!pip install tensorflow==1.15.0

!pip install -q lucid>=0.2.3

!pip install -q moviepy

import numpy as np

import json

import moviepy.editor as mvp

from google.colab import files

import tensorflow.compat.v1.gfile as gfile

import lucid.misc.io.showing as show

from lucid.misc.gl.glcontext import create\_opengl\_context

# Now it's safe to import OpenGL and EGL functions

import OpenGL.GL as gl

from OpenGL.GLU import \*

# create\_opengl\_context() creates GL context that is attached to an

# offscreen surface of specified size. Note that rendering to buffers

# of different size and format is still possible with OpenGL Framebuffers.

#

# Users are expected to directly use EGL calls in case more advanced

# context management is required.

WIDTH, HEIGHT = 400,400

create\_opengl\_context((WIDTH, HEIGHT))

# OpenGL context is available here.

print(gl.glGetString(gl.GL\_VERSION))

print(gl.glGetString(gl.GL\_VENDOR))

#print(gl.glGetString(gl.GL\_EXTENSIONS))

# Task 1

import random

i=0

gl.glClear(gl.GL\_COLOR\_BUFFER\_BIT)

gl.glPointSize(5)

gl.glBegin(gl.GL\_POINTS)

while i<50:

gl.glVertex2f((-1)\*\*random.randrange(2)\*random.random(),(-1)\*\*random.randrange(2)\*random.random())

i=i+1

gl.glEnd()

img\_buf = gl.glReadPixelsub(0, 0, WIDTH, HEIGHT, gl.GL\_RGB, gl.GL\_UNSIGNED\_BYTE)

img = np.frombuffer(img\_buf, np.uint8).reshape(HEIGHT, WIDTH, 3)[::-1]

show.image(img/255.0)

Graphical user interface, application

Description automatically generated

#Task 2

gl.glClear(gl.GL\_COLOR\_BUFFER\_BIT)

gl.glPointSize(5)

gl.glBegin(gl.GL\_LINES)

gl.glVertex2f(-0.5,0)

gl.glVertex2f(0,0.5)

gl.glVertex2f(0.5,0)

gl.glVertex2f(0,0.5)

gl.glVertex2f(0,0.5)

gl.glVertex2f(-0.5,0)

gl.glVertex2f(-0.5,0)

gl.glVertex2f(-0.5,-0.75)

gl.glVertex2f(0.5,0)

gl.glVertex2f(0.5,-0.75)

gl.glVertex2f(-0.5,-0.75)

gl.glVertex2f(0.5,-0.75)

gl.glVertex2f(-0.5,0)

gl.glVertex2f(0.5,0)

gl.glVertex2f(-0.25,-0.1)

gl.glVertex2f(-0.25,-0.35)

gl.glVertex2f(0.25,-0.1)

gl.glVertex2f(0.25,-0.35)

gl.glVertex2f(-0.25,-0.1)

gl.glVertex2f(0.25,-0.1)

gl.glVertex2f(-0.25,-0.35)

gl.glVertex2f(0.25,-0.35)

gl.glVertex2f(-0.1,-0.75)

gl.glVertex2f(-0.1,-0.5)

gl.glVertex2f(0.1,-0.75)

gl.glVertex2f(0.1,-0.5)

gl.glVertex2f(-0.1,-0.5)

gl.glVertex2f(0.1,-0.5)

gl.glEnd()

gl.glBegin(gl.GL\_POINTS)

gl.glVertex2f(0.05,-0.65)

gl.glEnd()

img\_buf = gl.glReadPixelsub(0, 0, WIDTH, HEIGHT, gl.GL\_RGB, gl.GL\_UNSIGNED\_BYTE)

img = np.frombuffer(img\_buf, np.uint8).reshape(HEIGHT, WIDTH, 3)[::-1]

show.image(img/255.0)

Graphical user interface, application

Description automatically generated