                                 34.020 11537966
                                                  836.1971
## 5 Afghanistan
                                 36.088 13079460
                                                  739.9811
                      Asia 1972
## 6 Afghanistan
                      Asia 1977
                                 38.438 14880372 786.1134
# %>% is called a pipe. We will tell R to filter the gapminder dataset to year 2007
gapminder_2007 <- gapminder %>% filter(year==2007)
# lets make a figure of year vs lifeExp
# add a box plot on top of the jitters
# alpha changes the transprency of the dot/box
ggplot(gapminder) +
  aes(x=year, y=lifeExp, col=continent) +
  geom_jitter(width= 0.3, alpha=0.4) +
 geom_boxplot(aes(group=year, alpha=0.4))
```



```
# try a vln plot instead of a box plot
g <- ggplot(gapminder) +
  aes(x=year, y=lifeExp, col=continent) +
  geom_jitter(width= 0.3, alpha=0.4) +
  geom_violin(aes(group=year), alpha=0.2, draw_quantiles =0.5)
g</pre>
```



```
#install.packages("plotly")
#install the plotly
#plotly lets you hover over the data and see specifics of the points
#library(plotly)
#ggplotly()
```