

Lab 2

Norah Saarman

2024-09-12

Section 4.3 Worked Example

https://bookdown.org/hhwagner1/LandGenCourse_book/WE_1.html

Make sure we have the packages:

```
if(!require("adegenet")) install.packages("adegenet") if(!requireNamespace("popgraph", quietly = TRUE))
{ install.packages(c("RgoogleMaps", "geosphere", "proto", "sampling", "seqinr", "spacetime", "spdep"), de-
dependencies=TRUE) remotes::install_github("dyerlab/popgraph") } if(!requireNamespace("gstudio", quietly
= TRUE)) remotes::install_github("dyerlab/gstudio")
```

```
install.packages("here")
```

Load libraries

```
library(adegenet)
```

```
## Loading required package: ade4
##
##    /// adegenet 2.1.10 is loaded //////////////////////////////////
##
##    > overview: '?adegenet'
##    > tutorials/doc/questions: 'adegenetWeb()'
##    > bug reports/feature requests: adegenetIssues()
```

```
library(gstudio)
```

```
## Warning: replacing previous import 'dplyr::union' by 'raster::union' when
## loading 'gstudio'
##
## Warning: replacing previous import 'dplyr::intersect' by 'raster::intersect'
## when loading 'gstudio'
##
## Warning: replacing previous import 'dplyr::select' by 'raster::select' when
## loading 'gstudio'
##
## Attaching package: 'gstudio'
##
## The following objects are masked from 'package:adegenet':
##
##    alleles, ploidy
```

```
library(LandGenCourse)
library(tibble)
library(here)
```

```
## here() starts at /uufs/chpc.utah.edu/common/home/u6036559/git/usu-biol4750
```

```
library(vcfR)

##
##      *****      ***   vcfR   ***      *****
##      This is vcfR 1.15.0
##      browseVignettes('vcfR') # Documentation
##      citation('vcfR') # Citation
##      *****      *****      *****      *****

library(pinfsc50)
library(utils)
```

1. Overview

The data set we will use is ralu.loci

Import straight from the package after library is loaded

```
data("ralu.loci")
```

As a .csv file:

To download the csv file...

```
if(!dir.exists(paste0(here(), "/downloads"))) dir.create(paste0(here(), "/downloads"))
file.copy(system.file("extdata", "ralu.loci.csv", package = "LandGenCourse"),
  paste0(here(), "/downloads/ralu.loci.csv"), overwrite=FALSE)
```

```
## [1] FALSE
```

2. Import from csv file:

```
Frogs <- read.csv(file="./downloads/ralu.loci.csv", header=TRUE)
as_tibble(Frogs)
```

```
## # A tibble: 181 x 10
##   SiteName      Pop      A      B      C      D      E      F      G      H
##   <chr>         <chr>   <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
## 1 AirplaneLake Airplane 1:1   1:1   1:1   1:1   1:2   1:1   1:1   4:5
## 2 AirplaneLake Airplane 2:2   1:1   NA:NA 1:1   1:1   NA:NA 2:2   NA:NA
## 3 AirplaneLake Airplane 1:1   1:1   1:1   1:1   3:3   1:1   1:1   3:3
## 4 AirplaneLake Airplane 1:1   1:1   NA:NA 2:2   1:2   NA:NA NA:NA NA:NA
## 5 AirplaneLake Airplane 1:2   1:3   1:1   1:1   1:2   1:1   1:2   4:5
## 6 AirplaneLake Airplane 1:2   1:1   1:1   3:1   1:1   1:1   1:2   4:5
## 7 AirplaneLake Airplane 2:2   1:3   1:1   1:1   3:3   1:1   1:1   2:3
## 8 AirplaneLake Airplane 2:2   1:3   1:1   1:1   3:3   1:1   1:1   2:3
## 9 AirplaneLake Airplane 3:1   1:1   1:1   1:1   1:7   1:1   1:1   3:5
## 10 AirplaneLake Airplane 2:2   1:3   1:1   1:1   3:7   1:1   1:1   3:3
## # i 171 more rows
```

Adding a column that gives us Frogs\$FrogID

```
Frogs <- data.frame(FrogID = paste(substr(Frogs$Pop, 1, 3), row.names(Frogs), sep="."), Frogs)
as_tibble(Frogs)
```

```
## # A tibble: 181 x 11
##   FrogID SiteName      Pop      A      B      C      D      E      F      G      H
##   <chr>   <chr>         <chr>   <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr>
```

```
## 1 Air.1 AirplaneLake Airplane 1:1 1:1 1:1 1:1 1:2 1:1 1:1 4:5
## 2 Air.2 AirplaneLake Airplane 2:2 1:1 NA:NA 1:1 1:1 NA:NA 2:2 NA:NA
## 3 Air.3 AirplaneLake Airplane 1:1 1:1 1:1 1:1 3:3 1:1 1:1 3:3
## 4 Air.4 AirplaneLake Airplane 1:1 1:1 NA:NA 2:2 1:2 NA:NA NA:NA NA:NA
## 5 Air.5 AirplaneLake Airplane 1:2 1:3 1:1 1:1 1:2 1:1 1:2 4:5
## 6 Air.6 AirplaneLake Airplane 1:2 1:1 1:1 3:1 1:1 1:1 1:2 4:5
## 7 Air.7 AirplaneLake Airplane 2:2 1:3 1:1 1:1 3:3 1:1 1:1 2:3
## 8 Air.8 AirplaneLake Airplane 2:2 1:3 1:1 1:1 3:3 1:1 1:1 2:3
## 9 Air.9 AirplaneLake Airplane 3:1 1:1 1:1 1:1 1:7 1:1 1:1 3:5
## 10 Air.10 AirplaneLake Airplane 2:2 1:3 1:1 1:1 3:7 1:1 1:1 3:3
## # i 171 more rows
```

```
dim(Frogs)
```

```
## [1] 181 11
```

Some useful file directory functions

```
here()
```

```
## [1] "/uufs/chpc.utah.edu/common/home/u6036559/git/usu-biol4750"
```

```
#file.choose() but don't leave within code chunk without commenting it out
```

```
paste0(here(), "/output", "/gobblygook")
```

```
## [1] "/uufs/chpc.utah.edu/common/home/u6036559/git/usu-biol4750/output/gobblygook"
```

Save output file

```
if(!dir.exists(paste0(here(), "/output"))) dir.create(paste0(here(), "/output"))

write.csv(ralu.loci, paste0(here(), "/output/ralu.loci.csv"),
          quote=FALSE, row.names=FALSE)
```

3. Create a 'genind' object using adegenet

```
Frogs[,c(4:11)]
```

```
##      A      B      C      D      E      F      G      H
## 1  1:1  1:1  1:1  1:1  1:2  1:1  1:1  4:5
## 2  2:2  1:1 NA:NA  1:1  1:1 NA:NA  2:2 NA:NA
## 3  1:1  1:1  1:1  1:1  3:3  1:1  1:1  3:3
## 4  1:1  1:1 NA:NA  2:2  1:2 NA:NA NA:NA NA:NA
## 5  1:2  1:3  1:1  1:1  1:2  1:1  1:2  4:5
## 6  1:2  1:1  1:1  3:1  1:1  1:1  1:2  4:5
## 7  2:2  1:3  1:1  1:1  3:3  1:1  1:1  2:3
## 8  2:2  1:3  1:1  1:1  3:3  1:1  1:1  2:3
## 9  3:1  1:1  1:1  1:1  1:7  1:1  1:1  3:5
## 10 2:2  1:3  1:1  1:1  3:7  1:1  1:1  3:3
## 11 1:1  1:1 NA:NA  1:1  1:3  1:1  1:1  4:5
## 12 1:1  1:1  1:1  1:2  1:1  1:1  1:1  3:3
## 13 1:1  1:1  1:1  1:1  1:3  1:1  1:1  4:5
## 14 1:1  1:1 NA:NA  1:1  2:7  1:1  1:1  3:5
## 15 1:1  1:1  1:1  1:2  1:3  1:1  1:2  4:5
```

| | | | | | | | | |
|-------|-------|-------|-------|-----|-------|-------|-------|-------|
| ## 16 | 1:1 | 1:3 | 1:1 | 3:1 | 1:1 | 1:1 | NA:NA | 4:4 |
| ## 17 | 1:2 | 1:3 | NA:NA | 3:1 | 1:3 | 1:1 | 1:1 | 4:5 |
| ## 18 | 1:1 | 1:1 | NA:NA | 1:1 | 1:2 | 1:1 | 1:1 | 3:5 |
| ## 19 | 1:2 | 1:1 | NA:NA | 1:1 | 2:3 | 1:1 | 1:1 | 5:5 |
| ## 20 | NA:NA | 1:3 | NA:NA | 3:1 | 1:1 | 1:1 | 1:1 | 1:4 |
| ## 21 | 2:2 | 1:1 | 1:1 | 1:2 | 3:7 | 1:1 | 1:1 | 2:3 |
| ## 22 | 1:1 | 1:1 | 1:2 | 2:2 | 6:8 | 1:1 | 2:2 | 6:4 |
| ## 23 | 1:1 | 2:2 | 1:1 | 2:2 | 2:2 | 1:1 | 1:2 | 6:4 |
| ## 24 | 1:1 | 1:2 | 1:1 | 3:2 | 1:2 | 1:1 | NA:NA | 1:4 |
| ## 25 | NA:NA | 1:3 | NA:NA | 2:2 | 2:5 | 1:1 | NA:NA | 4:5 |
| ## 26 | 1:1 | 1:2 | 1:1 | 3:2 | 2:5 | 1:1 | 1:2 | 4:5 |
| ## 27 | 1:1 | 2:2 | 1:2 | 2:2 | 2:3 | 1:1 | 1:1 | 6:4 |
| ## 28 | 1:1 | 1:1 | NA:NA | 2:2 | 2:3 | 1:1 | 1:1 | 4:4 |
| ## 29 | 1:1 | 1:1 | NA:NA | 2:2 | 2:8 | 1:1 | 2:2 | 5:5 |
| ## 30 | 1:1 | 1:1 | NA:NA | 4:4 | 1:3 | 1:1 | 1:1 | 5:5 |
| ## 31 | 1:1 | 1:1 | 1:1 | 4:2 | 1:3 | 1:1 | NA:NA | 5:5 |
| ## 32 | 1:1 | 1:1 | 2:2 | 2:2 | 1:2 | 1:1 | NA:NA | 4:4 |
| ## 33 | 1:1 | 1:1 | 1:1 | 2:2 | 3:3 | 1:1 | 1:1 | NA:NA |
| ## 34 | 3:1 | 1:1 | 1:1 | 4:4 | 1:1 | 1:1 | NA:NA | 5:5 |
| ## 35 | 1:1 | 1:1 | 1:1 | 4:2 | 1:3 | 1:1 | NA:NA | 5:5 |
| ## 36 | 1:1 | 1:3 | NA:NA | 4:2 | 1:5 | 1:1 | 1:2 | 4:5 |
| ## 37 | 1:1 | 1:1 | NA:NA | 4:2 | 1:3 | 1:1 | 1:2 | 5:5 |
| ## 38 | 1:1 | 1:1 | NA:NA | 2:2 | 1:1 | 1:1 | 1:1 | 5:5 |
| ## 39 | 1:1 | 2:2 | 1:1 | 4:2 | 3:5 | 1:1 | 1:1 | 5:5 |
| ## 40 | 1:1 | 1:1 | NA:NA | 4:2 | 1:2 | 1:1 | NA:NA | 3:5 |
| ## 41 | 1:1 | 1:1 | 1:1 | 4:2 | 1:3 | 1:1 | 1:1 | 3:5 |
| ## 42 | 1:1 | 1:2 | 1:1 | 2:2 | 1:5 | 2:1 | 1:1 | 5:5 |
| ## 43 | 1:1 | 1:1 | NA:NA | 4:2 | 1:3 | 1:1 | 1:1 | 5:5 |
| ## 44 | 1:1 | 1:2 | 1:2 | 2:2 | 3:5 | 1:1 | 1:1 | 3:5 |
| ## 45 | 1:1 | 1:1 | 1:2 | 1:2 | 1:3 | NA:NA | NA:NA | NA:NA |
| ## 46 | 1:1 | 1:1 | 1:1 | 2:2 | 1:4 | 1:1 | 1:1 | 6:4 |
| ## 47 | 1:1 | 4:1 | 1:1 | 2:2 | NA:NA | 1:1 | 1:1 | 6:5 |
| ## 48 | 1:1 | 1:1 | 1:1 | 2:2 | 3:5 | 1:1 | 1:1 | 6:4 |
| ## 49 | 1:1 | 1:1 | 1:2 | 2:2 | 1:2 | 1:1 | 1:1 | 3:4 |
| ## 50 | 1:1 | 1:1 | NA:NA | 2:2 | 3:5 | 1:1 | 1:1 | 6:4 |
| ## 51 | 1:1 | 1:2 | 1:1 | 2:2 | 1:8 | 1:1 | NA:NA | 5:5 |
| ## 52 | 1:1 | 1:2 | 1:1 | 2:2 | 1:8 | 1:1 | NA:NA | 5:5 |
| ## 53 | 3:1 | 1:1 | 1:2 | 2:2 | 1:3 | 1:1 | 1:1 | 4:5 |
| ## 54 | 1:1 | 1:1 | 1:1 | 2:2 | 3:5 | 1:1 | 1:1 | 6:4 |
| ## 55 | 1:1 | 4:1 | 1:2 | 1:2 | 2:2 | 1:1 | NA:NA | 4:4 |
| ## 56 | 3:1 | 1:1 | 1:1 | 2:2 | 1:8 | 1:1 | 1:2 | 5:5 |
| ## 57 | 1:1 | NA:NA | NA:NA | 1:2 | 1:2 | 1:1 | 1:1 | 6:4 |
| ## 58 | NA:NA | 1:2 | 1:1 | 2:2 | 2:5 | 1:1 | NA:NA | 6:4 |
| ## 59 | 1:1 | 4:1 | NA:NA | 2:2 | 2:8 | 1:1 | NA:NA | 6:4 |
| ## 60 | 1:1 | 1:2 | 1:1 | 2:2 | 1:4 | 1:1 | 1:2 | 4:5 |
| ## 61 | 1:1 | 2:2 | NA:NA | 1:2 | 1:4 | 1:1 | 1:1 | 6:5 |
| ## 62 | 1:1 | 1:2 | 2:2 | 2:2 | 2:4 | 1:1 | 2:2 | 5:5 |
| ## 63 | 1:1 | 1:2 | 1:1 | 2:2 | 4:5 | 1:1 | 1:2 | 1:5 |
| ## 64 | 1:1 | 1:2 | 1:1 | 2:2 | NA:NA | 1:1 | 2:2 | 3:4 |
| ## 65 | 1:1 | 1:2 | 1:1 | 2:2 | 4:5 | 1:1 | 1:2 | 6:5 |
| ## 66 | 1:1 | 1:1 | 1:1 | 2:2 | 2:8 | 1:1 | 1:2 | 6:4 |
| ## 67 | 1:1 | 1:1 | 1:1 | 2:2 | 2:5 | 1:1 | NA:NA | 6:4 |
| ## 68 | 1:1 | 1:1 | 1:1 | 2:2 | 4:5 | 1:1 | 1:2 | 4:5 |
| ## 69 | 1:1 | 1:1 | NA:NA | 2:2 | 1:6 | 1:1 | 2:2 | 5:5 |

