Provenance: **VAST Challenge 2017**
Title: **Mini-Challenge 1**

Description:
Mistford is a mid-size city is located to the southwest of a large nature preserve. The city has a small industrial area with four light-manufacturing endeavors. Mitch Vogel is a post-doc student studying ornithology at Mistford College and has been discovering signs that the number of nesting pairs of the Rose-Crested Blue Pipit, a popular local bird due to its attractive plumage and pleasant songs, is decreasing! The decrease is sufficiently significant that the Pangera Ornithology Conservation Society is sponsoring Mitch to undertake additional studies to identify the possible reasons. Mitch is gaining access to several datasets that may help him in his work, and he has asked you (and your colleagues) as experts in visual analytics to help him analyze these datasets.

The Boonsong Lekagul Nature Preserve is used by local residents and tourists for day-trips, overnight camping or sometimes just passing through to access main thoroughfares on the opposite sides of the preserve. The entrance booths of the preserve are monitored in order to generate revenue as well as monitor usage. Vehicles entering and exiting the preserve must pay a fee based on their number of axles (personal auto, recreational trailer, semi-trailer, etc.). This generates a data stream with entry/exit timestamps and vehicle type. There are also other locations in the part that register traffic passing through. While hiking through the various parts of the preserve, Mitch has noticed some odd behaviors of vehicles that he doesn't think are consistent with the kinds of park visitors he would expect. If there were some ways that Mitch could analyze the behaviors of vehicles through the park over time, this may assist him in his investigations.

Ground Truth
There is a truck that visits a Ranger Station in a fairly remote part of the Preserve periodically throughout the dataset timeline that is illicitly dumping factory waste. It is registering in the data as a non-Ranger vehicle, visiting a Ranger-Stop. The dumping has a slight effect on the visits to the campground nearby.

Data
Contestants are provided with a description of how traffic through the Preserve appears and how traffic is measured through the sensors. They are given background information about the Preserve. They are given bitmapped files describing the gridded map against which the data is provided. Finally, the data is given in a .csv file. The .csv data contains: a timestamp of when the vehicle passed a sensor location, a car-id, a car type (as described in the background information), and a sensor identification (also described in the background. The sensors are identified on the labeled bitmap).
Download the data using your Rowan Account at
https://drive.google.com/file/d/1NEEWqkvGjYIHV9OP1xp2IZi9CAcg5HEC/view?usp=sharing

Contestant Questions
1. "Patterns of Life" analyses depend on recognizing repeating patterns of activities by individuals or groups. Describe up to six daily patterns of life by vehicles traveling through and within the park. Characterize the patterns by describing the kinds of vehicles participating, their spatial activities (where do they go?), their temporal activities (when does the pattern happen?), and provide a hypothesis of what the pattern represents (for example, if I drove to a coffee house every morning, but did not stay for long, you might hypothesize I'm getting coffee "to-go"). Please limit your answer to six images and 500 words.

2. Patterns of Life analyses may also depend on understanding what patterns appear over longer periods of time (in this case, over multiple days). Describe up to six patterns of life that occur over multiple days (including across the entire data set) by vehicles traveling through and within the park. Characterize the patterns by describing the kinds of vehicles participating, their spatial activities (where do they go?), their temporal activities (when does the pattern happen?), and provide a hypothesis of what the pattern represents (for example, many vehicles showing up at the same location each Saturday at the same time may suggest some activity occurring there each Saturday). Please limit your answer to six images and 500 words.

3. Unusual patterns may be patterns of activity that changes from an established pattern, or are just difficult to explain from what you know of a situation. Describe up to six unusual patterns (either single day or multiple days) and highlight why you find them unusual. Please limit your answer to six images and 500 words.