CSE423: Computer Graphics
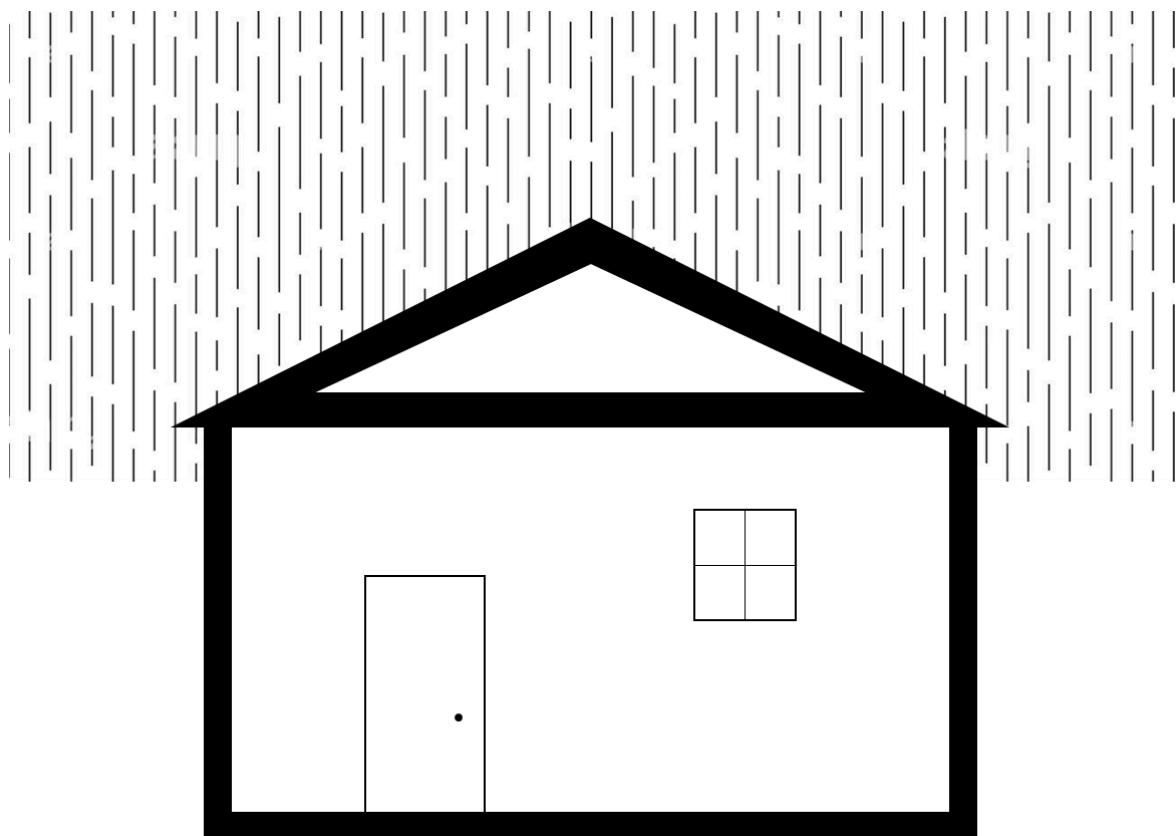
Lab Assignment 1

Important Instructions for the Assignment:

- Before starting this assignment, please ensure you have installed the mentioned OpenGL libraries in your System.

- The skeleton code is provided for completing the tasks, or you can design your own.

- For submission, **bring the relevant py files only(no need to copy opengl folder) in a separate folder, also paste the screenshot of different outputs in that folder for the assignment. Rename the folder into ID_name_labNo (ex. 17003456_md x_01), zip the folder and submit it. Failing to follow appropriate format in submitting will yield -10% penalty.**

- The deadline for submission is to be strictly maintained. **Late submissions will not be accepted.**

- **You must attend the lab viva for each assignment. Otherwise, you won't get any lab marks for that assignment.**

- Any form of plagiarism will automatically cancel your assignment and will be awarded with a **-100%** mark.. Please refrain from such activities.

Task 1: Building a House in Rainfall

i.   Draw a **house with a raindrop** using the base primitives: points, lines, or triangles. You can use **ONLY** *GL_POINTS*, *GL_LINES,* or *GL_TRIANGLES* for designing this house. A diagram has been provided as an example. **You can modify the house design to your liking. The rain drops should be animated to fall from top to bottom.**

ii.   It has been raining unwantedly for the last few days, so let's control its direction by designing a key that will change the direction of the rain when clicked (slightly bending the rainfall). Design this functionality such that the **left arrow** will gradually bend the rain to the left and the **right arrow** will gradually bend the rain to the right.

iii.   Formulate two more keys(**assign whatever key you like**); pressing one will gradually change the skin colour from dark to light simulating night to day, and the other will change it from light to dark simulating day to night . You must also consider the rain and the house visibility in different background colours.
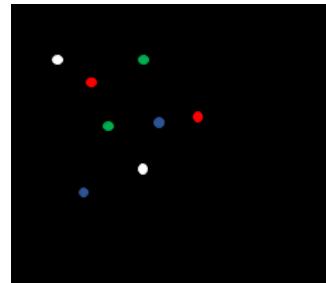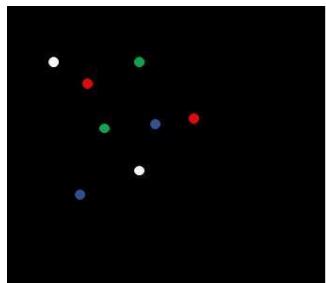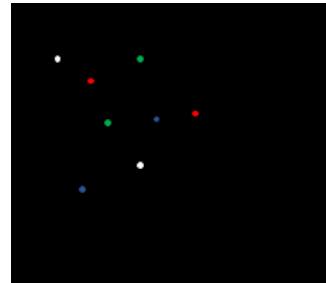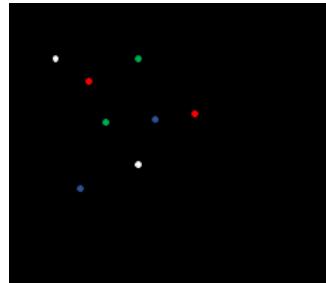
Task 2: Building the Amazing Box

Design a box with the following functionalities and ensure they all work independently and in any combination. Check out the gifs along with instructions for better understanding.

i. The **right button** click on a mouse will generate random movable points with different colours going **in any random direction diagonally within a boundary region**. For instance, if a point is generated at (0,0), it can go to (-1, 1), (-1, -1), (1,1), or (1, -1), and so on. The points should be spawned where the **right button** click will be given in the box and the colour and direction of movement should be random. **The points will continue to move in the same direction and will bounce back from the wall of the**

boundary. [Bouncing from the wall can be implemented by changing the sign of corresponding position update parameter]

ii.   Pressing the "**up arrow**" key on the keyboard will increase the speed of all the points generated so far and pressing the "**down arrow**" key on the keyboard will decrease the speed.

iii.   The **left button** click on a mouse will make the points blink i.e. if a point is in red, it will go background color(here it's black) and return to red, and this transition should take place within a second while the transition cycle goes on. [Think how you can easily implement this]

iv.   Pressing the "**Spacebar"** on the keyboard should freeze all the points and none of the above functionalities will work when frozen. The same "**Spacebar**" should unfreeze them.

Above pictures don't depict the full scenario

Submission guideline: You have to submit it in the classroom. Please follow the submission instructions carefully. Failure to follow will be subject to a mark penalty (20% to 50%).