| | | | | | | | | |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| ## 70 | 1:1 | 1:2 | 1:1 | 2:2 | 4:5 | 1:1 | 1:2 | 6:5 |
| ## 71 | 1:1 | 1:2 | 1:1 | 2:2 | 4:5 | NA:NA | NA:NA | NA:NA |
| ## 72 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | NA:NA | NA:NA |
| ## 73 | 1:1 | 2:2 | 1:1 | 2:2 | 2:5 | 1:1 | 1:1 | 4:4 |
| ## 74 | 1:1 | 1:2 | NA:NA | 2:2 | 1:4 | 1:1 | NA:NA | 1:5 |
| ## 75 | 1:1 | 1:1 | 1:1 | 2:2 | 2:5 | 1:1 | NA:NA | 6:4 |
| ## 76 | 1:1 | 1:1 | 1:1 | 2:2 | 2:8 | 1:1 | NA:NA | 6:4 |
| ## 77 | 1:1 | 1:1 | 1:1 | 2:2 | 2:4 | 1:1 | 1:1 | 6:5 |
| ## 78 | 1:1 | 1:2 | NA:NA | 2:2 | 2:2 | 1:1 | 1:1 | 4:5 |
| ## 79 | 1:1 | 1:1 | 1:1 | 2:2 | NA:NA | 1:1 | 1:1 | 6:5 |
| ## 80 | 1:1 | 1:2 | 1:1 | 2:2 | 1:4 | 1:1 | 1:1 | 1:5 |
| ## 81 | 1:1 | 1:2 | 1:1 | 3:2 | 2:4 | 1:1 | NA:NA | 6:4 |
| ## 82 | 1:1 | 1:1 | NA:NA | 1:2 | NA:NA | NA:NA | NA:NA | NA:NA |
| ## 83 | 1:1 | 2:2 | 1:1 | 3:2 | 2:4 | 1:1 | 1:2 | 4:5 |
| ## 84 | 1:1 | 1:1 | 1:1 | 1:2 | 2:2 | NA:NA | NA:NA | NA:NA |
| ## 85 | 1:1 | 1:1 | 4:4 | 2:2 | 3:4 | 1:1 | 1:1 | 4:5 |
| ## 86 | 1:1 | 1:1 | 1:2 | 2:2 | 1:4 | NA:NA | NA:NA | NA:NA |
| ## 87 | 1:1 | 1:2 | NA:NA | 2:2 | NA:NA | NA:NA | NA:NA | NA:NA |
| ## 88 | 1:1 | 1:2 | 1:1 | 3:2 | 2:4 | NA:NA | NA:NA | 4:5 |
| ## 89 | 1:1 | NA:NA | 1:1 | 2:2 | 2:4 | 1:1 | 2:2 | 4:5 |
| ## 90 | 1:1 | 1:3 | 1:1 | 3:3 | 1:1 | 1:1 | 2:2 | 5:5 |
| ## 91 | 1:1 | 1:2 | 1:1 | 3:2 | 3:5 | 1:1 | 1:2 | 3:5 |
| ## 92 | 1:1 | 1:3 | NA:NA | 3:1 | 2:6 | 1:3 | 1:2 | 3:4 |
| ## 93 | 1:1 | 1:3 | NA:NA | 3:1 | 1:7 | 1:1 | 1:2 | 3:5 |
| ## 94 | NA:NA | 1:3 | 1:1 | 1:1 | 2:5 | 1:1 | 1:1 | 4:5 |
| ## 95 | 1:2 | 1:2 | 1:1 | 3:1 | 1:2 | 1:1 | NA:NA | 4:5 |
| ## 96 | 1:1 | NA:NA | 1:1 | 4:2 | 2:2 | 1:3 | 1:2 | 4:4 |
| ## 97 | 1:1 | 2:3 | NA:NA | 3:1 | 1:5 | 1:1 | 2:2 | 5:5 |
| ## 98 | 1:1 | 2:3 | 1:1 | 4:2 | 1:2 | 1:1 | 1:2 | 4:5 |
| ## 99 | 1:1 | 1:3 | NA:NA | 1:2 | 5:7 | 1:1 | 1:2 | 3:5 |
| ## 100 | 1:1 | 2:3 | 1:1 | 3:2 | 1:6 | 1:1 | 2:2 | 3:5 |
| ## 101 | 1:2 | 2:3 | NA:NA | 3:4 | 1:6 | 1:1 | 2:2 | 3:5 |
| ## 102 | 1:1 | 2:3 | NA:NA | 4:2 | 1:2 | 1:3 | 1:2 | 1:4 |
| ## 103 | 1:1 | 2:3 | NA:NA | 3:2 | 5:6 | 1:1 | 1:2 | 1:8 |
| ## 104 | 1:1 | 1:2 | NA:NA | 1:1 | 5:7 | 1:1 | 1:2 | NA:NA |
| ## 105 | 1:1 | 2:3 | NA:NA | 4:2 | 1:7 | 1:1 | 1:2 | 1:4 |
| ## 106 | 1:1 | 2:2 | 1:1 | 1:1 | 5:7 | 1:1 | 1:1 | 1:3 |
| ## 107 | 1:1 | 1:2 | NA:NA | 1:1 | 5:6 | 1:1 | NA:NA | 3:5 |
| ## 108 | 1:1 | 1:2 | 1:1 | NA:NA | 1:2 | 1:1 | 2:2 | 4:5 |
| ## 109 | 1:1 | 2:3 | 1:1 | 3:1 | 2:3 | 1:1 | 2:2 | 1:4 |
| ## 110 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 1:2 | 3:5 |
| ## 111 | 1:1 | 1:1 | 1:1 | 2:2 | 1:4 | 1:1 | 1:2 | 3:5 |
| ## 112 | 1:1 | 4:1 | 1:1 | 2:2 | 1:1 | 1:1 | 1:1 | 5:5 |
| ## 113 | 1:1 | 1:1 | NA:NA | 2:2 | 1:2 | 1:1 | NA:NA | 2:5 |
| ## 114 | 1:1 | 4:4 | 1:1 | 2:2 | 1:4 | 1:1 | 1:1 | 5:5 |
| ## 115 | 1:1 | 1:1 | NA:NA | 2:2 | 1:4 | 1:1 | 2:2 | 3:5 |
| ## 116 | 1:1 | 1:1 | 1:5 | 2:2 | 1:1 | 1:1 | 2:2 | 3:3 |
| ## 117 | 1:1 | 1:1 | NA:NA | 2:2 | 1:1 | 1:1 | 2:2 | 3:5 |
| ## 118 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 1:2 | 5:5 |
| ## 119 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 1:2 | 3:5 |
| ## 120 | NA:NA | 1:1 | NA:NA | 2:2 | 1:2 | 1:1 | NA:NA | 4:8 |
| ## 121 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 1:1 | 5:5 |
| ## 122 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | NA:NA | 3:3 |
| ## 123 | 1:1 | 1:1 | 1:1 | 4:2 | 1:1 | 1:1 | NA:NA | 5:5 |

| | | | | | | | | |
|--------|-----|-----|-------|-------|-------|-------|-------|-------|
| ## 124 | 1:1 | 1:1 | NA:NA | 4:2 | 1:4 | 1:1 | 1:2 | 3:5 |
| ## 125 | 1:1 | 1:1 | 1:1 | 4:2 | 1:1 | 1:1 | 1:1 | 3:3 |
| ## 126 | 1:1 | 4:1 | 1:1 | 2:2 | 1:1 | 1:1 | 2:2 | 5:5 |
| ## 127 | 1:1 | 1:1 | NA:NA | 2:2 | 1:1 | 1:1 | 1:1 | 3:3 |
| ## 128 | 1:1 | 1:1 | 1:1 | 2:2 | NA:NA | 1:1 | NA:NA | 3:5 |
| ## 129 | 1:1 | 1:1 | 1:1 | 3:1 | 1:1 | NA:NA | NA:NA | NA:NA |
| ## 130 | 1:1 | 1:1 | 1:1 | 1:1 | 1:7 | 1:1 | NA:NA | 3:5 |
| ## 131 | 1:1 | 1:1 | NA:NA | NA:NA | 1:1 | 1:1 | 3:2 | 1:5 |
| ## 132 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | NA:NA | 5:5 |
| ## 133 | 1:1 | 1:1 | 1:1 | 1:1 | 1:7 | 1:1 | 3:2 | 3:3 |
| ## 134 | 1:1 | 1:1 | NA:NA | 1:1 | NA:NA | 1:1 | 1:1 | NA:NA |
| ## 135 | 1:1 | 1:1 | 1:1 | 3:1 | 1:7 | 1:1 | NA:NA | 3:5 |
| ## 136 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | 2:2 | 5:5 |
| ## 137 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 | 3:2 | 1:3 |
| ## 138 | 1:1 | 1:1 | 1:1 | 1:1 | 1:7 | 1:1 | 2:2 | 1:3 |
| ## 139 | 1:1 | 1:1 | NA:NA | 1:1 | 1:7 | 1:1 | 1:2 | 3:5 |
| ## 140 | 1:1 | 1:1 | NA:NA | 3:1 | 1:1 | 1:1 | NA:NA | 1:5 |
| ## 141 | 1:1 | 1:1 | NA:NA | 3:1 | 1:7 | 1:1 | NA:NA | 3:5 |
| ## 142 | 1:2 | 3:3 | NA:NA | 3:3 | 2:3 | 1:1 | NA:NA | 5:5 |
| ## 143 | 1:1 | 1:1 | NA:NA | 1:1 | 10:10 | NA:NA | NA:NA | 3:3 |
| ## 144 | 2:2 | 1:1 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 4:4 |
| ## 145 | 1:1 | 1:1 | NA:NA | 3:1 | 1:3 | 1:1 | 2:2 | 4:5 |
| ## 146 | 1:2 | 3:3 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 4:5 |
| ## 147 | 1:1 | 3:3 | 1:1 | 1:1 | 2:3 | 1:1 | 1:1 | 3:5 |
| ## 148 | 1:1 | 1:3 | 1:1 | 1:1 | 2:2 | 1:1 | 1:1 | 3:3 |
| ## 149 | 1:2 | 1:1 | 1:1 | 3:1 | 1:2 | 1:1 | 1:2 | 3:4 |
| ## 150 | 1:2 | 1:1 | 1:1 | 1:2 | 2:2 | 1:1 | 1:1 | 3:4 |
| ## 151 | 1:1 | 1:3 | 1:1 | 1:2 | 1:2 | 1:1 | 1:2 | 3:4 |
| ## 152 | 1:2 | 3:3 | 1:1 | 3:1 | 1:2 | 1:1 | 2:2 | 4:4 |
| ## 153 | 1:1 | 1:3 | 1:1 | 1:2 | 2:2 | 1:1 | 1:1 | 4:5 |
| ## 154 | 2:2 | 1:3 | 1:1 | 3:1 | 2:2 | 1:1 | 1:1 | 4:5 |
| ## 155 | 1:1 | 1:1 | NA:NA | 1:1 | 1:1 | 1:1 | 1:2 | 4:5 |
| ## 156 | 1:2 | 1:3 | NA:NA | 3:1 | 1:2 | 1:1 | 1:2 | 4:5 |
| ## 157 | 1:2 | 1:3 | NA:NA | 1:2 | 1:2 | 1:1 | 1:2 | 4:5 |
| ## 158 | 1:1 | 1:3 | 1:1 | 3:1 | 1:3 | 1:1 | NA:NA | 3:5 |
| ## 159 | 1:1 | 1:1 | NA:NA | 2:2 | 2:2 | 1:1 | 1:2 | 6:4 |
| ## 160 | 1:1 | 1:1 | 1:1 | 2:2 | 2:2 | 1:1 | 1:2 | 6:4 |
| ## 161 | 1:1 | 1:2 | 1:1 | 3:2 | 2:8 | 1:1 | 1:1 | 6:4 |
| ## 162 | 1:1 | 2:2 | 1:1 | 2:2 | 2:3 | 1:1 | 1:2 | 3:4 |
| ## 163 | 1:1 | 1:2 | 1:1 | 2:2 | 1:5 | 1:1 | NA:NA | 7:6 |
| ## 164 | 1:1 | 1:2 | 1:1 | 1:2 | 2:2 | 1:1 | 1:1 | 6:4 |
| ## 165 | 3:1 | 1:1 | 1:1 | 2:2 | 2:2 | 1:1 | 2:5 | 6:6 |
| ## 166 | 1:1 | 1:2 | 1:1 | 1:2 | 2:2 | 1:1 | NA:NA | 6:4 |
| ## 167 | 1:1 | 1:2 | 1:2 | 1:2 | 8:8 | 1:1 | NA:NA | 6:4 |
| ## 168 | 1:1 | 1:1 | 1:2 | 2:2 | 1:8 | 1:1 | 1:2 | 4:4 |
| ## 169 | 1:1 | 1:2 | 1:1 | 1:2 | 2:5 | 1:1 | NA:NA | NA:NA |
| ## 170 | 1:1 | 1:1 | NA:NA | 4:4 | 1:4 | NA:NA | NA:NA | 5:5 |
| ## 171 | 1:1 | 1:2 | NA:NA | 2:2 | 2:8 | 1:1 | 1:2 | 6:6 |
| ## 172 | 1:1 | 1:2 | 1:1 | 2:2 | 2:2 | 1:1 | 1:2 | 4:4 |
| ## 173 | 1:1 | 2:2 | NA:NA | 2:2 | 2:5 | 1:1 | NA:NA | 4:5 |
| ## 174 | 1:1 | 1:1 | 1:1 | 2:2 | 2:5 | 1:1 | NA:NA | 4:4 |
| ## 175 | 1:1 | 1:1 | 1:1 | 2:2 | 2:8 | 1:1 | NA:NA | 6:4 |
| ## 176 | 1:1 | 1:2 | 1:1 | 2:2 | 2:2 | 1:1 | 1:2 | 6:4 |
| ## 177 | 1:1 | 1:2 | 1:1 | 1:2 | 3:8 | 1:1 | 1:1 | 6:4 |

```
## 178 1:1 1:2 NA:NA 3:2 2:2 1:1 NA:NA 5:5
## 179 1:1 1:2 1:1 2:2 2:2 1:1 1:2 6:4
## 180 1:1 4:2 1:1 2:2 3:3 1:1 1:2 4:4
## 181 1:1 1:1 2:2 2:2 1:2 1:1 NA:NA 4:4
```

```
Frogs.genind <- df2genind(X=Frogs[,c(4:11)], sep=":", ncode=NULL, ind.names= Frogs$FrogID, loc.names=NU
```

Check the genind object

```
Frogs.genind
```

```
## /// GENIND OBJECT ///////////
##
## // 181 individuals; 8 loci; 39 alleles; size: 55.2 Kb
##
## // Basic content
## @tab: 181 x 39 matrix of allele counts
## @loc.n.all: number of alleles per locus (range: 3-9)
## @loc.fac: locus factor for the 39 columns of @tab
## @all.names: list of allele names for each locus
## @ploidy: ploidy of each individual (range: 2-2)
## @type: codom
## @call: df2genind(X = Frogs[, c(4:11)], sep = ":", ncode = NULL, ind.names = Frogs$FrogID,
## loc.names = NULL, pop = Frogs$Pop, NA.char = "NA", ploidy = 2,
## type = "codom", strata = NULL, hierarchy = NULL)
##
## // Optional content
## @pop: population of each individual (group size range: 7-23)
```

```
summary(Frogs.genind)
```

```
##
## // Number of individuals: 181
## // Group sizes: 21 8 14 13 7 17 9 20 19 13 17 23
## // Number of alleles per locus: 3 4 4 4 9 3 4 8
## // Number of alleles per group: 21 21 20 22 20 19 19 25 18 14 18 26
## // Percentage of missing data: 10.64 %
## // Observed heterozygosity: 0.1 0.4 0.09 0.36 0.68 0.02 0.38 0.68
## // Expected heterozygosity: 0.17 0.47 0.14 0.59 0.78 0.02 0.48 0.74
```

4. View info stored in ‘genind’ object

Pull out subsets of info:

```
as_tibble(Frogs.genind@tab)
```

```
## # A tibble: 181 x 39
##   A.1 A.2 A.3 B.1 B.3 B.2 B.4 C.1 C.2 C.4 C.5 D.1 D.2
##   <int> <int> <int> <int> <int> <int> <int> <int> <int> <int> <int> <int> <int>
## 1     2     0     0     2     0     0     0     2     0     0     0     2     0
## 2     0     2     0     2     0     0     0    NA    NA    NA    NA     2     0
## 3     2     0     0     2     0     0     0     2     0     0     0     2     0
## 4     2     0     0     2     0     0     0    NA    NA    NA    NA     0     2
## 5     1     1     0     1     1     0     0     2     0     0     0     2     0
## 6     1     1     0     2     0     0     0     2     0     0     0     1     0
## 7     0     2     0     1     1     0     0     2     0     0     0     2     0
```

```
## 8      0      2      0      1      1      0      0      2      0      0      0      2      0
## 9      1      0      1      2      0      0      0      2      0      0      0      2      0
## 10     0      2      0      1      1      0      0      2      0      0      0      2      0
## # i 171 more rows
## # i 26 more variables: D.3 <int>, D.4 <int>, E.1 <int>, E.2 <int>, E.3 <int>,
## #   E.7 <int>, E.6 <int>, E.8 <int>, E.5 <int>, E.4 <int>, E.10 <int>,
## #   F.1 <int>, F.2 <int>, F.3 <int>, G.1 <int>, G.2 <int>, G.3 <int>,
## #   G.5 <int>, H.4 <int>, H.5 <int>, H.3 <int>, H.2 <int>, H.1 <int>,
## #   H.6 <int>, H.8 <int>, H.7 <int>
```

5. From here on, uses gstudio, and is OPTIONAL for now...

Part 2: Section 4.4 R exercise Week 1

Do this section on your own!

