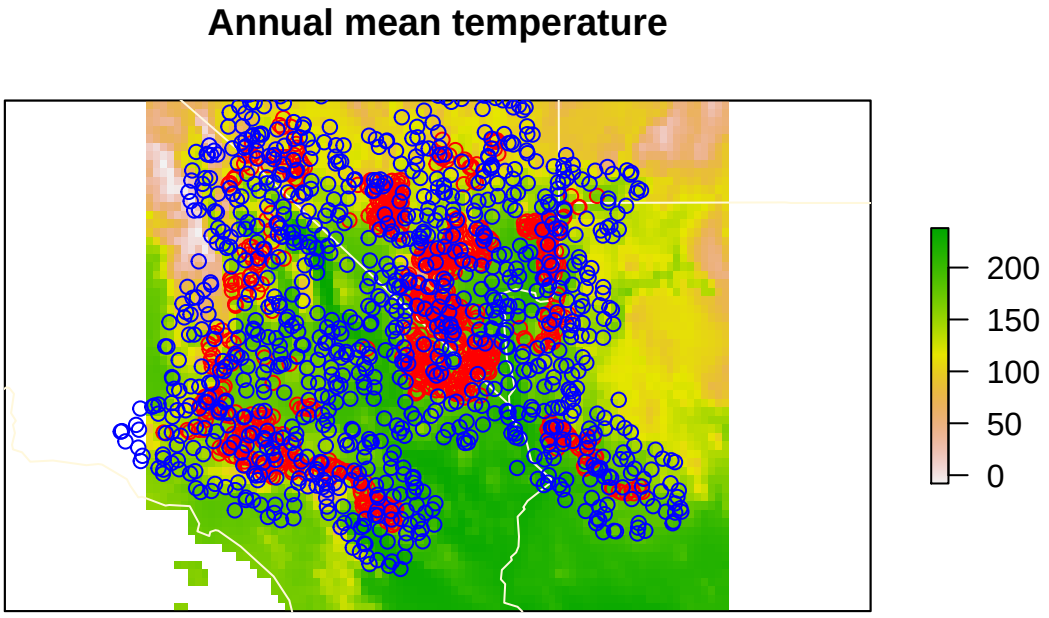
Week 8 Homework

Question 1

The 'trees2.csv' file in the Data folder is a subset of Joshua tree location we used for last week's homework and raster measurements of climate conditions ('ext5.grd') for the same area. Please add your lines codes in the following snippets of the codes to address the question I put in the comments:

```
# plot the trees
library(sp)
library(maptools)
library(maps)
library(mapdata)
library(dismo)

locs = read.csv(file="Data/trees2.csv", header=T)

# Generate psuedo-absence tree locations as background data

coordinates(locs)=c('lngitude', 'latitude')
proj4string(locs) = CRS('+init=epsg:4326')

x = circles(coordinates(locs), d=50000, lonlat=T)
bg = spsample(x@polygons, 1000, type='random', iter=1000)


# load the climate conditions raster datasets
clim = brick('Data/ext5.grd')

plot(clim, 1, cex=0.5, legend=T, mar=par("mar"), xaxt="n", yaxt="n", main="Annual mean temperature")
map("state", xlim=c(-119, -113), ylim=c(33.5, 38), fill=F, col="cornsilk", add=T)

# presence of trees
points(locs, col='red')
# psuedo-absense
points(bg, col='blue')
```




```
# extracting bioclim values for locations
presence_bc = extract(clim, coordinates(locs)) # for the presence points
bg_bc = extract(clim, bg) # for the pseudo-absence points

# put all the data including presence locations and related climate conditions into a data frame
presence_bc = data.frame(lon=coordinates(locs)[,1], lat=coordinates(locs)[,2], presence_bc)

# do the samething for background pseudo-absence data

bg_bc = data.frame(lon=coordinates(bg)[,1], lat=coordinates(bg)[,2], bg_bc)

length(which(is.na(bg_bc$bio1))) # double-check for missing data
bg_bc = bg_bc[!is.na(bg_bc$bio1), ] # and pull out the missing values


group_p = kfold(presence_bc, 5) # divide the presence data frame into 5 groups
group_a = kfold(bg_bc, 5) # same for bg_bc

## Till now, all the data prepreration has finished. Now your turn.
##  Based on the kfold results, choose one group (say group 2) as your
##  validation dataset, and use the other four groups as your training
##  data. Use MaxEnt to generate a presense probability map of Joushua
##  trees, plot it, output the accuracy measure. Please identify the
##  climate conditions that affect the most to the Joushua tree
##  distribution and explain how
```

Question 2

Please sign up on Google Earth Engine at https://signup.earthengine.google.com/#/. We will need it for one of the following courses, and it may take a while for Google to approve your request.