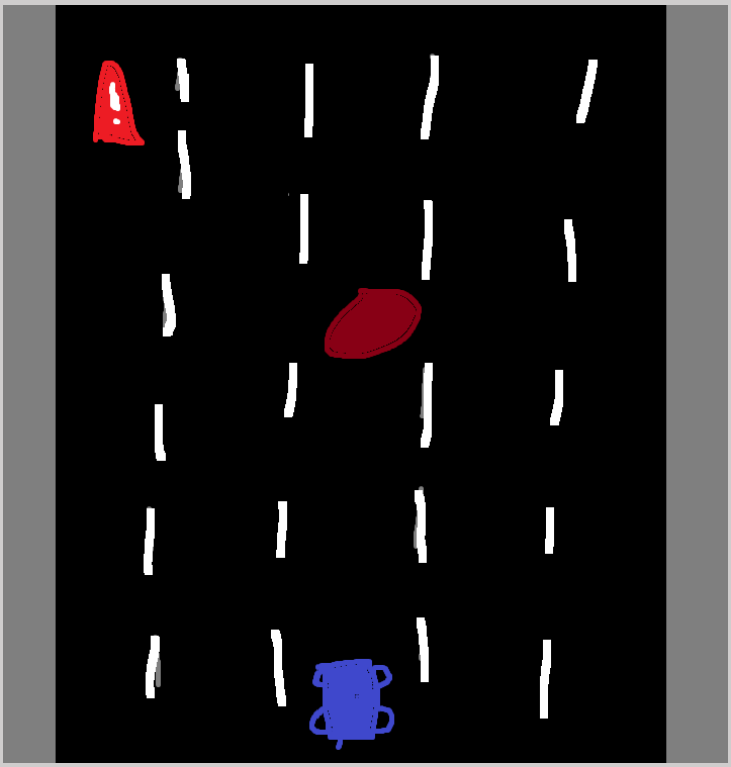
Concept PRIMA: Highway Racer

1: References, Core Thoughts:

- create a 2D browser racing game leaned on classical browser games in a 2D area
- Avoiding obstacles while the game gets harder / faster over time

2: First short concept as presented in the seminar



(first beautiful sketch)

0 Units and Positions

0 = middle, 1 = one track / 5 tracks

1 Hierarchy

- Game
  - Background (Texture)
  - Car
  - obstacles
    - signs
    - pothole
  - sounds