Download file:

```
file.copy(system.file("extdata", "pulsatilla_genotypes.csv", package = "LandGenCourse"),
  paste0(here(), "/downloads/pulsatilla_genotypes.csv"), overwrite=FALSE)
```

```
## [1] FALSE
```

Import from csv as data frame:

```
Flowers <- read.csv(paste0(here(), "/downloads/pulsatilla_genotypes.csv"), header=TRUE)
as_tibble(Flowers)
```

```
## # A tibble: 536 x 19
##       ID OffID Population      X      Y loc1_a loc1_b loc2_a loc2_b loc3_a
##   <int> <int> <chr>      <dbl> <dbl> <int> <int> <int> <int> <int>
## 1    62     0 A21      4426941. 5427173.   340   340   422   422   413
## 2    64     0 A21      4426933. 5427178.   334   334   424   424   417
## 3    65     0 A21      4426936. 5427173.   338   340   417   422   417
## 4    66     0 A21      4426937. 5427174.   340   344   422   422   411
## 5    68     0 A21      4426934. 5427171.   336   342   417   422   423
## 6    69     0 A21      4426933. 5427166.   336   346   422   422   417
## 7    75     0 A21      4426925. 5427175.   340   340   422   422   415
## 8    76     0 A21      4426925. 5427173.   338   340   417   422   413
## 9    77     0 A21      4426922. 5427174.   344   352   422   422   415
## 10   78     0 A21      4426922. 5427174.   342   352   417   424   425
## # i 526 more rows
## # i 9 more variables: loc3_b <int>, loc4_a <int>, loc4_b <int>, loc5_a <int>,
## #   loc5_b <int>, loc6_a <int>, loc6_b <int>, loc7_a <int>, loc7_b <int>
```

Create 'genind' object:

```
Flowers.genind <- df2genind(X=Flowers[,c(6:19)], sep="\t", ncode=NULL, ind.names= Flowers$ID, loc.names=
```

```
## Warning in df2genind(X = Flowers[, c(6:19)], sep = "\t", ncode = NULL,
## ind.names = Flowers$ID, : duplicate labels detected for some individuals; using
## generic labels
```

Get info on genind object:

```
Flowers.genind
```

```
## /// GENIND OBJECT ///////////
##
```



```
## // 536 individuals; 14 loci; 184 alleles; size: 459.3 Kb
##
## // Basic content
## @tab: 536 x 184 matrix of allele counts
## @loc.n.all: number of alleles per locus (range: 5-24)
## @loc.fac: locus factor for the 184 columns of @tab
## @all.names: list of allele names for each locus
## @ploidy: ploidy of each individual (range: 2-2)
## @type: codom
## @call: df2genind(X = Flowers[, c(6:19)], sep = "\t", ncode = NULL, ind.names = Flowers$ID,
## loc.names = NULL, pop = Flowers$Population, NA.char = "NA",
## ploidy = 2, type = "codom", strata = NULL, hierarchy = NULL)
##
## // Optional content
## @pop: population of each individual (group size range: 55-128)
```

Here, there is a problem because the genind object has 14 loci, but really this should be only 7 loci.

Going back to the Flowers dataframe and combining loci before creating the genind object

```
as_tibble(Flowers)
```

```
## # A tibble: 536 x 19
##      ID OffID Population      X      Y loc1_a loc1_b loc2_a loc2_b loc3_a
##    <int> <int> <chr>      <dbl>    <dbl> <int> <int> <int> <int> <int>
## 1    62     0 A21      4426941. 5427173.   340   340   422   422   413
## 2    64     0 A21      4426933. 5427178.   334   334   424   424   417
## 3    65     0 A21      4426936. 5427173.   338   340   417   422   417
## 4    66     0 A21      4426937. 5427174.   340   344   422   422   411
## 5    68     0 A21      4426934. 5427171.   336   342   417   422   423
## 6    69     0 A21      4426933. 5427166.   336   346   422   422   417
## 7    75     0 A21      4426925. 5427175.   340   340   422   422   415
## 8    76     0 A21      4426925. 5427173.   338   340   417   422   413
## 9    77     0 A21      4426922. 5427174.   344   352   422   422   415
## 10   78     0 A21      4426922. 5427174.   342   352   417   424   425
## # i 526 more rows
## # i 9 more variables: loc3_b <int>, loc4_a <int>, loc4_b <int>, loc5_a <int>,
## #   loc5_b <int>, loc6_a <int>, loc6_b <int>, loc7_a <int>, loc7_b <int>
```

I'll make a new data frame with the first 5 columns, then paste loc1_a:loc1_b, etc.

```
Flowers <- data.frame(Flowers[,1:5], loc1 = paste(Flowers$loc1_a, Flowers$loc1_b, sep=":"), loc2 = paste
as_tibble(Flowers)
```

```
## # A tibble: 536 x 12
##      ID OffID Population      X      Y loc1  loc2  loc3  loc4  loc5  loc6
##    <int> <int> <chr>      <dbl>    <dbl> <chr> <chr> <chr> <chr> <chr> <chr>
## 1    62     0 A21      4426941. 5427173. 340:3~ 422::~ 413::~ 446::~ 121::~ 155::~
## 2    64     0 A21      4426933. 5427178. 334:3~ 424::~ 417::~ 444::~ 122::~ 155::~
## 3    65     0 A21      4426936. 5427173. 338:3~ 417::~ 417::~ 446::~ 135::~ 153::~
## 4    66     0 A21      4426937. 5427174. 340:3~ 422::~ 411::~ 446::~ 122::~ 157::~
## 5    68     0 A21      4426934. 5427171. 336:3~ 417::~ 423::~ 448::~ 119::~ 155::~
## 6    69     0 A21      4426933. 5427166. 336:3~ 422::~ 417::~ 444::~ 122::~ 155::~
## 7    75     0 A21      4426925. 5427175. 340:3~ 422::~ 415::~ 442::~ 121::~ 152::~
## 8    76     0 A21      4426925. 5427173. 338:3~ 417::~ 413::~ 446::~ 126::~ 155::~
## 9    77     0 A21      4426922. 5427174. 344:3~ 422::~ 415::~ 446::~ 121::~ 155::~
## 10   78     0 A21      4426922. 5427174. 342:3~ 417::~ 425::~ 446::~ 121::~ 157::~
```

```
## # i 526 more rows
## # i 1 more variable: loc7 <chr>
```

Create 'genind' object:

```
Flowers.genind <- df2genind(X=Flowers[,c(6:12)], sep=":", ncode=NULL, ind.names= Flowers$ID, loc.names=)
```

```
## Warning in df2genind(X = Flowers[, c(6:12)], sep = ":", ncode = NULL, ind.names
## = Flowers$ID, : duplicate labels detected for some individuals; using generic
## labels
```

Get info on genind object:

```
Flowers.genind
```

```
## /// GENIND OBJECT ///////////
##
## // 536 individuals; 7 loci; 109 alleles; size: 291.1 Kb
##
## // Basic content
##   @tab: 536 x 109 matrix of allele counts
##   @loc.n.all: number of alleles per locus (range: 8-26)
##   @loc.fac: locus factor for the 109 columns of @tab
##   @all.names: list of allele names for each locus
##   @ploidy: ploidy of each individual (range: 2-2)
##   @type: codom
##   @call: df2genind(X = Flowers[, c(6:12)], sep = ":", ncode = NULL, ind.names = Flowers$ID,
##     loc.names = names(Flowers[, c(6:12)]), pop = Flowers$Population,
##     NA.char = "NA", ploidy = 2, type = "codom", strata = NULL,
##     hierarchy = NULL)
##
## // Optional content
##   @pop: population of each individual (group size range: 55-128)
```

```
summary(Flowers.genind)
```

```
##
## // Number of individuals: 536
## // Group sizes: 69 128 78 75 71 55 60
## // Number of alleles per locus: 19 8 26 9 20 14 13
## // Number of alleles per group: 63 68 55 53 55 73 54
## // Percentage of missing data: 1.79 %
## // Observed heterozygosity: 0.6 0.48 0.72 0.57 0.6 0.6 0.61
## // Expected heterozygosity: 0.83 0.59 0.88 0.75 0.77 0.79 0.85
```

Number of individuals per group/pop is 55-128.

With Gstudio this time

```
Flowers <- read.csv(paste0(here(), "/downloads/pulsatilla_genotypes.csv"), header=TRUE)
```

```
g.Flowers <- read_population(system.file("extdata", "pulsatilla_genotypes.csv", package = "LandGenCourse
```

```
g.Flowers
```

```
##      ID OffID Population      X      Y loc1_a loc2_a loc3_a loc4_a
## 1    62      0        A21 4426941 5427173 340:340 422:422 413:425 446:448
## 2    64      0        A21 4426933 5427178 334:334 424:424 417:434 444:449
```

| | | | |
|-------|-----|---|---|
| ## 3 | 65 | 0 | A21 4426936 5427173 338:340 417:422 417:419 446:452 |
| ## 4 | 66 | 0 | A21 4426937 5427174 340:344 422:422 411:431 446:448 |
| ## 5 | 68 | 0 | A21 4426934 5427171 336:342 417:422 423:438 448:448 |
| ## 6 | 69 | 0 | A21 4426933 5427166 336:346 422:422 417:421 444:452 |
| ## 7 | 75 | 0 | A21 4426925 5427175 340:340 422:422 415:425 442:446 |
| ## 8 | 76 | 0 | A21 4426925 5427173 338:340 417:422 413:421 446:452 |
| ## 9 | 77 | 0 | A21 4426922 5427174 344:352 422:422 415:421 446:452 |
| ## 10 | 78 | 0 | A21 4426922 5427174 342:352 417:424 425:450 446:446 |
| ## 11 | 82 | 0 | A21 4426922 5427169 340:344 422:424 398:413 452:452 |
| ## 12 | 88 | 0 | A21 4426912 5427147 340:342 417:422 421:450 446:446 |
| ## 13 | 89 | 0 | A21 4426912 5427147 334:352 417:422 409:427 448:448 |
| ## 14 | 90 | 0 | A21 4426912 5427147 338:340 422:422 392:417 444:447 |
| ## 15 | 92 | 0 | A21 4426912 5427146 334:346 417:422 409:417 |
| ## 16 | 211 | 0 | A25 4422658 5425371 354:358 417:422 392:411 446:448 |
| ## 17 | 212 | 0 | A25 4422659 5425372 340:342 417:417 409:417 446:452 |
| ## 18 | 213 | 0 | A25 4422659 5425371 340:344 417:422 392:448 446:452 |
| ## 19 | 214 | 0 | A25 4422658 5425370 354:358 422:422 392:392 442:446 |
| ## 20 | 215 | 0 | A25 4422659 5425371 338:358 422:422 392:411 448:452 |
| ## 21 | 217 | 0 | A25 4422659 5425371 334:352 422:422 409:434 |
| ## 22 | 218 | 0 | A25 4422659 5425371 338:340 417:417 409:417 446:452 |
| ## 23 | 219 | 0 | A25 4422658 5425370 340:358 422:424 392:392 444:452 |
| ## 24 | 220 | 0 | A25 4422659 5425372 334:356 422:422 421:448 446:452 |
| ## 25 | 222 | 0 | A25 4422659 5425370 344:356 417:422 392:411 446:446 |
| ## 26 | 223 | 0 | A25 4422659 5425369 340:356 417:422 392:421 447:452 |
| ## 27 | 224 | 0 | A25 4422658 5425368 356:356 417:422 392:392 444:446 |
| ## 28 | 225 | 0 | A25 4422660 5425367 334:358 422:422 411:448 446:448 |
| ## 29 | 228 | 0 | A25 4422658 5425365 334:362 417:422 409:417 446:452 |
| ## 30 | 229 | 0 | A25 4422659 5425366 340:342 422:424 409:448 447:447 |
| ## 31 | 230 | 0 | A25 4422659 5425365 338:356 422:424 430:430 446:452 |
| ## 32 | 231 | 0 | A25 4422660 5425365 334:334 417:422 411:413 446:452 |
| ## 33 | 232 | 0 | A25 4422661 5425364 344:352 417:422 392:434 446:448 |
| ## 34 | 233 | 0 | A25 4422659 5425365 340:342 422:422 421:448 446:448 |
| ## 35 | 234 | 0 | A25 4422659 5425364 340:340 417:422 392:392 446:452 |
| ## 36 | 235 | 0 | A25 4422657 5425364 340:340 422:424 392:392 446:452 |
| ## 37 | 236 | 0 | A25 4422657 5425365 334:352 424:424 392:411 447:452 |
| ## 38 | 237 | 0 | A25 4422661 5425362 334:336 422:424 411:411 448:450 |
| ## 39 | 239 | 0 | A25 4422658 5425364 340:352 422:424 392:409 446:452 |
| ## 40 | 240 | 0 | A25 4422659 5425363 334:334 417:422 392:407 446:448 |
| ## 41 | 241 | 0 | A25 4422659 5425362 338:344 422:422 392:417 446:452 |
| ## 42 | 242 | 0 | A25 4422659 5425362 342:344 422:422 417:448 446:448 |
| ## 43 | 245 | 0 | A25 4422655 5425361 338:340 422:424 392:413 444:452 |
| ## 44 | 246 | 0 | A25 4422653 5425359 334:338 422:424 411:430 446:452 |
| ## 45 | 247 | 0 | A25 4422655 5425360 334:334 411:417 452:452 |
| ## 46 | 248 | 0 | A25 4422656 5425360 334:356 417:424 411:430 447:452 |
| ## 47 | 249 | 0 | A25 4422655 5425361 334:334 422:422 407:434 446:446 |
| ## 48 | 251 | 0 | A25 4422653 5425354 338:340 422:422 392:430 444:446 |
| ## 49 | 252 | 0 | A25 4422654 5425354 340:360 422:422 409:413 448:450 |
| ## 50 | 253 | 0 | A25 4422654 5425343 334:338 417:424 409:409 446:448 |
| ## 51 | 254 | 0 | A25 4422656 5425345 338:340 422:424 409:440 446:446 |
| ## 52 | 255 | 0 | A25 4422655 5425345 336:338 417:422 413:417 446:452 |
| ## 53 | 256 | 0 | A25 4422654 5425345 342:350 409:417 446:446 |
| ## 54 | 257 | 0 | A25 4422654 5425347 338:350 417:424 417:434 446:452 |
| ## 55 | 258 | 0 | A25 4422654 5425347 338:360 417:422 409:419 446:446 |
| ## 56 | 259 | 0 | A25 4422654 5425346 422:422 407:440 444:446 |

