Lab 1
Due date: on or before 2/21/2014 6pm: submit on ublearns and demo it to TA

Goal: Learn to work with Processing Development Environment and to learn to solve problems using Processing.

Objectives:

Learn to (i) solve problem using Processing language (ii) use Processing Development Environment (PDE) (iii) use 2D primitives, color settings, image commands, mouse operations and the coordinate system of PDE.

Problem context:

Imagine the landscape and a scenario capturing American Prairie. If you cannot, search for the images representing “American Prairie”. Two representative images are shown below:

![American Prairie Landscape](image1.png)

The image on the left shows the American Prairie with grasslands in the fore front, the blue sky at the far end or upper half of the picture. It also shows the horizon with a mountain range and a few bushes far away. The picture on the right shows some of the inhabitants of the prairie, fox, hawk, butterflies, prairie dogs, buffalo etc.

Problem Statement¹:

Design an interactive sketch (Processing program) depicting the American Prairie. The top half of the sketch will represent the sky and the bottom half the grassland. Color the top and bottom of your sketch appropriately. User interaction involves placing the animals and other objects on the savannah by clicking the mouse the various points. As the user clicks on the top half various birds, cloud and similar objects in the sky are placed. If the user clicks on the grassland (lower half) animals, rocks and trees are placed. Object to be placed is selected randomly by the program. Make sure you keep track of the horizontal line position (as a variable) between the two halves since this will decide the type of animals to be placed in the respective half. One may also choose different sizes for the objects. For example, the size of clouds and rocks should shrink as the mouse click position approaches the horizon line. As an example see the size of the buffalo in the picture on the right. They are small (not because they are miniature but) because they are far away from user's view.

¹ Based on the lab suggestions given by the authors of the Processing 2 textbook by Greenberg et al.
We also want to add a couple of site seeing vehicles (jeeps) using rect and ellipse primitives. While one of the jeeps will be stationary, other jeep should be moving around slowly through the prairie.

**Implementation Details:**

- For the initial size of the sketch use 500 pixels by 500 pixels.
- When the mouse is clicked, test the mouse position in relation to the horizon to determine which object to draw.
- Your objects can be simple. For example, clouds could be made of multiple ellipses, flowers could be made with nested colored ellipses and a green rectangle, and rocks could be made of multiple rectangles. You may also get the objects from picture files from public sources or your own pictures.
- Use random number generator to use the object to be placed. This random number will decide the file name.
- Your code should use variables as appropriate and use comments.

Use the following structure for your header: Name box as shown below

```cpp
// Declare variables

void setup() {
  // Set up the drawing.
  // Draw the sky and the ground
}

void draw() { /* remains empty */ }

void mousePressed() {
  // Use the mouseY position to decide whether drawing on sky or on ground
  // Compute scale factor and call appropriate drawing function.
}

// You may rename this function, depending on what you choose as your sky object
void drawCloud( int x, int y, float scal ) {
  // Draw a cloud at the given coordinates using scale factor.
}

// You may rename this function, depending on what you choose as your land object
void drawRock( int x, int y, float scal ) {
  // Draw a rock at the given coordinates using scale factor.
}
```

**Submission:** Submit it ublearns 6pm before the due date.