Using R programming language for Geographical Information System (GIS)

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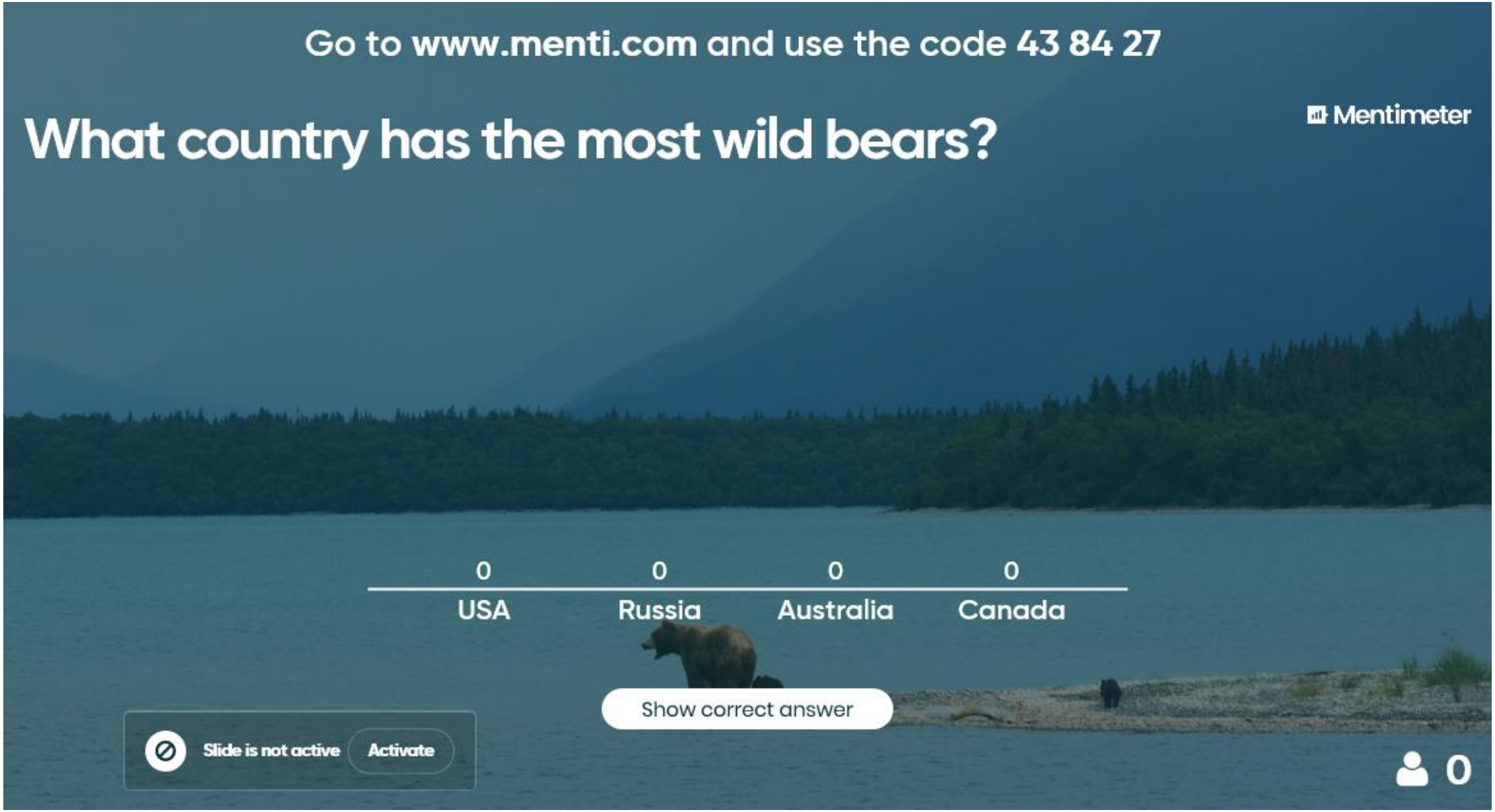
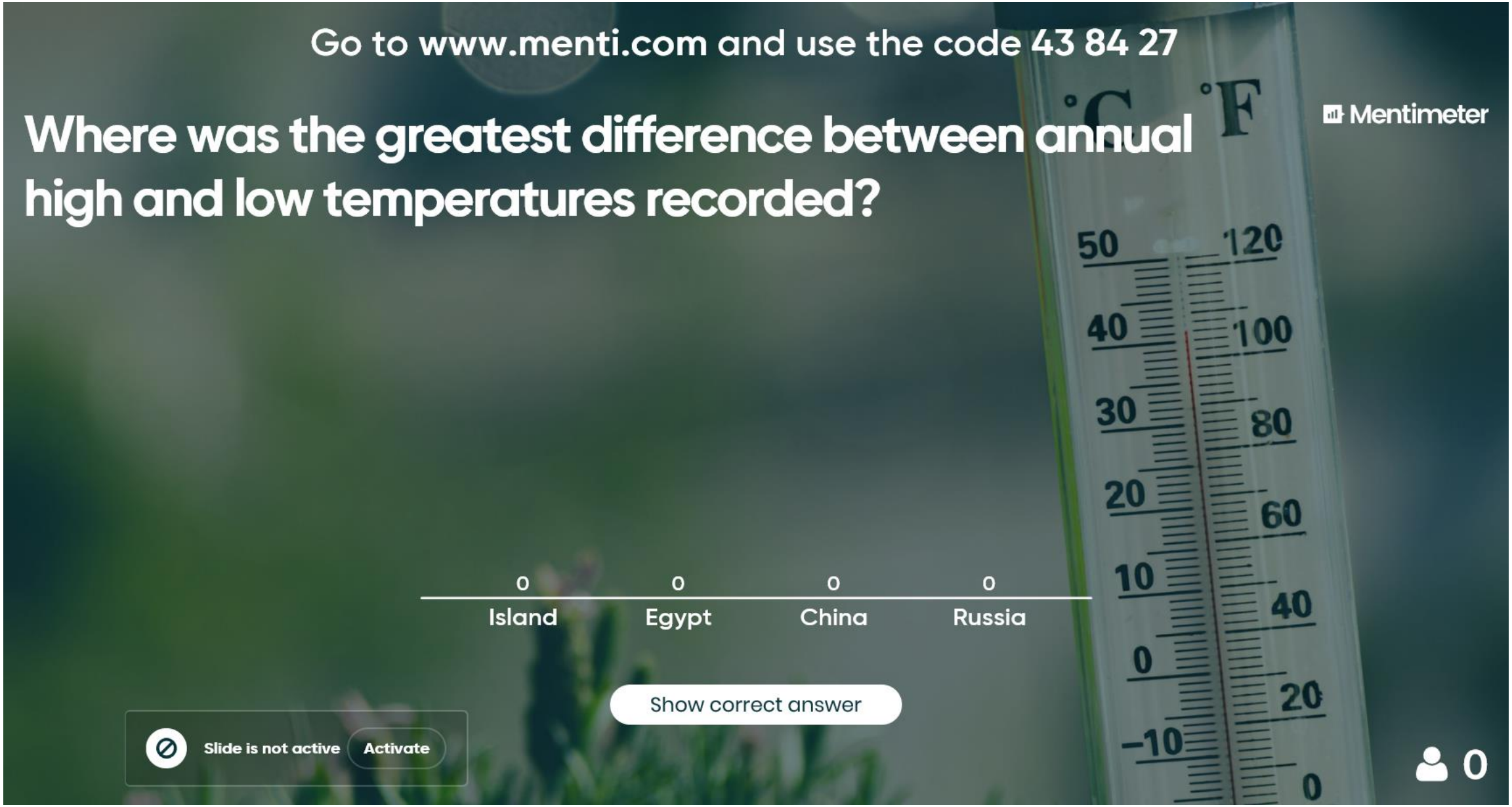
Before we start