| | | | | | | | | |
|--------|-----|---|-------------|---------|---------|---------|---------|---------|
| ## 57 | 260 | 0 | A25 4422654 | 5425346 | 338:338 | 422:424 | 417:434 | 446:446 |
| ## 58 | 261 | 0 | A25 4422655 | 5425346 | 338:352 | 422:424 | 407:419 | 446:452 |
| ## 59 | 262 | 0 | A25 4422656 | 5425347 | 340:352 | 417:422 | 411:434 | 446:446 |
| ## 60 | 263 | 0 | A25 4422656 | 5425347 | 340:350 | 417:424 | 409:434 | 444:446 |
| ## 61 | 264 | 0 | A25 4422667 | 5425354 | 332:336 | 422:422 | 411:440 | 444:446 |
| ## 62 | 265 | 0 | A25 4422670 | 5425355 | 338:346 | 422:422 | 409:430 | 448:452 |
| ## 63 | 266 | 0 | A25 4422669 | 5425356 | 336:336 | 422:426 | 421:434 | 446:448 |
| ## 64 | 267 | 0 | A26 4422707 | 5425139 | 344:346 | 417:422 | 409:434 | 442:442 |
| ## 65 | 268 | 0 | A26 4422707 | 5425139 | 326:338 | 417:422 | 407:411 | 442:448 |
| ## 66 | 269 | 0 | A26 4422707 | 5425138 | 334:358 | 422:424 | 411:430 | 444:446 |
| ## 67 | 270 | 0 | A26 4422704 | 5425138 | 340:358 | 417:424 | 434:436 | 444:452 |
| ## 68 | 272 | 0 | A26 4422708 | 5425138 | 334:340 | 422:425 | 392:411 | 448:452 |
| ## 69 | 273 | 0 | A26 4422706 | 5425137 | 340:340 | 417:422 | 392:411 | 446:448 |
| ## 70 | 274 | 0 | A26 4422707 | 5425137 | 334:340 | 422:422 | 392:409 | 446:449 |
| ## 71 | 275 | 0 | A26 4422707 | 5425137 | 340:344 | 422:422 | 411:411 | 446:450 |
| ## 72 | 276 | 0 | A26 4422707 | 5425137 | 334:340 | 422:424 | 411:417 | 444:452 |
| ## 73 | 278 | 0 | A26 4422708 | 5425137 | 340:340 | 422:424 | 411:417 | 444:452 |
| ## 74 | 279 | 0 | A26 4422707 | 5425136 | 340:340 | 422:424 | 392:411 | 446:452 |
| ## 75 | 280 | 0 | A26 4422708 | 5425136 | 340:340 | 417:422 | 411:417 | 446:450 |
| ## 76 | 282 | 0 | A26 4422712 | 5425138 | 334:340 | 422:424 | 392:436 | 448:452 |
| ## 77 | 284 | 0 | A26 4422709 | 5425143 | 340:364 | 422:424 | 405:411 | 444:446 |
| ## 78 | 334 | 0 | A45 4423100 | 5427048 | 334:334 | 422:424 | 409:409 | 442:442 |
| ## 79 | 335 | 0 | A45 4423096 | 5427012 | 334:342 | 417:423 | 415:430 | 446:450 |
| ## 80 | 336 | 0 | A45 4423094 | 5427008 | 340:350 | 424:424 | 419:419 | 444:446 |
| ## 81 | 339 | 0 | A45 4423092 | 5427017 | 338:338 | 422:422 | 411:430 | 442:452 |
| ## 82 | 340 | 0 | A45 4423090 | 5427011 | 334:338 | 422:422 | 415:417 | 444:446 |
| ## 83 | 341 | 0 | A45 4423090 | 5427012 | 334:340 | 422:422 | 392:419 | 446:452 |
| ## 84 | 342 | 0 | A45 4423090 | 5427011 | 338:338 | 417:422 | 407:411 | 446:446 |
| ## 85 | 345 | 0 | A45 4423090 | 5427007 | 332:334 | 417:417 | 411:417 | 446:452 |
| ## 86 | 346 | 0 | A45 4423091 | 5427007 | 334:342 | 417:422 | 411:415 | 452:452 |
| ## 87 | 349 | 0 | A45 4423096 | 5427008 | 334:340 | 422:424 | 409:411 | 442:452 |
| ## 88 | 353 | 0 | A45 4423093 | 5427005 | 334:334 | 422:422 | 409:417 | 452:452 |
| ## 89 | 355 | 0 | A45 4423091 | 5426993 | 334:340 | 417:422 | 417:419 | 446:450 |
| ## 90 | 356 | 0 | A45 4423092 | 5426992 | 340:360 | 417:422 | 392:434 | 446:446 |
| ## 91 | 360 | 0 | A45 4423098 | 5426985 | 340:342 | 422:422 | 411:415 | 446:452 |
| ## 92 | 361 | 0 | A45 4423096 | 5426984 | 334:356 | 410:422 | 407:411 | 446:446 |
| ## 93 | 366 | 0 | A45 4423092 | 5426971 | 334:334 | 422:422 | 409:411 | 450:450 |
| ## 94 | 495 | 0 | A41 4426038 | 5423338 | 340:344 | 417:424 | 411:432 | 446:446 |
| ## 95 | 496 | 0 | A41 4426039 | 5423338 | 340:344 | 417:422 | 392:411 | 447:447 |
| ## 96 | 498 | 0 | A41 4426038 | 5423337 | 340:344 | 410:417 | 392:415 | 444:446 |
| ## 97 | 502 | 0 | A41 4426037 | 5423337 | 340:344 | | 409:411 | 449:449 |
| ## 98 | 503 | 0 | A41 4426038 | 5423335 | 334:340 | 410:424 | 392:409 | 448:448 |
| ## 99 | 820 | 0 | A03 4431326 | 5429379 | 336:340 | 410:422 | 431:431 | 446:448 |
| ## 100 | 821 | 0 | A03 4431318 | 5429372 | 340:340 | 417:422 | 392:419 | 446:448 |
| ## 101 | 822 | 0 | A03 4431317 | 5429373 | 340:354 | 417:422 | 411:417 | 446:446 |
| ## 102 | 823 | 0 | A03 4431317 | 5429369 | 340:358 | 417:422 | 419:434 | 446:448 |
| ## 103 | 824 | 0 | A03 4431316 | 5429369 | 340:342 | 424:424 | 419:421 | 446:448 |
| ## 104 | 825 | 0 | A03 4431315 | 5429368 | 334:334 | 422:422 | 411:413 | 444:446 |
| ## 105 | 827 | 0 | A03 4431315 | 5429371 | 338:340 | 418:418 | 409:425 | 446:448 |
| ## 106 | 828 | 0 | A03 4431314 | 5429373 | 340:340 | 417:417 | 421:421 | 446:448 |
| ## 107 | 829 | 0 | A03 4431313 | 5429371 | 340:352 | 417:422 | 409:411 | 444:444 |
| ## 108 | 830 | 0 | A03 4431312 | 5429370 | 340:348 | 417:422 | 392:427 | 446:446 |
| ## 109 | 831 | 0 | A03 4431312 | 5429369 | 340:352 | 422:422 | 392:413 | 446:446 |
| ## 110 | 832 | 0 | A03 4431311 | 5429369 | 340:342 | 417:422 | 398:430 | 446:448 |

| | | | |
|--------|-----|---|--|
| ## 111 | 833 | 0 | A03 4431308 5429365 338:340 418:424 394:409 446:448 |
| ## 112 | 834 | 0 | A03 4431307 5429364 340:348 422:422 417:421 446:446 |
| ## 113 | 835 | 0 | A03 4431311 5429364 340:344 422:422 411:411 446:448 |
| ## 114 | 836 | 0 | A03 4431314 5429361 340:340 417:422 398:417 446:446 |
| ## 115 | 837 | 0 | A03 4431316 5429361 340:344 417:417 392:411 446:448 |
| ## 116 | 838 | 0 | A03 4431317 5429358 352:352 422:422 392:421 446:446 |
| ## 117 | 839 | 0 | A03 4431322 5429362 326:340 417:422 392:411 446:448 |
| ## 118 | 840 | 0 | A03 4431328 5429363 340:342 422:424 392:411 446:448 |
| ## 119 | 841 | 0 | A03 4431328 5429358 334:340 422:424 411:442 446:446 |
| ## 120 | 842 | 0 | A03 4431328 5429357 342:342 422:422 392:411 446:446 |
| ## 121 | 843 | 0 | A03 4431325 5429358 340:340 417:422 419:421 446:448 |
| ## 122 | 844 | 0 | A03 4431323 5429355 340:340 417:417 411:413 442:448 |
| ## 123 | 845 | 0 | A03 4431315 5429353 338:352 417:417 417:419 446:452 |
| ## 124 | 846 | 0 | A03 4431312 5429354 326:358 418:422 392:417 442:448 |
| ## 125 | 850 | 0 | A03 4431317 5429345 340:340 422:422 392:413 444:452 |
| ## 126 | 851 | 0 | A03 4431318 5429344 340:346 422:422 417:430 446:446 |
| ## 127 | 852 | 0 | A03 4431316 5429343 340:340 422:422 392:394 446:446 |
| ## 128 | 853 | 0 | A03 4431317 5429343 340:340 422:425 392:413 446:448 |
| ## 129 | 854 | 0 | A03 4431320 5429344 340:340 422:422 413:417 448:452 |
| ## 130 | 855 | 0 | A03 4431321 5429344 334:342 417:422 411:411 446:448 |
| ## 131 | 856 | 0 | A03 4431321 5429342 340:340 417:417 417:421 446:448 |
| ## 132 | 857 | 0 | A03 4431320 5429341 340:350 422:422 413:421 446:452 |
| ## 133 | 858 | 0 | A03 4431319 5429340 336:340 417:422 392:409 448:448 |
| ## 134 | 859 | 0 | A03 4431321 5429337 338:340 422:422 392:421 446:446 |
| ## 135 | 860 | 0 | A03 4431319 5429338 340:354 417:422 417:425 446:446 |
| ## 136 | 954 | 0 | G05a 4429214 5434927 336:344 422:424 398:417 444:448 |
| ## 137 | 955 | 0 | G05a 4429215 5434928 336:340 422:422 411:430 446:446 |
| ## 138 | 956 | 0 | G05a 4429216 5434930 348:362 422:424 398:398 444:446 |
| ## 139 | 957 | 0 | G05a 4429212 5434932 336:336 422:422 417:417 446:446 |
| ## 140 | 958 | 0 | G05a 4429209 5434943 340:348 422:424 409:411 444:446 |
| ## 141 | 959 | 0 | G05a 4429209 5434942 336:356 422:424 409:419 448:452 |
| ## 142 | 960 | 0 | G05a 4429208 5434943 342:342 422:424 411:419 444:452 |
| ## 143 | 961 | 0 | G05a 4429205 5434947 338:340 422:422 411:419 446:452 |
| ## 144 | 962 | 0 | G05a 4429205 5434947 336:338 422:424 409:411 446:448 |
| ## 145 | 963 | 0 | G05a 4429205 5434948 338:356 422:424 411:419 446:450 |
| ## 146 | 964 | 0 | G05a 4429207 5434950 340:340 422:422 409:411 446:446 |
| ## 147 | 965 | 0 | G05a 4429205 5434951 338:346 422:424 409:411 444:446 |
| ## 148 | 966 | 0 | G05a 4429203 5434953 340:346 422:422 392:411 444:448 |
| ## 149 | 967 | 0 | G05a 4429201 5434955 340:344 422:422 411:417 448:450 |
| ## 150 | 968 | 0 | G05a 4429204 5434951 344:354 422:422 392:407 448:452 |
| ## 151 | 969 | 0 | G05a 4429203 5434950 338:338 422:422 409:411 446:448 |
| ## 152 | 970 | 0 | G05a 4429202 5434950 340:340 417:422 398:417 |
| ## 153 | 971 | 0 | G05a 4429202 5434949 338:344 422:424 409:419 442:446 |
| ## 154 | 972 | 0 | G05a 4429203 5434949 336:342 422:422 417:431 446:448 |
| ## 155 | 973 | 0 | G05a 4429203 5434948 336:362 422:422 409:431 450:450 |
| ## 156 | 974 | 0 | G05a 4429202 5434950 336:338 422:422 392:419 446:446 |
| ## 157 | 975 | 0 | G05a 4429201 5434951 340:340 422:422 392:411 444:450 |
| ## 158 | 976 | 0 | G05a 4429201 5434948 336:342 422:422 411:417 446:450 |
| ## 159 | 977 | 0 | G05a 4429201 5434949 342:362 422:424 409:411 446:450 |
| ## 160 | 979 | 0 | G05a 4429201 5434950 340:356 422:424 392:407 448:448 |
| ## 161 | 980 | 0 | G05a 4429200 5434949 334:338 422:422 419:425 444:446 |
| ## 162 | 981 | 0 | G05a 4429200 5434949 334:344 422:422 398:417 444:446 |
| ## 163 | 984 | 0 | G05a 4429199 5434949 340:340 422:424 409:411 444:446 |
| ## 164 | 985 | 0 | G05a 4429199 5434948 340:340 422:424 409:411 444:450 |

