

The background features a vertical gradient from light green at the top to dark blue at the bottom. Overlaid on this are several faint, semi-transparent circular patterns. Some are solid lines, while others are dashed. A prominent circular scale on the left side has numerical markings from 140 to 260 in increments of 10. Other smaller circles and arcs are scattered across the frame, some with arrows indicating direction.

# KEEP MOWING A LAWN

BY: JUSTIN CONLEY

# PROJECT AND REQUIREMENTS

- **Project Description:**

- Simulate the driving of a zero turn lawn mower similar to driving a race car on a stand-up video game at an arcade.

- **General Requirements:**

- Two arms to manipulate speed and direction independently. ■
- Ability to set sensitivity of the arms. ■
- Could teach mechanics to new operators of a zero turn mower. ■
- Visually show the progress of the mower on the lawn. ■
- Account for stationary objects like trees and moving objects like “Frogger”. ■
- Design an algorithm for the mower to autonomously cut the lawn **efficiently**. ⚡

# PLAN OF APPROACH

- Use Unreal Engine 4
  - Use a game controller's joysticks for the "arms"
  - Use static meshes for realistic grass environment
  - AI features within the engine can be used for AI
- Use DS4Windows (Dualshock4Windows)
- Use Audacity/Wwise
  - Audio





# STEP 1: MAP DESIGN



# GRASS IMPLEMENTATION

- Attempt 1: “Landscape” with static mesh “Material” component.
- Attempt 2: Blueprint with static mesh component.
- Attempt 3: “Foliage” tool with collision properties.







