# CS535: Assignment #4 – Homework

**NAME: _____**
**TOTAL: _____ out of 100 points**

**Out**: April 21st, 2026
**Back/Due**: April 28th, 2026

**Objective:**
This objective of this assignment is to obtain a better understanding of some of the more recent topics covered in the course. All answers should fit in the provided space.

1. (20 points) **Lightfields**. You are an ant. Thus you only see light rays within a plane (i.e., 2D). Please describe a two-line-segment parameterization method to represent all light rays for image formation for an ant. Next, you want to form a "line of pixels" as seen from the ant (i.e., since the ant only sees lightfields in a plane, then the image is actually a line of pixels). Position the ant somewhere in the plane and describe how you would sample (i.e., form) a lightfield-based image, for a field-of-view of 60 degrees (approximately), from your database to define the color for each pixel.

2. (20 points) **NERFs**. Please describe using at least one diagram the basic idea behind how a trained NERF model is able to form an image, of for example a 60 degree field of view, of a scene.

3. (20 points) **Procedural Modeling.** Given the L-system below

$$F \rightarrow F[-F][+F]F$$

Assume a starting axiom of one vertical line segment 'F'. Please draw the result of each of three sequential rewriting steps. This means three drawings, one of n=1, n=2, and n=3.

4. (20 points) GANs. What is one of the main challenges in simultaneously training the discriminator and the generator in a GAN and what are strategies for helping/controlling their successful training?

5. (20 points) Please describe, with at least one diagram, the process of training diffusion models and how it pertains to image generation / graphics.