| | | | | | | | | |
|--------|------|----|--------------|---------|---------|---------|---------|---------|
| ## 165 | 986 | 0 | G05a 4429199 | 5434949 | 334:340 | 424:424 | 398:409 | 444:450 |
| ## 166 | 989 | 0 | G05a 4429198 | 5434952 | 336:340 | 422:422 | 409:411 | 446:450 |
| ## 167 | 990 | 0 | G05a 4429198 | 5434948 | 336:340 | 422:422 | 409:417 | 446:448 |
| ## 168 | 991 | 0 | G05a 4429198 | 5434949 | 340:356 | 422:422 | 409:411 | 442:448 |
| ## 169 | 992 | 0 | G05a 4429198 | 5434949 | 332:336 | 422:422 | 417:417 | 446:448 |
| ## 170 | 993 | 0 | G05a 4429197 | 5434948 | 338:346 | 422:422 | 392:417 | 442:444 |
| ## 171 | 994 | 0 | G05a 4429199 | 5434947 | 336:348 | 417:424 | 411:419 | 450:452 |
| ## 172 | 995 | 0 | G05a 4429197 | 5434947 | 346:346 | 422:422 | 392:417 | 442:446 |
| ## 173 | 3080 | 0 | A25 4422657 | 5425371 | 334:352 | 424:424 | 392:434 | 446:446 |
| ## 174 | 3080 | 1 | A25 4422657 | 5425371 | 334:358 | 417:424 | 392:411 | 446:448 |
| ## 175 | 3080 | 2 | A25 4422657 | 5425371 | 334:358 | 422:424 | 392:434 | 442:446 |
| ## 176 | 3080 | 3 | A25 4422657 | 5425371 | 334:354 | 422:424 | 392:434 | 446:446 |
| ## 177 | 3080 | 4 | A25 4422657 | 5425371 | 334:354 | 422:424 | 392:392 | 446:446 |
| ## 178 | 3080 | 5 | A25 4422657 | 5425371 | 352:358 | 417:424 | 392:411 | 446:446 |
| ## 179 | 3080 | 6 | A25 4422657 | 5425371 | 352:354 | 417:424 | 392:392 | 446:446 |
| ## 180 | 3080 | 7 | A25 4422657 | 5425371 | 352:358 | 422:424 | 392:392 | 442:446 |
| ## 181 | 3080 | 8 | A25 4422657 | 5425371 | 334:358 | 422:424 | 392:392 | 446:448 |
| ## 182 | 3080 | 9 | A25 4422657 | 5425371 | 334:354 | 422:424 | 411:434 | 446:448 |
| ## 183 | 3080 | 10 | A25 4422657 | 5425371 | 334:354 | 417:424 | 392:411 | 446:446 |
| ## 184 | 3081 | 0 | A25 4422664 | 5425365 | 338:360 | 417:422 | 407:417 | 448:452 |
| ## 185 | 3081 | 1 | A25 4422664 | 5425365 | 338:342 | 417:417 | 392:417 | 448:452 |
| ## 186 | 3081 | 2 | A25 4422664 | 5425365 | 342:360 | 422:422 | 417:417 | 448:452 |
| ## 187 | 3081 | 3 | A25 4422664 | 5425365 | 338:338 | 422:422 | 407:417 | 448:452 |
| ## 188 | 3081 | 4 | A25 4422664 | 5425365 | 338:338 | 417:417 | 407:417 | 452:452 |
| ## 189 | 3081 | 5 | A25 4422664 | 5425365 | 338:338 | 417:422 | 417:417 | 448:452 |
| ## 190 | 3081 | 6 | A25 4422664 | 5425365 | 338:350 | 417:422 | 417:417 | 446:452 |
| ## 191 | 3081 | 7 | A25 4422664 | 5425365 | 342:360 | 417:422 | 392:407 | 446:452 |
| ## 192 | 3081 | 8 | A25 4422664 | 5425365 | 338:360 | 417:422 | 417:417 | 448:452 |
| ## 193 | 3081 | 9 | A25 4422664 | 5425365 | 338:360 | 422:422 | 407:407 | 448:452 |
| ## 194 | 3081 | 10 | A25 4422664 | 5425365 | 338:342 | 422:422 | 417:417 | 446:452 |
| ## 195 | 3082 | 0 | A25 4422663 | 5425365 | 342:350 | 417:422 | 392:417 | 446:448 |
| ## 196 | 3082 | 1 | A25 4422663 | 5425365 | 342:342 | 422:422 | 392:417 | 446:446 |
| ## 197 | 3082 | 2 | A25 4422663 | 5425365 | 350:358 | 422:422 | 392:392 | 444:446 |
| ## 198 | 3082 | 3 | A25 4422663 | 5425365 | 342:350 | 422:422 | 392:417 | 446:446 |
| ## 199 | 3082 | 4 | A25 4422663 | 5425365 | 334:350 | 422:422 | | 446:446 |
| ## 200 | 3082 | 5 | A25 4422663 | 5425365 | 340:342 | 422:422 | 392:392 | 446:452 |
| ## 201 | 3082 | 6 | A25 4422663 | 5425365 | 342:350 | 417:417 | 417:417 | |
| ## 202 | 3082 | 7 | A25 4422663 | 5425365 | 342:350 | 417:417 | 417:417 | 446:446 |
| ## 203 | 3082 | 8 | A25 4422663 | 5425365 | 350:350 | 422:422 | 417:417 | 448:448 |
| ## 204 | 3082 | 9 | A25 4422663 | 5425365 | 340:342 | 422:422 | 392:392 | 444:448 |
| ## 205 | 3082 | 10 | A25 4422663 | 5425365 | 342:350 | 417:422 | 392:417 | 446:448 |
| ## 206 | 3082 | 11 | A25 4422663 | 5425365 | 342:342 | 422:422 | 392:392 | 446:446 |
| ## 207 | 3083 | 0 | A25 4422659 | 5425370 | 338:340 | 417:424 | 392:392 | 452:452 |
| ## 208 | 3083 | 1 | A25 4422659 | 5425370 | 338:340 | 417:424 | 392:409 | 446:452 |
| ## 209 | 3083 | 3 | A25 4422659 | 5425370 | 338:338 | 417:424 | | 452:452 |
| ## 210 | 3083 | 4 | A25 4422659 | 5425370 | 340:340 | 417:422 | 392:411 | 448:452 |
| ## 211 | 3083 | 5 | A25 4422659 | 5425370 | 340:340 | 417:424 | 392:392 | 452:452 |
| ## 212 | 3083 | 6 | A25 4422659 | 5425370 | 338:338 | 422:424 | 392:411 | 452:452 |
| ## 213 | 3083 | 7 | A25 4422659 | 5425370 | 338:340 | 424:424 | 392:392 | 452:452 |
| ## 214 | 3083 | 8 | A25 4422659 | 5425370 | 340:340 | 417:417 | 392:417 | 452:452 |
| ## 215 | 3084 | 0 | A25 4422659 | 5425370 | 338:340 | 417:417 | 409:417 | 444:452 |
| ## 216 | 3084 | 4 | A25 4422659 | 5425370 | 338:340 | 417:422 | 417:421 | 442:444 |
| ## 217 | 3084 | 5 | A25 4422659 | 5425370 | 340:340 | 417:422 | 417:421 | 442:452 |
| ## 218 | 3084 | 6 | A25 4422659 | 5425370 | 332:340 | 417:422 | 392:417 | 444:448 |

| | | | | | | | | | | |
|----|-----|------|----|-----|---------|---------|---------|---------|---------|---------|
| ## | 219 | 3084 | 8 | A25 | 4422659 | 5425370 | 340:340 | 417:422 | 417:421 | 452:452 |
| ## | 220 | 3084 | 9 | A25 | 4422659 | 5425370 | 340:340 | 417:424 | 409:421 | 442:444 |
| ## | 221 | 3084 | 10 | A25 | 4422659 | 5425370 | 340:340 | 417:422 | 409:417 | 452:452 |
| ## | 222 | 3084 | 12 | A25 | 4422659 | 5425370 | 338:340 | 417:422 | | 446:452 |
| ## | 223 | 3085 | 0 | A25 | 4422660 | 5425368 | 334:340 | 422:422 | 409:434 | 448:452 |
| ## | 224 | 3085 | 2 | A25 | 4422660 | 5425368 | | 422:422 | 434:448 | 448:448 |
| ## | 225 | 3085 | 3 | A25 | 4422660 | 5425368 | 334:340 | 422:424 | 434:434 | 448:452 |
| ## | 226 | 3085 | 6 | A25 | 4422660 | 5425368 | 340:340 | 417:422 | 392:434 | 452:452 |
| ## | 227 | 3085 | 8 | A25 | 4422660 | 5425368 | 340:340 | 422:422 | 409:448 | 452:452 |
| ## | 228 | 3085 | 9 | A25 | 4422660 | 5425368 | 340:342 | 422:422 | 392:434 | 446:452 |
| ## | 229 | 3085 | 10 | A25 | 4422660 | 5425368 | 340:356 | 422:422 | 421:434 | 446:452 |
| ## | 230 | 3085 | 12 | A25 | 4422660 | 5425368 | 334:356 | 422:422 | 434:448 | 448:452 |
| ## | 231 | 3086 | 0 | A25 | 4422658 | 5425362 | 340:340 | 422:422 | 411:434 | 452:452 |
| ## | 232 | 3086 | 2 | A25 | 4422658 | 5425362 | 334:340 | 422:422 | 434:448 | 452:452 |
| ## | 233 | 3086 | 3 | A25 | 4422658 | 5425362 | 340:358 | 422:422 | 392:411 | 452:452 |
| ## | 234 | 3086 | 5 | A25 | 4422658 | 5425362 | 340:340 | 422:424 | 392:411 | 452:452 |
| ## | 235 | 3086 | 8 | A25 | 4422658 | 5425362 | 340:340 | 422:422 | 392:411 | 452:452 |
| ## | 236 | 3086 | 9 | A25 | 4422658 | 5425362 | 340:340 | 422:424 | 417:434 | 452:452 |
| ## | 237 | 3086 | 10 | A25 | 4422658 | 5425362 | 340:358 | 422:422 | 392:434 | 452:452 |
| ## | 238 | 3086 | 11 | A25 | 4422658 | 5425362 | 340:340 | 422:422 | 392:411 | 452:452 |
| ## | 239 | 3086 | 12 | A25 | 4422658 | 5425362 | 340:358 | 422:422 | 411:411 | 448:452 |
| ## | 240 | 3086 | 13 | A25 | 4422658 | 5425362 | 340:358 | 422:422 | 392:411 | 444:452 |
| ## | 241 | 3086 | 14 | A25 | 4422658 | 5425362 | 340:358 | 422:422 | 434:434 | |
| ## | 242 | 3087 | 0 | A25 | 4422661 | 5425370 | 342:356 | 422:422 | 392:448 | 446:446 |
| ## | 243 | 3087 | 1 | A25 | 4422661 | 5425370 | 356:358 | 422:422 | 392:430 | 446:452 |
| ## | 244 | 3087 | 2 | A25 | 4422661 | 5425370 | 340:342 | 417:422 | 392:448 | 446:452 |
| ## | 245 | 3087 | 3 | A25 | 4422661 | 5425370 | 340:342 | 422:424 | 392:392 | 446:452 |
| ## | 246 | 3087 | 5 | A25 | 4422661 | 5425370 | 342:358 | 422:422 | 448:448 | 446:446 |
| ## | 247 | 3087 | 6 | A25 | 4422661 | 5425370 | 342:358 | 422:424 | 448:448 | 446:446 |
| ## | 248 | 3087 | 7 | A25 | 4422661 | 5425370 | 338:356 | 422:422 | 448:448 | 446:446 |
| ## | 249 | 3087 | 8 | A25 | 4422661 | 5425370 | 342:358 | 422:424 | 448:448 | 446:446 |
| ## | 250 | 3087 | 9 | A25 | 4422661 | 5425370 | 338:342 | 422:424 | 392:392 | 446:452 |
| ## | 251 | 3087 | 11 | A25 | 4422661 | 5425370 | 334:342 | 417:422 | 392:413 | 446:452 |
| ## | 252 | 3087 | 12 | A25 | 4422661 | 5425370 | 342:356 | 417:422 | 392:392 | 446:452 |
| ## | 253 | 3088 | 0 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:411 | 447:448 |
| ## | 254 | 3088 | 2 | A26 | 4422716 | 5425134 | 334:340 | 422:422 | 411:411 | 447:447 |
| ## | 255 | 3088 | 3 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:392 | 447:447 |
| ## | 256 | 3088 | 4 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:411 | 448:448 |
| ## | 257 | 3088 | 5 | A26 | 4422716 | 5425134 | 340:342 | 422:422 | 392:409 | 446:448 |
| ## | 258 | 3088 | 6 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:411 | 447:448 |
| ## | 259 | 3088 | 7 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:411 | 447:447 |
| ## | 260 | 3088 | 8 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:392 | 447:448 |
| ## | 261 | 3088 | 9 | A26 | 4422716 | 5425134 | 340:340 | 422:422 | 392:411 | 446:447 |
| ## | 262 | 3088 | 10 | A26 | 4422716 | 5425134 | 340:358 | 422:424 | 411:411 | 444:447 |
| ## | 263 | 3089 | 0 | A26 | 4422708 | 5425140 | 340:340 | 422:425 | 411:411 | 446:448 |
| ## | 264 | 3089 | 1 | A26 | 4422708 | 5425140 | 340:340 | 422:424 | 411:419 | 444:448 |
| ## | 265 | 3089 | 2 | A26 | 4422708 | 5425140 | 340:340 | 422:422 | 411:419 | 444:446 |
| ## | 266 | 3089 | 4 | A26 | 4422708 | 5425140 | 340:340 | 417:422 | 411:411 | 446:448 |
| ## | 267 | 3089 | 5 | A26 | 4422708 | 5425140 | 340:340 | 422:422 | 411:419 | 442:448 |
| ## | 268 | 3089 | 6 | A26 | 4422708 | 5425140 | 340:340 | 422:424 | 411:419 | 444:448 |
| ## | 269 | 3089 | 7 | A26 | 4422708 | 5425140 | 340:340 | 422:422 | 411:411 | 442:446 |
| ## | 270 | 3089 | 8 | A26 | 4422708 | 5425140 | 340:340 | 424:425 | 411:411 | 442:446 |
| ## | 271 | 3089 | 9 | A26 | 4422708 | 5425140 | 340:340 | 424:425 | 411:411 | 442:448 |
| ## | 272 | 3089 | 10 | A26 | 4422708 | 5425140 | 340:340 | 422:425 | 411:411 | 444:448 |