Jupyter notebook with the files used in this tutorial can be downloaded at https://github.com/Rosariolacono/Species-distribution-tutorial


Go to www.menti.com and use the code 43 84 27
Mentimeter
What country has the most wild bears?
0
USA
0
Russia
0
Australia
0
Canada
Show correct answer
Slide is not active
Activate
0


Go to www.menti.com and use the code 43 84 27
Where was the greatest difference between annual high and low temperatures recorded?
Mentimeter
0
Island
0
Egypt
0
China
0
Russia
Show correct answer
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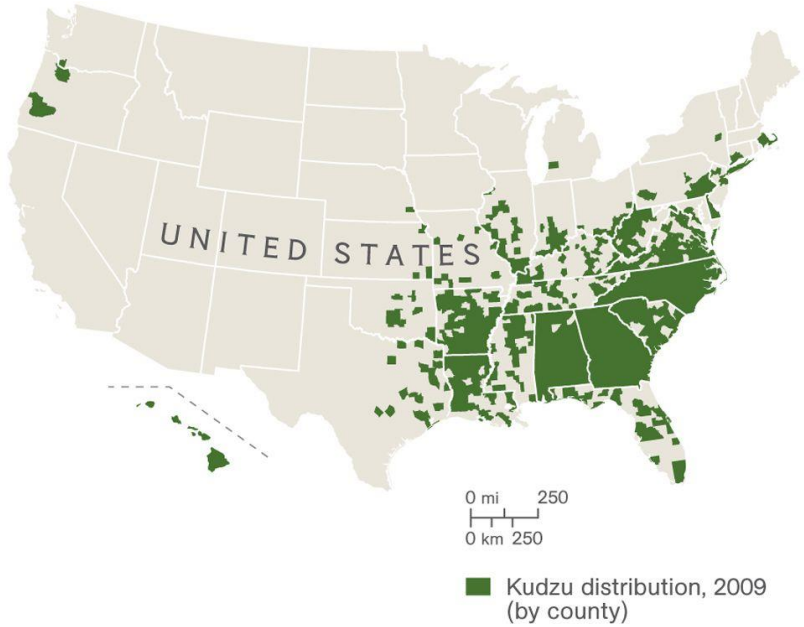
Activate
0

Species distribution

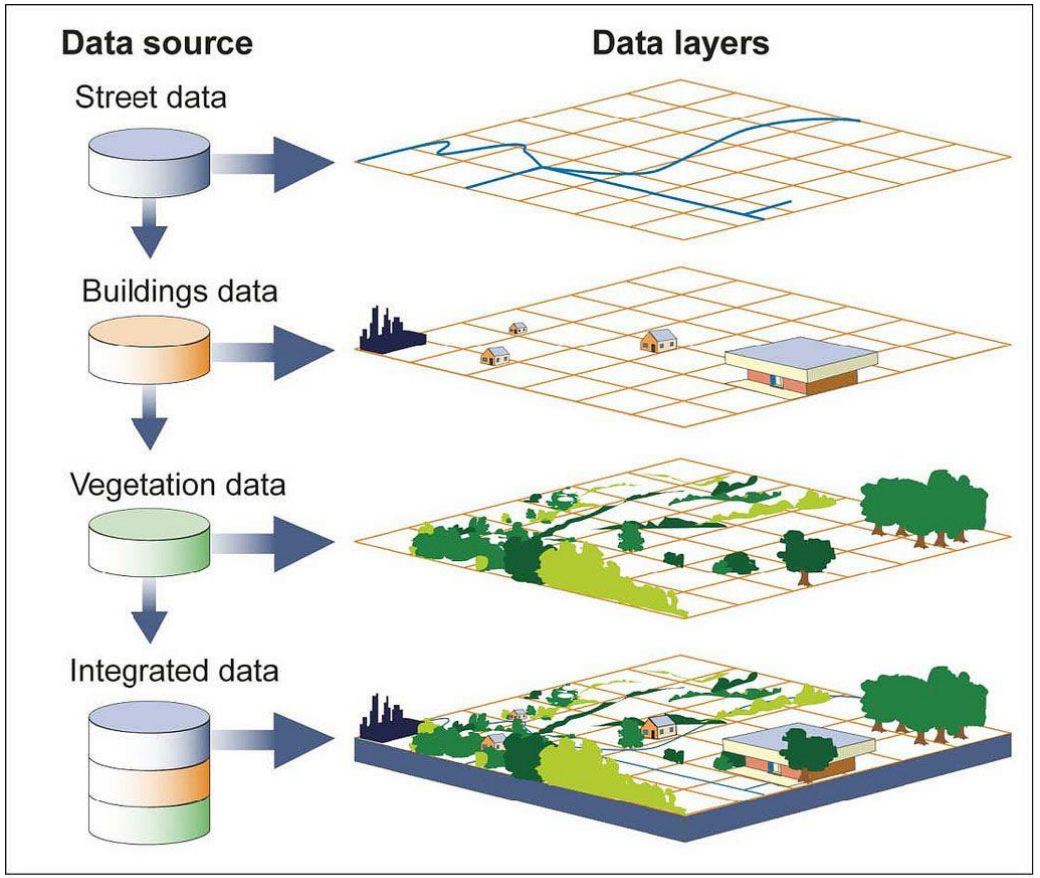
Kudzu is an invasive species of plant nicknamed "the vine that ate the South."



This map shows the distribution of kudzu in the United States in 2009.

Geographical Information System (GIS)

A geographic information system (GIS) is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.



Source: GAO.