2 Editor: Editor to create single objects, add textures to them.

Coding to randomly place them, multiply objects in random occasions

3 Scriptcomponents: drehende Reifen, sich bewegende obstacles (mit transformationen)

4 Extend : Extends Node (alle Objekte/Obstacles die created werden sind Nodes)

5 Sound : Sound einfach an Soundknoten lokal angehängt, da 2D - kein sich „bewegender“ Sound nötig

- Autogeräusch bei bewegendem Auto, Crash Geräusch bei Aufprall

6 VUI: UI (Speed, Distance (km))

7 Event-System: Event messages to handle gameOver

8 External Data: Speed, obstacle quantity

9 Light: 2D –> ShaderLit (kein weiteres Licht nötig)

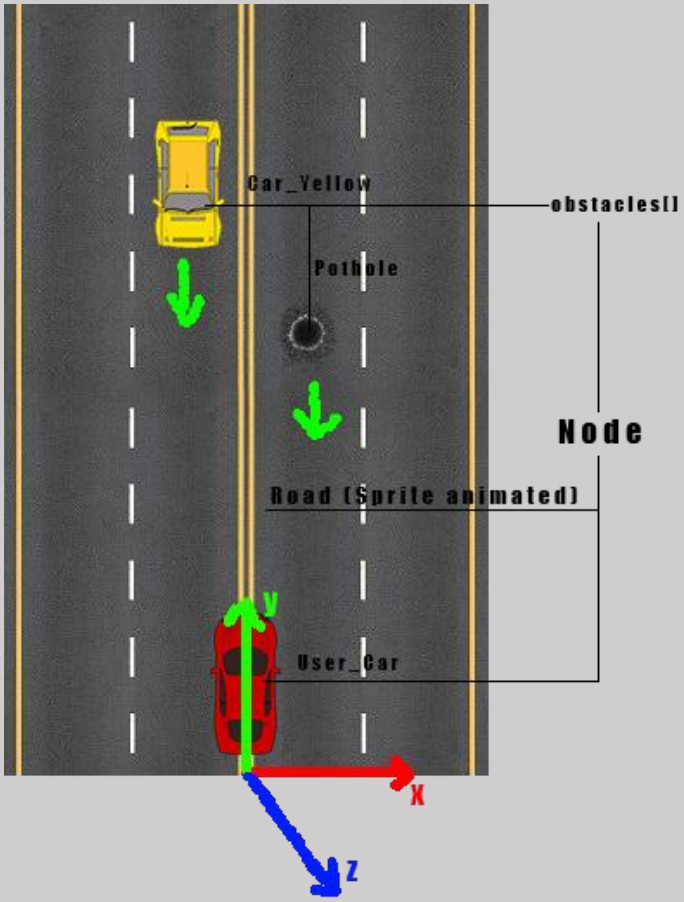
A Physics: Evtl. Aufpralleffekt mit obstacles (rigidbody an Car und obstacles)

B Net: not planned

C State Machines: not planned

D Animation: Sprites für bewegendes Auto (drehende Reifen, Auspuffgase

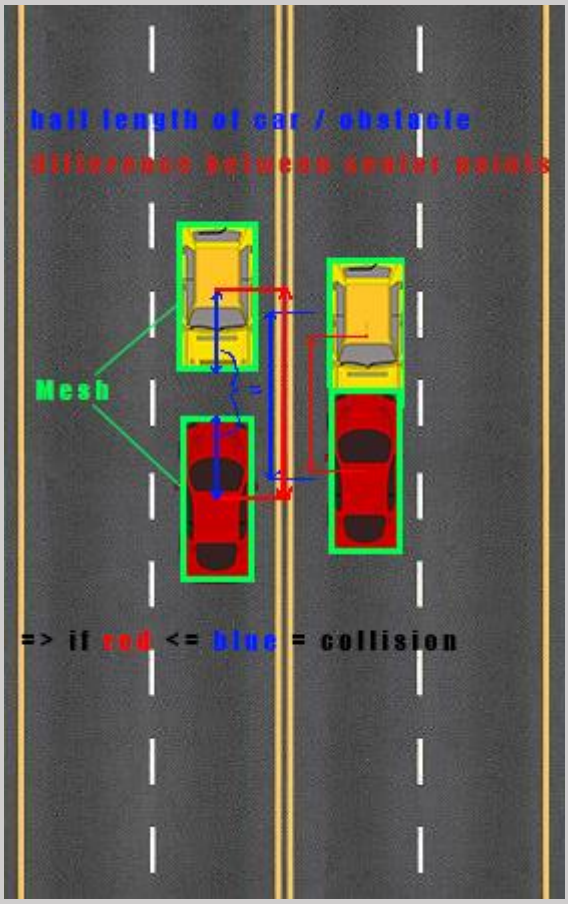
3: Advancing Concept



core Ideas / concepts:

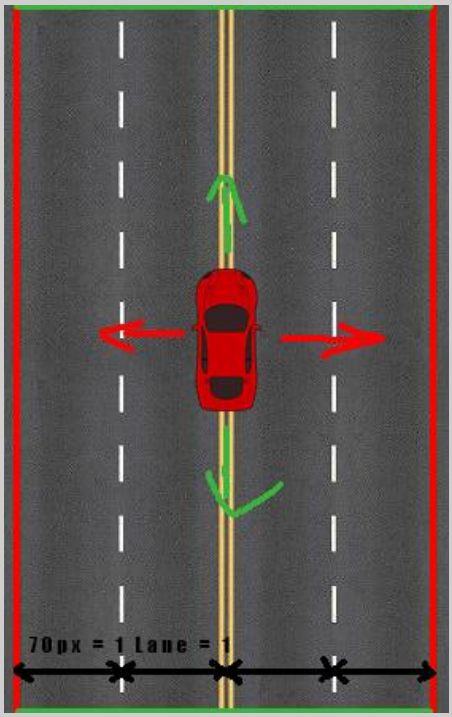
- Nodes built with mesh sprites and textures (no z value needed) – just 2D
- random creation of obstacles over time
- obstacles translating with negative y values
- User car being controlled to move in x and y direction
- Achieving the feel of moving on the road by creating a sprite for the road to make it appear moving at different speed by setting the framerate