| | | |
|-------------|----|---|
| ## 273 3090 | 0 | A26 4422707 5425137 340:340 422:424 411:419 442:444 |
| ## 274 3090 | 1 | A26 4422707 5425137 340:340 422:422 419:419 442:444 |
| ## 275 3090 | 2 | A26 4422707 5425137 334:340 417:422 411:419 442:442 |
| ## 276 3090 | 3 | A26 4422707 5425137 334:340 424:424 419:430 442:444 |
| ## 277 3090 | 4 | A26 4422707 5425137 334:340 422:422 411:419 444:448 |
| ## 278 3090 | 5 | A26 4422707 5425137 340:340 422:424 419:419 442:444 |
| ## 279 3090 | 6 | A26 4422707 5425137 340:340 422:422 411:411 442:444 |
| ## 280 3090 | 7 | A26 4422707 5425137 334:340 422:424 411:411 444:446 |
| ## 281 3090 | 8 | A26 4422707 5425137 340:340 422:422 411:419 442:442 |
| ## 282 3090 | 9 | A26 4422707 5425137 334:340 422:424 411:430 442:446 |
| ## 283 3090 | 10 | A26 4422707 5425137 340:340 422:422 419:419 442:444 |
| ## 284 3091 | 0 | A26 4422712 5425139 340:340 417:424 409:436 444:452 |
| ## 285 3091 | 2 | A26 4422712 5425139 340:340 417:422 405:409 446:452 |
| ## 286 3091 | 3 | A26 4422712 5425139 334:340 422:424 409:409 444:448 |
| ## 287 3091 | 4 | A26 4422712 5425139 340:340 417:417 436:436 444:444 |
| ## 288 3091 | 6 | A26 4422712 5425139 340:344 417:422 409:411 444:448 |
| ## 289 3091 | 7 | A26 4422712 5425139 417:422 452:452 |
| ## 290 3091 | 8 | A26 4422712 5425139 340:340 417:422 411:436 442:444 |
| ## 291 3091 | 9 | A26 4422712 5425139 340:340 424:424 409:411 444:446 |
| ## 292 3091 | 10 | A26 4422712 5425139 340:340 417:422 409:411 444:452 |
| ## 293 3092 | 0 | A26 4422712 5425140 340:340 424:424 405:436 446:452 |
| ## 294 3092 | 1 | A26 4422712 5425140 340:352 424:424 436:436 446:452 |
| ## 295 3092 | 2 | A26 4422712 5425140 340:340 424:424 436:436 446:452 |
| ## 296 3092 | 3 | A26 4422712 5425140 340:340 424:424 405:436 452:452 |
| ## 297 3092 | 4 | A26 4422712 5425140 340:352 424:424 405:405 452:452 |
| ## 298 3092 | 5 | A26 4422712 5425140 340:340 424:424 405:436 452:452 |
| ## 299 3092 | 6 | A26 4422712 5425140 340:340 417:424 436:436 446:452 |
| ## 300 3092 | 7 | A26 4422712 5425140 340:352 424:424 405:405 446:452 |
| ## 301 3092 | 8 | A26 4422712 5425140 338:340 417:424 411:436 444:446 |
| ## 302 3092 | 9 | A26 4422712 5425140 340:340 424:424 405:436 452:452 |
| ## 303 3092 | 10 | A26 4422712 5425140 340:340 424:424 405:436 446:452 |
| ## 304 3093 | 0 | A26 4422710 5425140 340:340 417:424 411:436 446:452 |
| ## 305 3093 | 1 | A26 4422710 5425140 340:340 417:424 436:436 446:452 |
| ## 306 3093 | 2 | A26 4422710 5425140 340:340 417:424 436:436 446:452 |
| ## 307 3093 | 4 | A26 4422710 5425140 340:340 424:424 411:436 452:452 |
| ## 308 3093 | 5 | A26 4422710 5425140 340:340 424:424 411:411 446:452 |
| ## 309 3093 | 7 | A26 4422710 5425140 340:340 424:424 411:411 446:446 |
| ## 310 3094 | 0 | A26 4422707 5425144 334:342 417:422 409:411 446:446 |
| ## 311 3094 | 1 | A26 4422707 5425144 342:342 417:417 409:411 446:446 |
| ## 312 3094 | 3 | A26 4422707 5425144 334:342 417:417 409:411 446:446 |
| ## 313 3094 | 4 | A26 4422707 5425144 342:342 417:422 409:411 |
| ## 314 3094 | 5 | A26 4422707 5425144 342:342 417:422 409:409 446:446 |
| ## 315 3094 | 6 | A26 4422707 5425144 342:342 422:422 409:411 446:446 |
| ## 316 3094 | 7 | A26 4422707 5425144 334:340 417:422 411:411 446:450 |
| ## 317 3097 | 0 | A45 4423088 5426988 336:340 422:422 392:411 446:446 |
| ## 318 3097 | 1 | A45 4423088 5426988 336:340 422:422 392:392 446:446 |
| ## 319 3097 | 2 | A45 4423088 5426988 336:336 422:422 392:392 446:446 |
| ## 320 3097 | 3 | A45 4423088 5426988 336:340 422:422 396:411 446:446 |
| ## 321 3097 | 5 | A45 4423088 5426988 340:340 422:422 411:411 446:446 |
| ## 322 3097 | 11 | A45 4423088 5426988 336:336 422:422 392:411 446:446 |
| ## 323 3097 | 12 | A45 4423088 5426988 340:340 422:422 411:411 446:446 |
| ## 324 3097 | 13 | A45 4423088 5426988 340:340 422:422 411:411 446:446 |
| ## 325 3097 | 14 | A45 4423088 5426988 336:340 422:422 392:411 446:446 |
| ## 326 3098 | 0 | A45 4423090 5427000 338:340 417:424 411:417 446:446 |

| | | |
|-------------|----|---|
| ## 327 3098 | 1 | A45 4423090 5427000 338:340 417:417 417:417 446:446 |
| ## 328 3098 | 2 | A45 4423090 5427000 338:338 417:417 411:417 446:446 |
| ## 329 3098 | 3 | A45 4423090 5427000 338:338 417:424 411:411 446:446 |
| ## 330 3098 | 5 | A45 4423090 5427000 334:340 417:417 411:417 444:446 |
| ## 331 3098 | 6 | A45 4423090 5427000 336:340 424:424 411:411 446:446 |
| ## 332 3098 | 7 | A45 4423090 5427000 334:340 417:417 411:417 446:446 |
| ## 333 3098 | 8 | A45 4423090 5427000 334:338 417:417 411:411 446:446 |
| ## 334 3098 | 9 | A45 4423090 5427000 338:340 424:424 411:417 446:446 |
| ## 335 3098 | 10 | A45 4423090 5427000 338:338 424:424 411:417 446:446 |
| ## 336 3099 | 0 | A45 4423088 5427004 342:352 422:422 413:430 446:452 |
| ## 337 3099 | 1 | A45 4423088 5427004 342:342 417:422 411:413 452:452 |
| ## 338 3099 | 2 | A45 4423088 5427004 334:352 417:422 411:430 446:452 |
| ## 339 3099 | 3 | A45 4423088 5427004 334:342 417:422 411:413 452:452 |
| ## 340 3099 | 4 | A45 4423088 5427004 334:342 422:422 411:413 452:452 |
| ## 341 3099 | 6 | A45 4423088 5427004 342:352 417:422 411:413 452:452 |
| ## 342 3099 | 7 | A45 4423088 5427004 342:342 417:422 413:415 452:452 |
| ## 343 3099 | 8 | A45 4423088 5427004 334:352 422:422 415:430 452:452 |
| ## 344 3099 | 9 | A45 4423088 5427004 334:342 422:422 411:413 452:452 |
| ## 345 3099 | 10 | A45 4423088 5427004 334:342 422:422 411:430 452:452 |
| ## 346 3100 | 0 | A45 4423092 5427007 340:342 422:422 415:419 442:452 |
| ## 347 3100 | 1 | A45 4423092 5427007 340:356 422:424 417:419 442:452 |
| ## 348 3100 | 5 | A45 4423092 5427007 340:340 422:422 452:452 |
| ## 349 3100 | 6 | A45 4423092 5427007 340:342 422:422 442:442 |
| ## 350 3100 | 7 | A45 4423092 5427007 342:356 422:422 415:415 442:452 |
| ## 351 3100 | 2 | A45 4423092 5427007 338:342 422:424 409:415 448:452 |
| ## 352 3100 | 9 | A45 4423092 5427007 334:340 417:422 415:415 442:452 |
| ## 353 3100 | 10 | A45 4423092 5427007 342:352 422:422 415:430 452:452 |
| ## 354 3100 | 12 | A45 4423092 5427007 334:340 417:422 415:417 442:446 |
| ## 355 3100 | 8 | A45 4423092 5427007 342:356 422:424 409:419 448:452 |
| ## 356 3101 | 0 | A45 4423092 5427008 334:336 422:424 407:411 446:446 |
| ## 357 3101 | 1 | A45 4423092 5427008 334:336 422:424 411:419 446:446 |
| ## 358 3101 | 2 | A45 4423092 5427008 334:336 422:422 411:411 446:446 |
| ## 359 3101 | 4 | A45 4423092 5427008 336:336 422:422 411:411 446:446 |
| ## 360 3101 | 5 | A45 4423092 5427008 336:336 422:422 407:407 446:446 |
| ## 361 3101 | 7 | A45 4423092 5427008 334:336 422:424 407:411 446:446 |
| ## 362 3101 | 3 | A45 4423092 5427008 336:336 422:424 407:407 446:446 |
| ## 363 3101 | 9 | A45 4423092 5427008 336:336 422:424 407:411 446:446 |
| ## 364 3101 | 10 | A45 4423092 5427008 334:334 422:424 411:411 446:446 |
| ## 365 3101 | 8 | A45 4423092 5427008 334:334 422:422 407:419 446:452 |
| ## 366 3102 | 0 | A45 4423093 5427003 334:338 422:424 419:434 446:452 |
| ## 367 3102 | 2 | A45 4423093 5427003 334:342 424:424 411:419 446:446 |
| ## 368 3102 | 3 | A45 4423093 5427003 330:334 417:424 419:419 452:452 |
| ## 369 3102 | 4 | A45 4423093 5427003 334:338 422:424 419:434 446:446 |
| ## 370 3102 | 5 | A45 4423093 5427003 334:342 422:424 411:419 446:452 |
| ## 371 3102 | 6 | A45 4423093 5427003 330:334 417:424 411:419 452:452 |
| ## 372 3102 | 7 | A45 4423093 5427003 334:338 417:422 417:419 446:446 |
| ## 373 3102 | 9 | A45 4423093 5427003 332:334 422:422 411:419 446:452 |
| ## 374 3102 | 11 | A45 4423093 5427003 338:340 424:424 419:434 446:446 |
| ## 375 3102 | 1 | A45 4423093 5427003 338:342 424:424 411:434 452:452 |
| ## 376 3103 | 2 | A41 4426038 5423339 340:342 422:422 411:419 446:446 |
| ## 377 3103 | 0 | A41 4426038 5423339 342:344 422:424 417:419 446:452 |
| ## 378 3103 | 6 | A41 4426038 5423339 344:344 422:424 417:419 450:452 |
| ## 379 3103 | 7 | A41 4426038 5423339 336:344 417:424 417:425 446:446 |
| ## 380 3103 | 8 | A41 4426038 5423339 336:342 422:424 392:419 446:452 |

| | | |
|-------------|----|---|
| ## 381 3103 | 9 | A41 4426038 5423339 344:344 422:424 417:419 446:452 |
| ## 382 3103 | 5 | A41 4426038 5423339 336:342 417:422 392:417 446:446 |
| ## 383 3104 | 0 | A41 4426037 5423338 410:422 392:411 442:452 |
| ## 384 3105 | 0 | A41 4426037 5423338 336:358 422:422 392:411 447:452 |
| ## 385 3105 | 4 | A41 4426037 5423338 422:422 392:411 |
| ## 386 3105 | 5 | A41 4426037 5423338 336:336 422:422 392:392 452:452 |
| ## 387 3105 | 7 | A41 4426037 5423338 336:336 422:422 392:411 |
| ## 388 3105 | 3 | A41 4426037 5423338 336:344 422:422 409:411 447:449 |
| ## 389 3105 | 10 | A41 4426037 5423338 336:336 422:422 392:392 447:452 |
| ## 390 3106 | 0 | A41 4426037 5423338 334:358 417:422 411:411 442:452 |
| ## 391 3106 | 1 | A41 4426037 5423338 358:358 422:422 411:411 442:452 |
| ## 392 3106 | 3 | A41 4426037 5423338 334:334 417:422 411:411 442:442 |
| ## 393 3106 | 5 | A41 4426037 5423338 334:344 410:422 392:411 442:446 |
| ## 394 3106 | 6 | A41 4426037 5423338 334:344 417:422 409:411 449:452 |
| ## 395 3106 | 7 | A41 4426037 5423338 358:358 417:422 411:411 442:442 |
| ## 396 3106 | 4 | A41 4426037 5423338 334:334 422:422 411:425 442:450 |
| ## 397 3106 | 9 | A41 4426037 5423338 344:358 422:424 411:432 446:452 |
| ## 398 3106 | 10 | A41 4426037 5423338 334:344 422:424 411:432 442:446 |
| ## 399 3106 | 8 | A41 4426037 5423338 334:334 422:422 411:411 442:442 |
| ## 400 3107 | 0 | A41 4426036 5423335 344:344 410:417 392:411 446:446 |
| ## 401 3107 | 2 | A41 4426036 5423335 344:344 410:422 392:425 446:450 |
| ## 402 3107 | 3 | A41 4426036 5423335 344:344 410:422 392:419 446:450 |
| ## 403 3107 | 4 | A41 4426036 5423335 344:344 417:422 411:419 446:450 |
| ## 404 3107 | 5 | A41 4426036 5423335 344:344 417:422 411:425 446:450 |
| ## 405 3107 | 6 | A41 4426036 5423335 344:344 417:422 411:419 446:450 |
| ## 406 3107 | 10 | A41 4426036 5423335 344:344 417:422 411:425 446:446 |
| ## 407 3107 | 1 | A41 4426036 5423335 344:344 410:422 392:425 446:450 |
| ## 408 3108 | 0 | A41 4426038 5423337 344:344 422:422 419:425 450:452 |
| ## 409 3108 | 1 | A41 4426038 5423337 344:344 422:422 425:425 450:450 |
| ## 410 3108 | 5 | A41 4426038 5423337 344:344 422:422 419:425 |
| ## 411 3108 | 6 | A41 4426038 5423337 344:344 422:422 419:425 452:452 |
| ## 412 3108 | 8 | A41 4426038 5423337 344:344 422:422 425:425 450:450 |
| ## 413 3108 | 2 | A41 4426038 5423337 344:344 422:422 419:419 450:452 |
| ## 414 3108 | 10 | A41 4426038 5423337 344:344 422:422 419:419 450:452 |
| ## 415 3108 | 11 | A41 4426038 5423337 344:344 422:422 419:425 450:450 |
| ## 416 3108 | 12 | A41 4426038 5423337 344:344 422:422 419:419 450:452 |
| ## 417 3109 | 0 | A41 4426032 5423338 336:340 417:422 392:411 446:446 |
| ## 418 3109 | 2 | A41 4426032 5423338 336:340 417:422 392:411 446:446 |
| ## 419 3109 | 3 | A41 4426032 5423338 340:344 417:422 392:411 446:449 |
| ## 420 3109 | 4 | A41 4426032 5423338 336:340 417:417 392:411 446:446 |
| ## 421 3109 | 1 | A41 4426032 5423338 340:340 422:422 411:411 446:446 |
| ## 422 3109 | 7 | A41 4426032 5423338 336:340 417:422 392:411 446:446 |
| ## 423 3109 | 8 | A41 4426032 5423338 336:336 422:422 392:392 446:446 |
| ## 424 3109 | 5 | A41 4426032 5423338 336:336 417:422 392:411 446:446 |
| ## 425 3109 | 10 | A41 4426032 5423338 336:340 417:422 392:411 446:446 |
| ## 426 3109 | 9 | A41 4426032 5423338 336:340 417:422 392:392 446:446 |
| ## 427 3111 | 0 | A41 4426038 5423338 344:358 422:422 392:411 442:447 |
| ## 428 3111 | 1 | A41 4426038 5423338 344:344 422:422 392:411 447:449 |
| ## 429 3111 | 5 | A41 4426038 5423338 358:358 422:422 411:411 442:442 |
| ## 430 3111 | 6 | A41 4426038 5423338 334:358 417:422 411:411 |
| ## 431 3111 | 8 | A41 4426038 5423338 358:358 422:422 411:411 442:452 |
| ## 432 3111 | 10 | A41 4426038 5423338 344:358 422:422 411:411 447:447 |
| ## 433 3112 | 0 | A41 4426037 5423350 326:334 417:422 417:440 442:446 |
| ## 434 3112 | 1 | A41 4426037 5423350 334:354 417:422 411:417 446:456 |