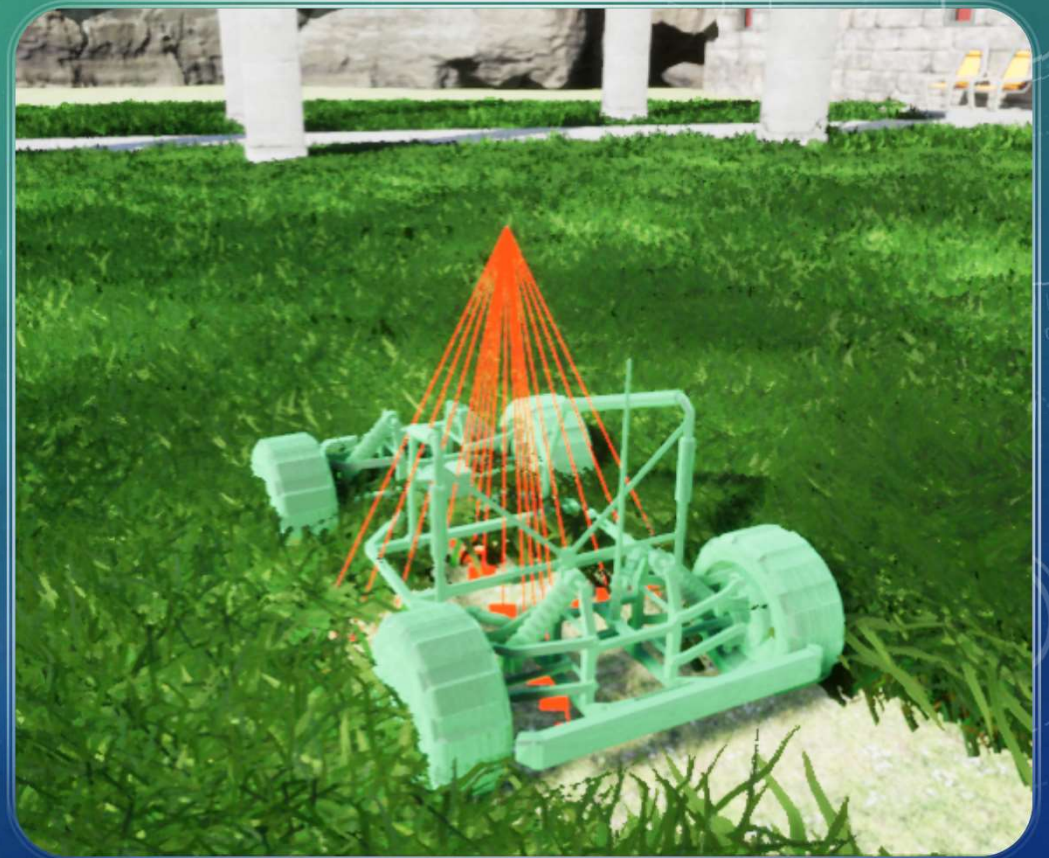




# STEP 2: CUTTING THE GRASS

# MOWER BLADES

- Mower Blade Area
  - Line Trace By Channel
  - Visibility



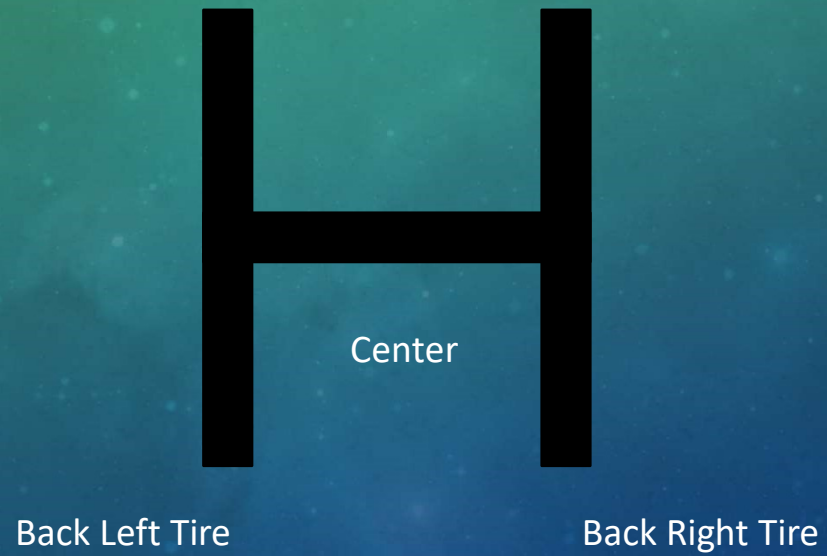


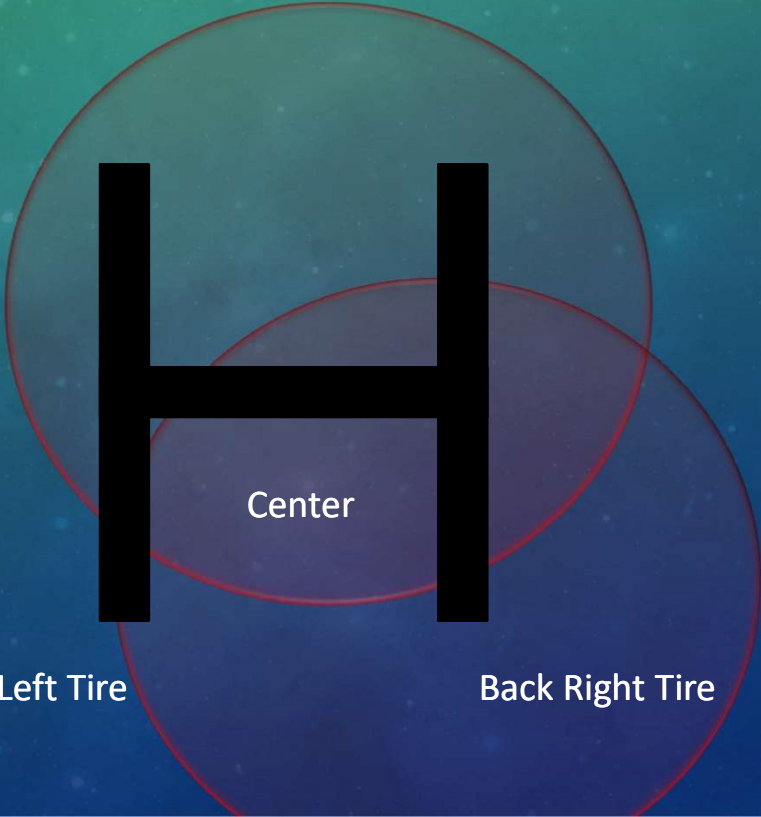
STEP 3:  
MOVEMENT MODEL

# TWO PHASES OF MOTION

- Position
- Rotation

# H DIAGRAM





Center

Back Left Tire

Back Right Tire



STEP 4:  
ADDITIONAL CONTENT



The background features a vertical gradient from light green at the top to dark blue at the bottom. Faint, semi-transparent technical diagrams are overlaid on the right side, including a large circular gauge with numerical markings (100, 120, 140, 150, 160, 170, 180, 190, 200) and several concentric circles with arrows indicating rotation or flow. The overall aesthetic is clean and modern, suggesting a focus on technology or engineering.

LETS MOW THE LAWN!

# FUTURE EXTENSIONS

- Advanced Lawn Mower Motion Physics
- AI Obstacles
- AI Lawn Mower
- Mathematical Efficiency Equation

# STRATEGIES

- Unreal Engine Default C++ Projects
- Unreal Engine Official Documentation
- [answers.unrealengine.com](https://answers.unrealengine.com)
- Youtube.com
  - Epic Games Training/Dev Days
  - Harrison McGuire
  - Various
- Stack Overflow
- Geogebra

# ESSENTIAL CLASSES

- CSCI 350 “Event Programming”
- CSCI 205/220 “Data Structures”
- CSCI 370 “Operating Systems”
- Math 203/303 “Linear Algebra/Advanced Linear”
- Math 350 “Modern Geometry”



QUESTIONS?



THANK YOU!