R programming language

R programming language can be used a free alternative to GIS software

Attribute	Advantages of R	Drawbacks of R
User interface	Command line interface allows rapid description of workflow and **reproducibility**	Steep learning curve (eased by RStudio)
Visualising data	Sophisticated and customisable graphics	No dynamic zoomable canvas
Selecting data	Concise and consistent method using square brackets (e.g. “map1[x > y,]”)	Difficult to dynamically select objects from map
Manipulating data	Very **wide range of functions** through additional packages	Only single core processing
Analysing/modelling data	**Integrated processing, analysis, and modelling framework**	Sometimes more than one solution available

Packages

“sp” a coherent set of classes and methods for handling spatial data in 2005

“sf” implements the simple features open standard for the representation of geographic vector data in R

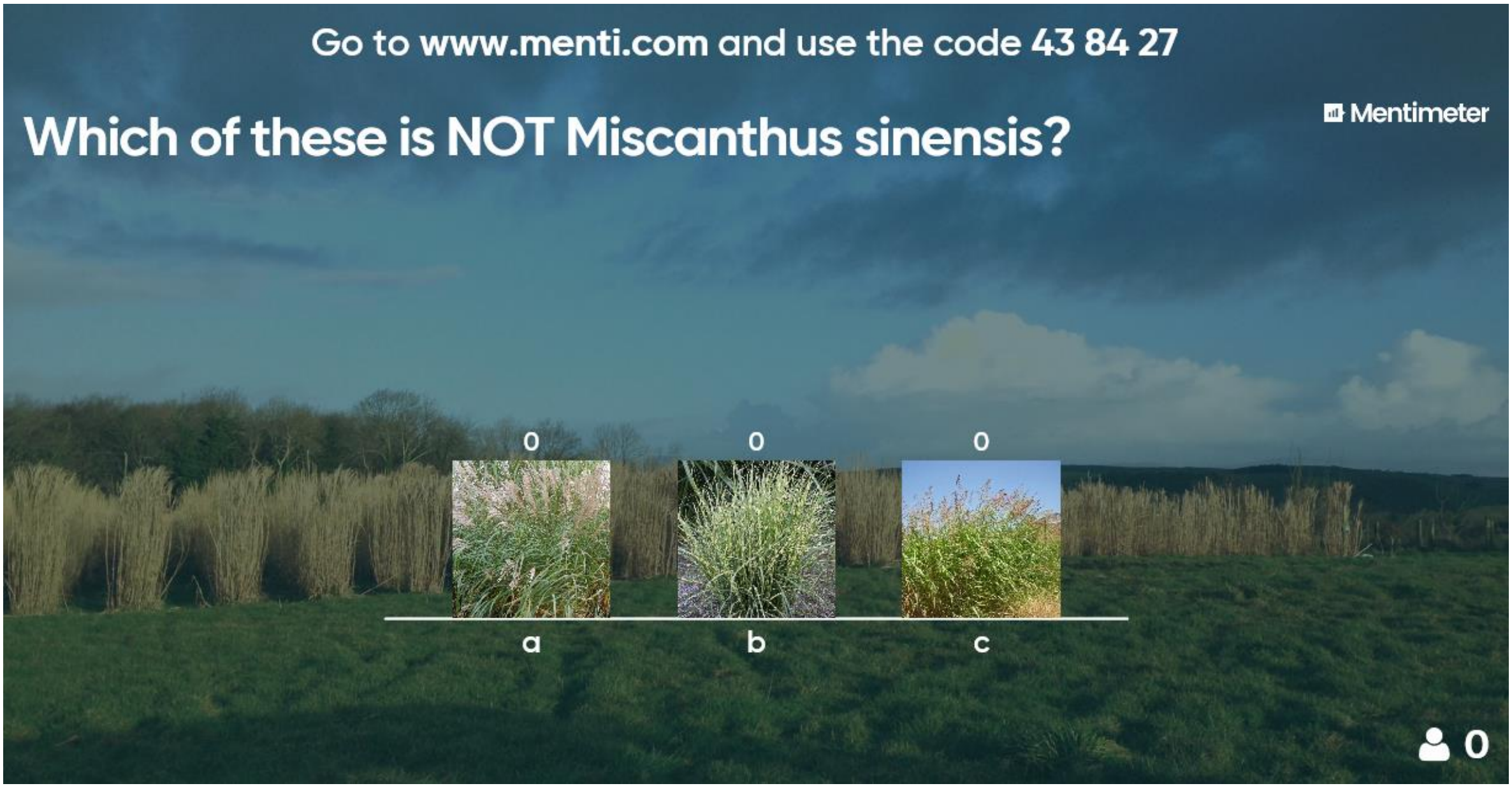
“dismo” functions for predicting entire geographic distributions form occurrences at a number of sites and the environment at these sites