| | | |
|-------------|----|---|
| ## 435 3112 | 2 | A41 4426037 5423350 326:340 417:422 411:417 442:446 |
| ## 436 3112 | 5 | A41 4426037 5423350 326:326 417:422 440:440 442:446 |
| ## 437 3112 | 6 | A41 4426037 5423350 326:326 417:422 398:440 442:442 |
| ## 438 3112 | 7 | A41 4426037 5423350 334:334 417:417 398:417 442:442 |
| ## 439 3112 | 3 | A41 4426037 5423350 334:334 417:422 398:417 442:442 |
| ## 440 3112 | 9 | A41 4426037 5423350 334:334 417:417 419:440 442:442 |
| ## 441 3112 | 10 | A41 4426037 5423350 326:334 417:422 398:417 442:442 |
| ## 442 3113 | 0 | A21 4426944 5427195 340:352 417:422 392:430 446:452 |
| ## 443 3113 | 1 | A21 4426944 5427195 340:340 417:417 392:392 446:446 |
| ## 444 3113 | 3 | A21 4426944 5427195 340:352 422:422 421:430 444:452 |
| ## 445 3113 | 4 | A21 4426944 5427195 334:340 417:424 392:430 446:446 |
| ## 446 3113 | 5 | A21 4426944 5427195 342:352 422:424 430:436 452:452 |
| ## 447 3113 | 2 | A21 4426944 5427195 334:340 417:424 392:409 444:452 |
| ## 448 3113 | 7 | A21 4426944 5427195 352:352 422:422 392:430 446:452 |
| ## 449 3113 | 9 | A21 4426944 5427195 340:352 392:392 452:452 |
| ## 450 3113 | 10 | A21 4426944 5427195 340:340 417:424 409:430 444:452 |
| ## 451 3113 | 6 | A21 4426944 5427195 352:352 422:422 430:430 446:446 |
| ## 452 3115 | 0 | A21 4426935 5427183 340:346 422:424 409:431 446:448 |
| ## 453 3115 | 2 | A21 4426935 5427183 346:346 422:422 409:409 448:448 |
| ## 454 3115 | 3 | A21 4426935 5427183 334:340 424:424 431:434 444:446 |
| ## 455 3115 | 4 | A21 4426935 5427183 340:346 422:422 409:431 448:448 |
| ## 456 3115 | 1 | A21 4426935 5427183 340:340 424:424 446:446 |
| ## 457 3115 | 6 | A21 4426935 5427183 340:340 422:422 444:446 |
| ## 458 3115 | 7 | A21 4426935 5427183 344:346 417:424 392:409 444:448 |
| ## 459 3115 | 8 | A21 4426935 5427183 334:340 424:424 431:434 448:448 |
| ## 460 3115 | 9 | A21 4426935 5427183 340:346 424:424 409:431 448:448 |
| ## 461 3115 | 5 | A21 4426935 5427183 334:346 424:424 409:434 444:446 |
| ## 462 3116 | 1 | A21 4426935 5427171 334:352 417:417 417:421 442:442 |
| ## 463 3116 | 3 | A21 4426935 5427171 352:352 417:417 421:421 |
| ## 464 3116 | 4 | A21 4426935 5427171 334:352 417:417 417:417 446:446 |
| ## 465 3116 | 0 | A21 4426935 5427171 334:352 417:417 417:421 442:446 |
| ## 466 3117 | 1 | A21 4426924 5427174 344:344 424:424 411:411 446:446 |
| ## 467 3117 | 2 | A21 4426924 5427174 342:342 417:417 411:411 444:444 |
| ## 468 3117 | 3 | A21 4426924 5427174 344:344 417:417 392:411 446:446 |
| ## 469 3117 | 0 | A21 4426924 5427174 342:344 417:424 392:411 444:446 |
| ## 470 3117 | 5 | A21 4426924 5427174 344:344 424:424 392:392 444:446 |
| ## 471 3117 | 6 | A21 4426924 5427174 344:344 424:424 392:392 444:446 |
| ## 472 3117 | 9 | A21 4426924 5427174 344:344 417:417 411:411 446:446 |
| ## 473 3117 | 10 | A21 4426924 5427174 424:424 411:411 446:446 |
| ## 474 3117 | 4 | A21 4426924 5427174 344:344 417:424 392:392 446:446 |
| ## 475 3118 | 1 | A21 4426919 5427160 340:340 417:422 436:436 446:446 |
| ## 476 3118 | 2 | A21 4426919 5427160 338:338 422:422 430:436 450:450 |
| ## 477 3118 | 3 | A21 4426919 5427160 340:340 417:422 436:436 446:450 |
| ## 478 3118 | 0 | A21 4426919 5427160 338:340 417:422 430:436 446:450 |
| ## 479 3118 | 5 | A21 4426919 5427160 340:340 417:417 430:436 446:446 |
| ## 480 3118 | 6 | A21 4426919 5427160 338:338 417:417 430:430 446:450 |
| ## 481 3118 | 7 | A21 4426919 5427160 338:340 417:422 430:436 446:450 |
| ## 482 3118 | 4 | A21 4426919 5427160 340:340 422:422 430:436 446:446 |
| ## 483 3118 | 9 | A21 4426919 5427160 338:338 417:417 436:436 446:446 |
| ## 484 3118 | 10 | A21 4426919 5427160 338:340 417:422 430:430 446:446 |
| ## 485 3118 | 8 | A21 4426919 5427160 338:340 422:422 430:430 446:450 |
| ## 486 3119 | 0 | A21 4426912 5427148 340:344 417:417 421:425 446:446 |
| ## 487 3119 | 2 | A21 4426912 5427148 340:344 417:417 392:421 446:446 |
| ## 488 3119 | 4 | A21 4426912 5427148 340:340 417:422 413:425 446:448 |

| | | | | | | | | | | |
|----|-----|---------|----|---------|---------|---------|---------|---------|---------|---------|
| ## | 489 | 3119 | 5 | A21 | 4426912 | 5427148 | 338:344 | 417:417 | 392:421 | 446:446 |
| ## | 490 | 3119 | 6 | A21 | 4426912 | 5427148 | 338:340 | 417:422 | 392:421 | 446:448 |
| ## | 491 | 3119 | 7 | A21 | 4426912 | 5427148 | 340:344 | 417:422 | 413:425 | 446:448 |
| ## | 492 | 3119 | 1 | A21 | 4426912 | 5427148 | 338:344 | 417:417 | 392:425 | 446:446 |
| ## | 493 | 3119 | 9 | A21 | 4426912 | 5427148 | 338:340 | 417:422 | 413:421 | 446:448 |
| ## | 494 | 3119 | 10 | A21 | 4426912 | 5427148 | 340:340 | 417:417 | 413:421 | 446:448 |
| ## | 495 | 3119 | 8 | A21 | 4426912 | 5427148 | 340:344 | 417:417 | 392:421 | 446:448 |
| ## | 496 | 3121 | 0 | G05a | 4429198 | 5434949 | 340:340 | 422:422 | 417:417 | 446:446 |
| ## | 497 | 3121 | 6 | G05a | 4429198 | 5434949 | 340:340 | 422:422 | 409:417 | |
| ## | 498 | 3121 | 3 | G05a | 4429198 | 5434949 | | 422:422 | 417:417 | 446:448 |
| ## | 499 | 3121 | 8 | G05a | 4429198 | 5434949 | 340:340 | | 417:417 | 446:446 |
| ## | 500 | 3121 | 10 | G05a | 4429198 | 5434949 | 340:340 | | 417:417 | 446:446 |
| ## | 501 | 3122 | 0 | G05a | 4429198 | 5434950 | 336:336 | 422:422 | 409:409 | 446:450 |
| ## | 502 | 3122 | 3 | G05a | 4429198 | 5434950 | | | 409:417 | 446:450 |
| ## | 503 | 3123 | 0 | G05a | 4429199 | 5434948 | 332:346 | 422:422 | 392:417 | 446:448 |
| ## | 504 | 3123 | 1 | G05a | 4429199 | 5434948 | 338:346 | 422:422 | 392:417 | 444:446 |
| ## | 505 | 3123 | 2 | G05a | 4429199 | 5434948 | | 422:422 | 392:417 | 444:448 |
| ## | 506 | 3123 | 4 | G05a | 4429199 | 5434948 | 332:336 | 422:422 | 417:417 | 448:448 |
| ## | 507 | 3123 | 5 | G05a | 4429199 | 5434948 | 332:332 | | 392:392 | 448:448 |
| ## | 508 | 3123 | 6 | G05a | 4429199 | 5434948 | 332:332 | 422:422 | 417:417 | 448:448 |
| ## | 509 | 3123 | 7 | G05a | 4429199 | 5434948 | 332:332 | 422:424 | | |
| ## | 510 | 3123 | 8 | G05a | 4429199 | 5434948 | 332:346 | 422:422 | 417:417 | 446:448 |
| ## | 511 | 3123 | 10 | G05a | 4429199 | 5434948 | 332:346 | 422:422 | 392:417 | 446:448 |
| ## | 512 | 3123 | 3 | G05a | 4429199 | 5434948 | 340:346 | 422:422 | 417:417 | 448:448 |
| ## | 513 | 3124 | 0 | G05a | 4429199 | 5434947 | 346:346 | 422:422 | 392:409 | 446:450 |
| ## | 514 | 3124 | 7 | G05a | 4429199 | 5434947 | | 422:422 | | 446:446 |
| ## | 515 | 3125 | 0 | G05a | 4429198 | 5434949 | 340:346 | 422:422 | 417:417 | 444:446 |
| ## | 516 | 3126 | 0 | G05a | 4429201 | 5434949 | 334:342 | 422:422 | 411:425 | 446:448 |
| ## | 517 | 3127 | 0 | G05a | 4429199 | 5434950 | 340:346 | 422:422 | 392:411 | 446:446 |
| ## | 518 | 3128 | 0 | A03 | 4431314 | 5429350 | 340:340 | 417:424 | 392:417 | 448:448 |
| ## | 519 | 3128 | 2 | A03 | 4431314 | 5429350 | 340:340 | 417:417 | 417:417 | 448:448 |
| ## | 520 | 3128 | 3 | A03 | 4431314 | 5429350 | 340:340 | 424:424 | 392:417 | 448:448 |
| ## | 521 | 3128 | 7 | A03 | 4431314 | 5429350 | 340:340 | 417:417 | 417:417 | 448:448 |
| ## | 522 | 3128 | 8 | A03 | 4431314 | 5429350 | 340:340 | 417:422 | 392:417 | 446:448 |
| ## | 523 | 3128 | 9 | A03 | 4431314 | 5429350 | 340:340 | 417:422 | 417:421 | 448:452 |
| ## | 524 | 3128 | 6 | A03 | 4431314 | 5429350 | 340:340 | 417:424 | 417:421 | 446:448 |
| ## | 525 | 3128 | 11 | A03 | 4431314 | 5429350 | 340:350 | 422:424 | 392:413 | 448:452 |
| ## | 526 | 3130 | 0 | A03 | 4431310 | 5429355 | 340:340 | 422:422 | 394:413 | 448:448 |
| ## | 527 | 3134 | 0 | A03 | 4431310 | 5429366 | 334:340 | 422:422 | 417:425 | 448:448 |
| ## | 528 | 3134 | 2 | A03 | 4431310 | 5429366 | 334:338 | 422:424 | 394:425 | 448:448 |
| ## | 529 | 3134 | 3 | A03 | 4431310 | 5429366 | 334:334 | 422:422 | 425:425 | 448:448 |
| ## | 530 | 3134 | 4 | A03 | 4431310 | 5429366 | 334:334 | 422:422 | 417:417 | 448:448 |
| ## | 531 | 3134 | 5 | A03 | 4431310 | 5429366 | 340:340 | 422:422 | | |
| ## | 532 | 3134 | 8 | A03 | 4431310 | 5429366 | 334:334 | 422:422 | 417:417 | 448:448 |
| ## | 533 | 3134 | 9 | A03 | 4431310 | 5429366 | 334:334 | 422:422 | 425:425 | 448:448 |
| ## | 534 | 3135 | 0 | A03 | 4431315 | 5429368 | 326:352 | 418:424 | 409:411 | 446:446 |
| ## | 535 | 3136 | 0 | A03 | 4431316 | 5429371 | 338:340 | 422:422 | 409:411 | 446:448 |
| ## | 536 | 4120 | 0 | G05a | 4429197 | 5434950 | 340:340 | 422:422 | 409:417 | 442:446 |
| ## | | loc5_a | | loc6_a | | loc7_a | | | | |
| ## | 1 | 121:121 | | 155:157 | | 242:244 | | | | |
| ## | 2 | 122:133 | | 155:161 | | 242:252 | | | | |
| ## | 3 | 135:137 | | 153:157 | | 244:246 | | | | |
| ## | 4 | 122:126 | | 157:159 | | 242:252 | | | | |
| ## | 5 | 119:123 | | 155:155 | | 244:256 | | | | |

```

## 6   122:124 155:161 256:256
## 7   121:128 152:161 244:244
## 8   126:133 155:157 240:242
## 9   121:122 155:177 242:268
## 10  121:124 157:161 240:242
## 11  121:123 155:161 246:246
## 12  121:122 155:155 242:244
## 13  121:121 157:159 238:246
## 14  128:137 155:159 244:252
## 15  121:124 155:159 242:250
## 16  121:121 153:165 240:242
## 17  121:121 155:157 240:242
## 18  121:121 153:155 244:246
## 19  118:121 157:157 236:252
## 20  121:121 155:159 236:242
## 21  121:122 155:157 242:244
## 22  121:121 155:157 236:246
## 23  121:133 153:157 244:252
## 24  121:133 157:161 242:244
## 25  121:122 157:157 242:244
## 26  121:124 155:157 240:258
## 27  121:121 155:157 242:250
## 28  121:122 155:157 242:242
## 29  121:124 153:157 242:256
## 30  121:122 155:165 240:244
## 31  121:121 157:157 236:242
## 32  121:121 155:161 236:244
## 33  121:123 155:157 244:252
## 34  114:121 157:165 240:252
## 35  121:123 157:157 236:244
## 36  123:123 157:157 246:246
## 37  121:121 153:153 240:240
## 38  121:123 150:157 244:244
## 39  121:123 157:157 244:246
## 40  121:121 155:157 236:252
## 41  122:123 157:167 238:244
## 42  121:123 153:157 252:252
## 43  122:123 155:155 244:256
## 44  119:121 155:155 242:250
## 45  121:121 150:155 242:242
## 46  121:122 153:155 250:258
## 47  121:128 157:159 244:250
## 48  121:122 155:157 244:250
## 49  121:122 153:153 240:244
## 50  121:121 165:165 246:246
## 51  122:124 159:161 242:256
## 52  121:124 157:161 240:246
## 53  121:122 155:155 252:256
## 54  121:121 155:165 242:256
## 55  121:124 150:165
## 56  122:133 155:159 242:242
## 57  121:122 155:165 246:256
## 58  121:122 157:159 242:242
## 59  124:124 155:157 252:256

```

```

## 60 122:133 155:169 238:246
## 61 122:133 150:155
## 62 126:128 155:169 240:242
## 63 121:121 152:157 240:242
## 64 121:121 167:167 242:252
## 65 121:122 152:157 246:252
## 66 114:121 155:157 242:256
## 67 114:121 157:159 242:250
## 68 122:124 161:161 242:246
## 69 121:124 159:161 242:246
## 70 119:128 157:161 242:252
## 71 121:126 157:159 252:256
## 72 121:133 155:159 242:252
## 73 126:128 159:161 242:252
## 74 121:133 161:161 242:252
## 75 121:133 155:161 252:252
## 76 122:126 159:161 250:250
## 77 126:133 161:161 240:252
## 78 122:122 155:155
## 79 121:121 155:157 238:246
## 80 121:133 161:161 236:252
## 81 122:122 155:159 242:242
## 82 121:122 155:159 238:240
## 83 121:133 155:159 242:244
## 84 121:126 157:159 242:252
## 85 126:126 155:155 246:252
## 86 121:126 155:167 242:246
## 87 121:126 161:161 242:256
## 88 121:126 155:159 246:252
## 89      157:157 242:252
## 90      155:155 244:252
## 91 124:128 155:155 246:256
## 92 121:133 155:155 242:252
## 93 121:128 155:157 252:256
## 94 121:124 155:175 252:256
## 95 119:121 157:165 242:256
## 96 124:124 152:155
## 97 126:133 155:165 236:250
## 98 123:133 155:157 244:256
## 99 121:150 153:157 242:250
## 100 131:152 157:171 242:242
## 101 131:135 155:157 242:242
## 102 122:122 155:155 244:256
## 103 150:152 157:157 240:242
## 104 124:150 155:157 242:242
## 105 133:133 157:159 242:244
## 106 121:135 152:161 242:242
## 107 129:139 155:157 244:256
## 108 123:135 152:157 242:252
## 109 121:152 157:157 244:262
## 110 122:133 157:157 242:242
## 111 121:121 157:167 242:256
## 112 121:121 157:157 238:242
## 113 124:133 155:157 240:256

