Java Nextbot

Introduction to Computer Graphics

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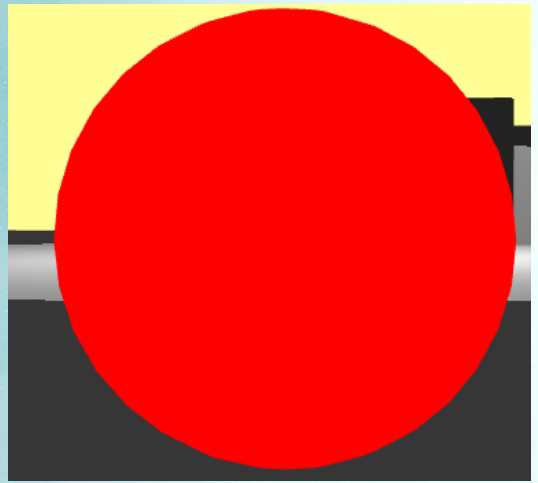
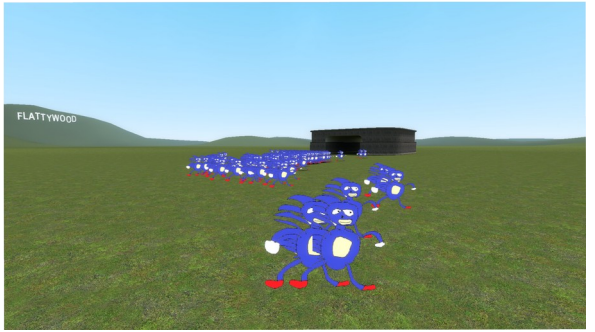


- URL: https://joaobastos023.github.io/javanextbot/

What is the project about

- Inspired from a physics-based sandbox game, **Garry's Mod**
- Escape from a mall and avoid getting caught



- Project made using only three.js

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Models and SceneGraph

Red Sphere (don’t get caught by it)

- SceneGraph: PointerLockControls, SpotLight, PointLight, Mesh with Texture applied, group with mesh and a PointLight

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Animations

- Check for collision:
  - Player and walls
  - Player and chaser (game over)
- Chase action
  - Vector calculated with player's position and chaser's position

```
const direction = new THREE.Vector3().subVectors(playerPosition, chaser.position).normalize();
const speed = 0.05;

// Try to move in the intended direction
const intendedMove = direction.clone().multiplyScalar(speed);
const intendedPosition = chaser.position.clone().add(intendedMove);
```

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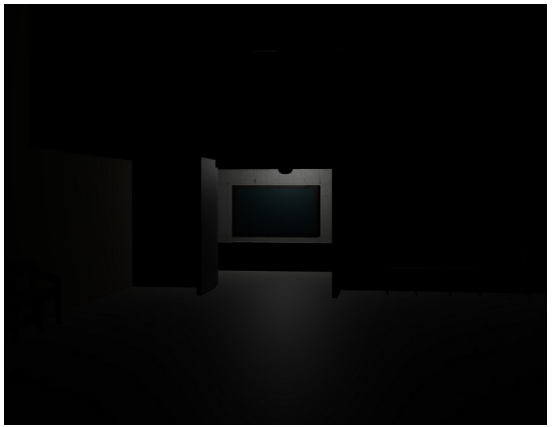
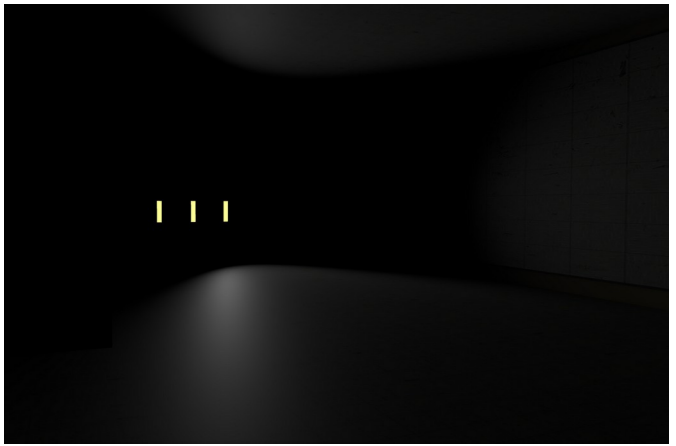
Illumination

- Spotlight – simulate a flashlight that the player is holding.
- Pointlight – a ceiling lamp placed to catch the player’s attention
- Other Spotlights – Simulate a Cinema projector and other to reproduce light coming from outside





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User Interaction

- WASD – Move the player around the scene.
- F – Turn off and on the flashlight
- Shift – Hold to crouch
- P – Pause the game and see map
- Move mouse to look around

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Development

- Some functions are exported from different JavaScript files to maintain organization.
- Files are named into different caregories: chaser, collisions, resetGame, generator

Difficulties

- Model imported from the web came with meshed materials, making it difficult to separete and create boxes from them for collisions. Boxes were manually added, so lot’s of models, the player can pass though them.

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Collision

```
function isColliding(obj, obstacle) {
    // Ensure world transforms are updated
    obj.updateMatrixWorld();
    obstacle.updateMatrixWorld();

    const objBox = new THREE.Box3().setFromObject(obj);
    const obstacleBox = new THREE.Box3().setFromObject(obstacle);

    return objBox.intersectsBox(obstacleBox);
}
```

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References

- https://threejs.org/docs/
- https://sketchfab.com

DEMO

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