“ggplot2” and “ggmap” for plotting according to the Grammar of Graphics

Go to www.menti.com and use the code 43 84 27

Mentimeter

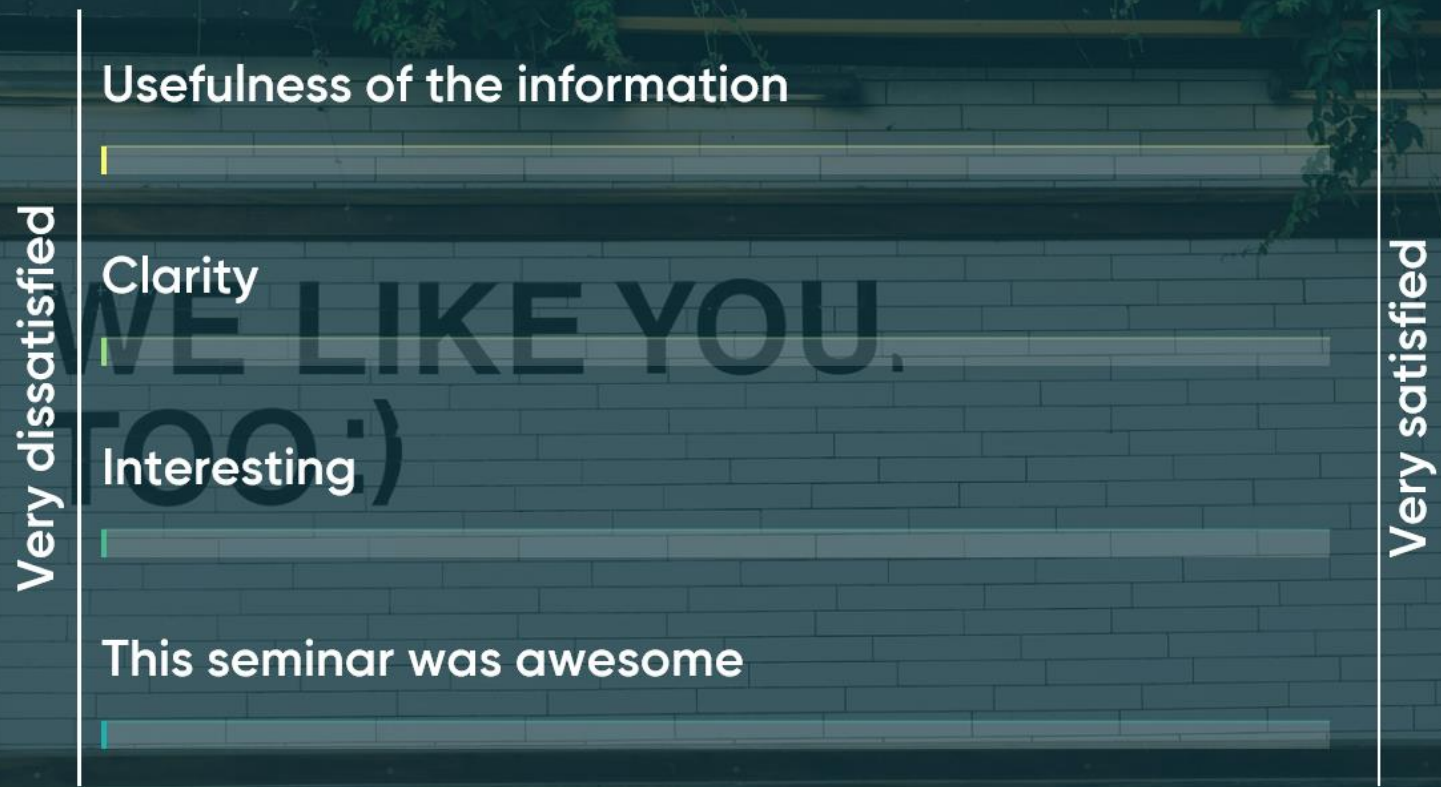
Which of these is NOT Miscanthus sinensis?



Go to www.menti.com and use the code 43 84 27

Please rate on a scale from 0-5

Mentimeter



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Useful links

Prediction Of Worldwide Energy Resources Project Data Sets
https://power.larc.nasa.gov/

More information about using R as GIS
https://www.jessesadler.com/post/gis-with-r-intro/

Thank you for your attention.

It is question o'clock!

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