```

114 121:135 157:159 242:244
115 122:150 157:157 242:244
116 121:121 155:157 240:240
117 123:124 152:167 242:256
118 123:135 155:157 242:242
119 121:121 152:157 242:244
120 133:133 157:161 242:242
121 121:121 157:171 242:242
122 121:121 155:157 242:256
123 124:133 157:157 242:246
124 133:133 157:173 240:246
125 121:133 157:159 242:244
126 128:133 155:157 242:256
127 122:126 157:157 242:242
128 123:135 155:157 244:270
129 122:131 153:157 240:242
130 121:131 157:157 242:256
131 121:122 155:155 252:252
132 133:150 157:159 242:256
133 121:128 155:157 242:262
134 133:137 157:157 240:244
135 121:133 155:157 240:240
136 124:126 155:157 244:244
137 121:133 155:159 242:244
138 121:121 155:157 244:244
139 121:137 155:169 242:244
140 120:124 155:175 242:246
141 121:133 155:155 244:246
142 121:121 155:161 246:246
143 124:126 155:155 244:244
144 124:124 155:155 244:244
145 124:124 155:161 244:244
146 124:124 157:157 244:244
147 124:124 157:161 242:244
148 128:128 159:159 244:244
149 121:128 155:157 242:256
150 121:126 157:169 244:244
151 121:124 157:159 238:242
152 121:133 155:155 244:244
153 124:124 155:159 242:244
154 124:133 155:155 244:244
155 124:133 155:155 244:244
156 122:133 155:155 244:256
157 128:133 155:155 244:244
158 121:133 155:155 244:256
159 121:128 155:155 244:256
160 124:128 155:165 244:244
161 121:124 155:155 244:244
162 119:128 161:161 244:252
163 122:137 155:155 244:244
164 124:133 155:155 244:244
165 126:128 155:155 244:244
166 124:133 155:161 242:244
167 133:137 155:155 244:244

```

## 168 121:133 155:159 244:244
## 169 121:133 155:155 244:252
## 170 133:133 155:157 244:244
## 171 122:128 155:155 242:244
## 172 124:124 155:159 242:244
## 173 121:121 157:157 256:258
## 174 121:121 157:165 242:258
## 175 121:121 157:157 252:258
## 176 118:121 157:157 236:258
## 177 121:121 153:157 242:258
## 178 121:121 157:165 240:258
## 179 121:121 153:157 240:256
## 180 118:121 157:157 236:258
## 181 121:121 153:157 242:256
## 182 121:121 153:157 242:258
## 183 121:121 157:165 242:256
## 184 121:133 157:161 252:252
## 185 121:133 153:157 240:252
## 186 121:133 157:169 240:252
## 187 121:133 157:161 252:252
## 188 121:121 161:161 252:252
## 189 121:133 161:161 252:252
## 190 121:121 153:161 244:252
## 191 121:133 153:161 240:252
## 192 121:121 157:157 252:252
## 193 121:133 161:161 252:252
## 194 121:133 153:161 240:252
## 195 121:121 153:169 240:244
## 196 121:121 153:169 244:244
## 197 121:133 157:169 244:244
## 198 121:121 153:169 240:240
## 199 121:121 153:153 244:244
## 200 121:133 157:169 244:244
## 201 121:121 169:169 240:244
## 202 121:121 153:153 244:244
## 203 121:121 169:169 240:240
## 204 121:121 153:153 240:240
## 205 121:121 153:169 240:240
## 206      244:244
## 207 121:121 157:157 244:252
## 208 121:121 157:157 240:244
## 209 121:121 157:157
## 210 121:121 155:157 236:252
## 211 121:121 157:157 244:244
## 212 121:121 157:159 242:244
## 213 121:121 157:157 244:244
## 214 121:121 155:157 242:244
## 215 121:133 155:157 240:246
## 216 121:128 152:157 240:240
## 217 121:121 152:157 238:246
## 218 121:121 157:157 246:252
## 219 128:133 157:157 246:256
## 220 128:133 152:157 240:256
## 221 119:133 152:157 240:256

```



```

## 222 121:133 157:159 240:240
## 223 121:122 159:161 240:244
## 224 121:122 159:159
## 225 121:121 157:161 244:244
## 226 121:122 155:159 240:240
## 227 122:133 161:161 240:244
## 228 122:123 157:161 244:252
## 229 121:122 161:161 240:244
## 230 121:121 159:161 242:244
## 231 121:122 155:159 236:240
## 232 121:121 155:161 240:242
## 233 121:121 153:155 240:244
## 234 121:122 157:159 236:252
## 235 122:133 153:155 236:236
## 236 119:121 155:159 240:240
## 237 121:121 155:155
## 238 121:121 159:159 240:240
## 239 121:121 153:159 240:240
## 240 122:133 153:159 240:252
## 241 121:121 155:157
## 242 123:124 157:157 240:252
## 243 121:123 157:157 236:252
## 244 121:123 157:157 240:252
## 245 121:123 157:157 240:244
## 246 121:124 157:157 242:252
## 247 121:123 157:157 236:240
## 248 121:124 157:157 236:240
## 249 121:124 157:157 236:252
## 250 121:123 157:157 240:242
## 251 121:124 157:161 244:252
## 252 121:124 157:157 240:252
## 253 121:122 155:165 252:258
## 254 121:121 157:165 236:252
## 255 121:122 155:155 252:252
## 256 121:122 155:165 252:252
## 257 121:128 155:157 236:258
## 258 121:122 155:165 258:258
## 259 121:121 155:165 258:258
## 260 121:121 155:155 252:258
## 261 122:124 159:165 252:252
## 262 114:122 157:165 258:258
## 263 121:124 159:161 252:252
## 264 121:124 159:161 252:252
## 265 121:128 159:161 252:252
## 266 121:121 155:159 252:252
## 267 121:121 159:159 252:252
## 268 121:128 159:161 252:252
## 269 121:128 159:161 252:252
## 270 121:121 159:161 252:252
## 271 121:121 159:159 252:252
## 272 121:128 159:161 252:252
## 273 121:128 159:159 252:252
## 274 121:121 159:159 252:252
## 275 121:121 157:159 252:256

```

```

## 276 121:128 155:159 252:256
## 277 124:128 159:159 246:252
## 278 128:128 159:159 252:252
## 279 121:128 159:159 252:252
## 280 121:128 159:159 252:252
## 281 121:128 159:159 252:252
## 282 114:121 157:159 252:256
## 283 121:121 159:159 252:252
## 284 121:121 155:165 240:246
## 285 121:126 155:161 240:240
## 286 121:121 155:155 240:240
## 287 121:126 159:165 240:250
## 288 121:126 157:165 242:246
## 289 121:121 155:165 246:256
## 290 121:128 159:165 246:252
## 291 121:126 155:165 240:250
## 292 121:133 155:161 240:240
## 293 121:126 159:165 240:246
## 294 121:121 159:165 240:246
## 295 121:126 159:165 240:246
## 296 121:126 165:165 240:246
## 297 121:126 159:165 246:246
## 298 121:121 165:165 240:246
## 299 121:126 159:165 240:250
## 300 121:126 159:165 246:246
## 301 121:121 165:165 242:246
## 302 121:121      246:246
## 303 121:126 159:165 240:246
## 304 121:126 155:159 250:250
## 305 121:126 155:159 250:250
## 306 121:121 155:155 250:250
## 307 121:121 155:159 250:250
## 308 126:126 155:159 250:250
## 309 126:126 155:155 250:250
## 310 121:128 157:167 236:242
## 311 128:128 157:157 236:242
## 312 128:128 157:167 236:236
## 313 128:128 167:167 236:242
## 314 121:121 167:167 236:236
## 315 121:128 157:167 236:242
## 316 121:121 157:161 242:252
## 317 121:121 157:165 242:256
## 318 121:121 165:165 242:256
## 319 121:121 165:165
## 320 121:121 157:157 242:256
## 321      242:242
## 322 121:121 165:165 242:256
## 323 121:121 157:157 242:256
## 324 121:121 157:157 242:256
## 325 121:121 157:157 242:242
## 326 121:121 155:155 246:252
## 327 121:121 155:155 246:252
## 328 121:121 155:155 246:246
## 329 121:121 155:155 252:252

```

330 121:121 155:155 246:252
331 121:121 155:155 246:246
332 121:121 155:155 246:252
333 121:121 155:155 252:252
334 121:121 155:155 246:252
335 121:121 155:155 246:246
336 121:121 161:165 246:252
337 121:121 165:167 246:246
338 121:126 155:161 252:252
339 121:126 155:165 246:246
340 121:121 155:165 246:246
341 121:126 155:161 242:246
342 121:126 155:161 242:246
343 121:121 161:167 242:252
344 121:121 155:165 246:246
345 121:126 155:165 242:246
346 121:124 161:165 242:256
347 121:121 161:165 236:242
348 121:121 161:165 256:256
349 165:165 242:242
350 121:121 165:165 252:256
351 121:121 155:165 242:252
352 121:124 161:167 246:256
353 121:124 165:165 242:252
354 121:126 155:165 252:256
355 121:121 165:165 242:252
356 122:124 159:165 252:256
357 124:133 155:159 242:256
358 122:122 165:165 256:256
359 122:124 159:165 252:256
360 124:124 159:159 252:256
361 124:124 159:159 252:256
362 121:122 159:159 256:256
363 122:124 159:159 256:256
364 122:122 159:165 256:256
365 124:133 155:159 242:252
366 124:126 159:165 242:246
367 121:126 155:165 246:252
368 121:124 155:159 242:252
369 126:126 159:165 242:246
370 124:126 155:165 242:246
371 121:126 155:165 246:246
372 124:126 155:165 246:246
373 126:126 155:165 242:246
374 121:126 236:246
375 121:126 155:159 246:246
376 123:123 157:165 242:246
377 122:123 159:165 242:246
378 122:124 159:165 246:246
379 123:141 157:159 246:252
380 121:122 157:165 246:256
381 122:123 159:165 242:246
382 122:123 155:159 242:246
383 121:126 155:159 252:256

```

## 384 121:121 155:157 242:256
## 385 121:121 155:155 242:242
## 386 121:121 157:157 256:256
## 387 121:121      256:256
## 388 121:133 157:165 242:250
## 389 121:121 155:157 240:242
## 390 121:122 155:157 236:242
## 391 121:121 155:157 242:242
## 392 121:121 157:157 236:242
## 393 121:122 155:159 236:242
## 394 122:126 157:165 236:236
## 395 121:122 155:157 242:242
## 396 122:122 155:157 242:242
## 397 121:122 155:155 236:252
## 398 122:124 157:175 236:256
## 399 122:122 155:157 236:242
## 400 121:123 157:159 242:252
## 401 123:123 159:159 240:242
## 402 121:123 155:159 242:246
## 403 121:124 159:159 240:242
## 404 123:123 159:159 240:242
## 405 121:123 157:159 240:252
## 406 121:123 157:159 240:252
## 407 121:124 159:159 240:242
## 408 123:124 155:159 240:246
## 409 123:123 159:159 240:240
## 410 124:124 155:159 240:240
## 411 123:123 155:155 246:246
## 412 123:124 159:159 240:240
## 413 123:123 155:155 240:240
## 414 123:123 159:159 240:246
## 415 123:124 155:159 240:240
## 416 124:124 155:159 240:240
## 417 121:123 155:157 246:256
## 418 121:121 157:157 246:246
## 419 123:133 157:165 246:250
## 420 121:121 155:155 246:256
## 421 121:123 155:155 246:256
## 422 121:123 155:157 256:256
## 423 121:123 155:155 256:256
## 424 121:123 155:155 246:246
## 425 121:123 155:157 246:256
## 426 121:123 155:157 256:256
## 427 121:126 155:165 236:242
## 428 121:133 155:165 242:250
## 429 122:126 155:155 236:236
## 430 122:126      236:242
## 431 126:126 155:155
## 432 122:126 165:165 236:236
## 433 114:114 157:161 240:242
## 434 114:126 157:157 240:242
## 435 114:121 157:161 240:246
## 436 114:114 161:161 242:242
## 437 114:126 157:161 240:240

```

```

## 438 114:114 157:157 240:240
## 439 114:114 157:161 240:242
## 440 114:114 157:157 242:242
## 441 114:126 157:157 240:242
## 442 121:121 157:157 240:252
## 443 121:121 157:157 240:252
## 444 121:122 157:161 240:242
## 445 121:122 157:161 242:252
## 446 121:121 157:161 252:256
## 447 121:122 157:161 240:244
## 448 121:121 157:157 240:252
## 449 121:121 157:157 252:252
## 450 121:124 157:161 240:244
## 451 121:121 157:157 240:240
## 452 121:128 157:157 240:244
## 453 121:121 157:157 244:244
## 454 128:133 155:157 242:244
## 455 128:128 157:157 240:244
## 456 121:128      240:240
## 457 128:128 157:157
## 458 121:128 155:157 244:252
## 459 121:122 155:157 242:244
## 460 121:128 157:157 240:244
## 461 122:128 157:161 244:252
## 462 128:137 155:157 240:240
## 463 128:137 155:157 240:240
## 464 128:128 155:157 240:252
## 465 128:137 155:157 240:252
## 466 128:128 155:155 242:252
## 467 128:128 161:161 252:252
## 468 128:133 159:161 242:242
## 469 128:133 155:161 242:252
## 470 133:133 155:161
## 471 133:133 155:155 242:242
## 472 133:133 161:161 242:242
## 473 133:133 155:161 242:242
## 474 128:128 155:161 242:252
## 475 128:128 155:155 242:242
## 476 128:128 155:155 242:242
## 477 128:133 155:157 242:242
## 478 128:133 155:157 242:242
## 479 133:133 155:157 242:242
## 480 133:133 157:157 242:242
## 481 133:133 155:157 242:242
## 482 128:133 155:155 242:242
## 483 128:133 155:157 242:242
## 484 128:133 155:155 242:242
## 485 128:128 155:157 242:242
## 486 121:121 155:161 240:242
## 487 121:137 161:161 240:252
## 488 121:137 155:161 240:252
## 489 121:121 152:161 242:242
## 490 121:137 152:161 242:252
## 491 121:137 152:161 240:252

```

492 121:137 161:161 240:240
493 121:137 155:161 240:240
494 121:137 152:155 242:252
495 121:137 155:161 240:252
496 133:137 155:157 244:256
497 133:133 155:155 244:244
498 121:133 155:155 244:256
499 133:133 155:155 244:244
500 135:137 155:157 244:244
501 124:124 155:155 244:256
502 124:124 155:155 244:244
503 128:133 155:155 244:244
504 133:133 155:157 244:244
505 121:133 155:155 244:252
506 121:128 155:155 244:244
507 133:133 155:155 244:244
508 128:128 155:155 244:244
509 124:128 155:155 244:244
510 121:128 155:155 244:252
511 128:133 155:155 244:252
512 133:137 155:159 244:244
513 128:133 155:155 244:256
514 128:137 155:155 244:244
515 126:133 155:155 244:244
516 121:133 155:155 244:256
517 128:137 155:155 244:256
518 143:150 152:155 242:246
519 143:150 152:152 242:242
520 143:150 152:155 242:242
521 121:150 155:157 242:242
522 121:150 152:157 242:244
523 133:150 152:159 242:256
524 121:150 152:155 242:252
525 143:150 155:157 242:256
526 121:121 157:159 242:246
527 122:122 155:155 242:246
528 122:122 155:167 242:256
529 122:122 155:155 242:242
530 122:122 155:155 242:242
531 122:122 155:155 242:242
532 122:122 155:155 242:242
533 122:122 155:155 242:246
534 121:122 152:159 240:240
535 133:137 157:159 242:262
536 122:137 155:157 244:256