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

Objectives: Learn to (i) solve problem using Processing language (ii) use Processing Development Environment (PDE) (iii) program with variables, assignment statements, selection statements and functions, (iv) use 2D primitives, color settings, image commands, mouse operations and the coordinate system of PDE.

Problem context: Imagine the landscape and a scenario capturing African Savanna. If you cannot, search for the images representing “African Savanna”. Six representative images are shown below: (i) day time (ii) duck and dawn (iii) night time with moon and the Milky Way.
The first image of the African Savanna has grasslands in the forefront, 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 acacia trees. The picture on the right shows some of the inhabitants of the savanna: giraffe, elephant, zebra, lion, vulture, etc. The next of images show the animals with the sun rising or setting. The next two feature the night sky and some nocturnal animals.

**Problem Statement:**

Part 1: (60%) Design an interactive sketch (Processing program) depicting the African Savanna. 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 vultures, 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.

Part 2: (30%) Now that you have collection of animals and objects, we will create two alternate scenarios for African Safari: day time and night time scenarios. The choice of what is display if “conditional” on the “sun” (round yellow circle) being in the sky and under the horizon. The horizon is roughly defined in our scenes by a horizontal line somewhat in the middle of the canvas. Depict day and night in the picture. This can be accomplished by sun-set and sun-rise. Include a sun object in your picture. When the sun comes of the horizon (upper half), the screen becomes brighter and only diurnal (day time) animals will be present in the scene. When the sun sets (or hides into the horizon or bottom) the scenario changes and only nocturnal animals appear. Some animal may be present for both day and night. For the day time scene “sun” is the only celestial body whereas for the night you could have the moon, the stars and the Milky Way (esp. being in Africa).

**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.
- Include a name box (shown below) in your program (5%).
- Formatting and internal comments (5%)
Use the following structure for your program.

// Header comments: Name box as shown below
/*********************/
/** Project: Interactive African Savannah  ***********/
/** Author: Your full name  *****************/
/** Email: your buffalo email  *****************/
/** Date of completion: 9/19/2014  *****************/
/** Course: CSE113 Fall 2014  *****************/
/*********************/

// 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 sky object
void drawRock( int x, int y, float scal ) {
    // Draw a rock at the given coordinates using scale factor.
}

void nightScene() {
}

void dayScene() {

Submission: Submit it ublearns as you did with the mock lab during the first week of your recitation.

Due date: 2/20/2015 by 5pm