4: Game Logic



collision detection:

- Decided to use a mathematical function of comparing x and y values to detect a collision - x value collision follows the same example
- => no Physics system as planned earlier. reasons: 2D game, no Z axis needed, for me easier to implement and more intuitive for a 2D system than having 3 dimensional rigid bodies



car movement

- translation of the car node in x and y direction
- set up limits in x and y to have the car stay on the road
- as my 0 is in the middle – and one lane is 1 step = x range = -1,5 to 1,5
- y borders: 0.6 at the bottom (to start the car slightly above), 5.8 at the top (after testing camera setup and zoom out) for best visual outcome

- more results from this setup: defining one lane as 70 pixels to set up the road sprite
- obstacles being spawned at y value of 7 to spawn above the visual viewport to slowly “drive” into the game

game speed

- set gameSpeed up as a general value impacting all other speed values in the game (to easily mod it in the config file)
- in general representing the speed of the car => set up logarithmic to represent a cars acceleration
- other values affected: road framerate, obstacle speed, spawntime interval of obstacles

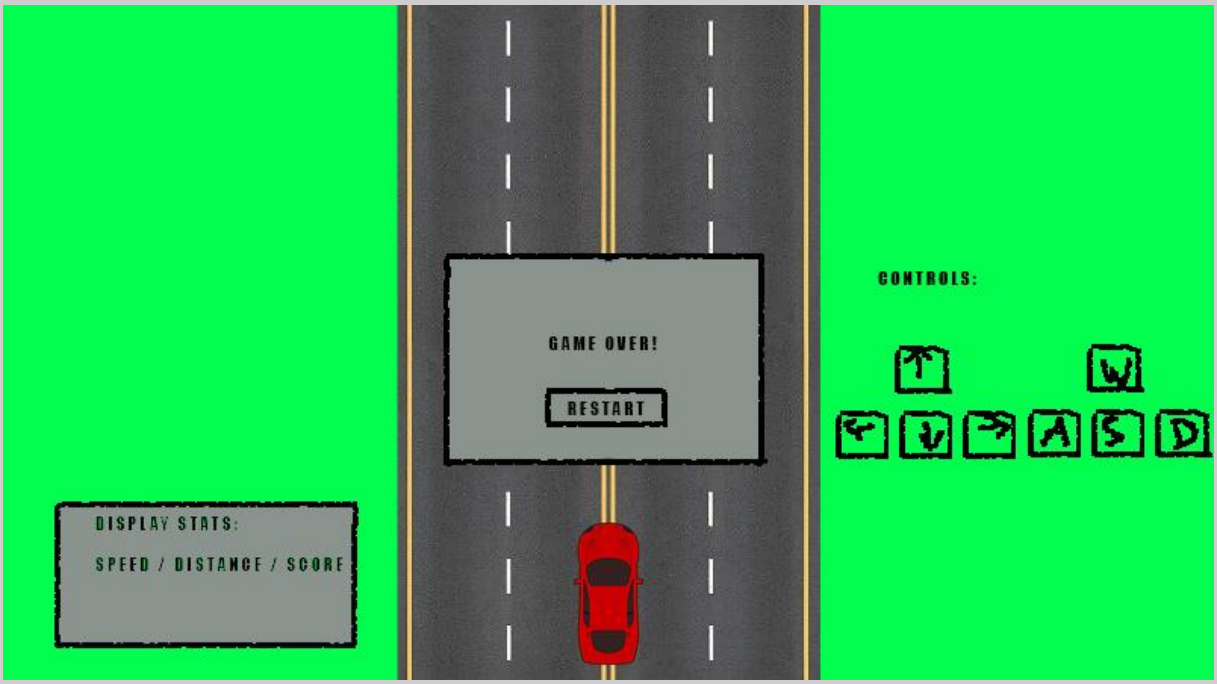
obstacle Creation:

- each obstacle gets set different properties (scale, speedmodifier depending on its texture
- gets spawned at x value of one of the 4 lanes (-1,5; -0,5; 0,5; 1,5)and on y = 7
- spawned in intervals (6-10 seconds in the beginning), intervals decreasing over time (see game speed) to ensure some randomness and make it more challenging over time

score calculation:

- score value gets increased every time an obstacle is passed (car.y > obstacle.y) – using car and obstacle center values
- To ensure each obstacle only counts once each Instance of the class Obstacle gets a boolean value “passed” that gets set to true whenever it got passed

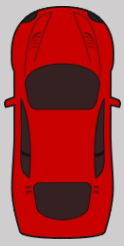
5: VUI Concept



- game over screen only shown after collision
- controls and game stats showing at game runtime
- green = background image to add some landscape next to the road

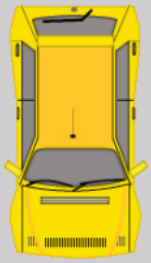
5: Textures Overview

User_car:



(Source: https://opengameart.org/content/red-car-top-down)

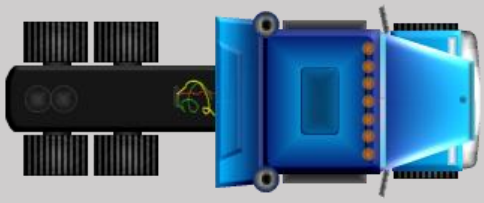
obstacles:



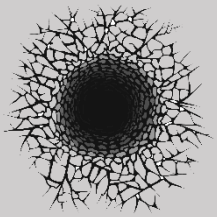
car_yellow: (source: https://gamesupply.itch.io/cars-and-trucks)

car_white (source: https://gamesupply.itch.io/cars-and-trucks)

Police sprite (source: https://opengameart.org/content/free-top-down-car-sprites-by-unlucky-studio)

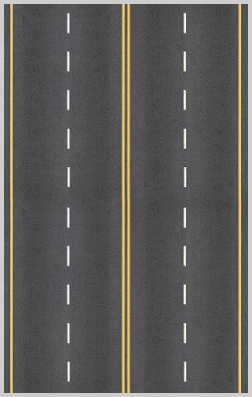


Truck: (source: https://gamesupply.itch.io/cars-and-trucks)



Pothole: (source: https://www.freepik.com/free-vector/big-hole-cracked-earth-background-earth-crack-surface-crack-ground-hole-crack-disaster-crack-land-illustration_13437736.htm#query=breaking%20wall&position=17&from_view=keyword&track=ais)

Road:



(source: https://www.dreamstime.com/stock-illustration-seamless-texture-highway-asphalt-road-yellow-white-markings-image69686438)

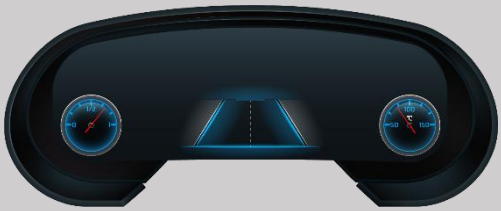
Background:

(source: https://www.freepik.com/free-vector/beautiful-illustration-sunny-landscape_16607912.htm)

Game Over Screen:

(source: https://de.freepik.com/vektoren-kostenlos/aufkleberdesign-mit-autowrack-isoliert_18233247.htm#query=red%20car%20crash%20sign&position=0&from_view=search&track=ais)

Car Panel:



(source: https://www.freepik.com/free-vector/car-digital-dashboard-screen-with-glowing-blue-speedometer-tachometer-fuel-level-engine-temperature-indicators-scales-realistic_4997649.htm)

Exhaust Sprite:

(source: https://de.freepik.com/vektoren-kostenlos/cartoon-element-animationsrahmen_13862945.htm#query=exhaust%20sprite&position=6&from_view=search&track=ais)

Start_Screen:

(source: https://de.vecteezy.com/vektorkunst/13074229-perspektive-asphaltstrasse-in-richtung-horizonthintergrund)