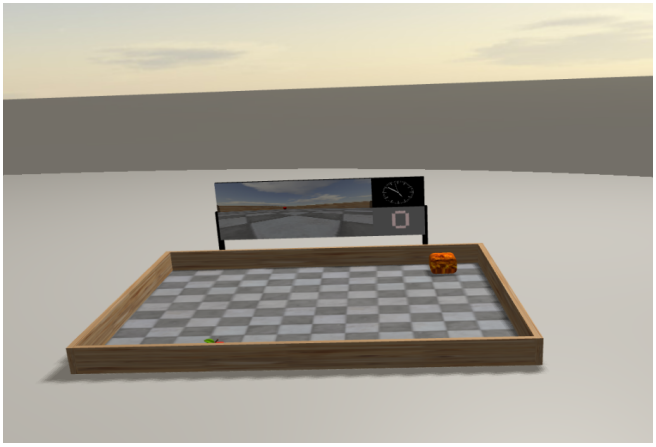
Assignment 4: Spice up your snake game

In this lab you'll extend your snake game from lab 1 to make it a bit more interesting.



1 Requirements

1. Place the playing field on a large gray ground inside a sky box. Use the textures in the `skybox` subdirectory of the `resources` directory for the sky box.
2. Add a spot light and ambient light to the scene. Tune the light intensity properly.
3. Increase your playing field to a size of 12×12 while leaving the size of a unit cell at 1×1. Also remove the camera motion. Position the main camera at a convenient initial position.
4. Apply the file `FloorsCheckerboard_S_Diffuse.jpg` as a texture map and the file `FloorsCheckerboard_S_Normal.jpg` as a normal map to the playing field. Configure the textures such that one unit cell of the playing field is covered by exactly one square of the checkerboard pattern.
5. Add walls of height 1 as boundaries to the playing field and apply the texture `hardwood2_diffuse.jpg` to the walls. Set the repeat-wrapping factor along the boundaries to a value of 3. Use the file `hardwood2_bump.jpg` as a bump map and set the bump scale to a value of 0.1.
6. Use cubes with rounded corners for the snake (see code example in the documentation of `THREE.ExtrudeGeometry`, use a value of at least 8 for the `bevelSegment` parameter). Apply the `lavatile.jpg` texture to the cubes. Use any colors you like for the snake cubes but make sure that the head is distinguishable from the rest of the snake.
7. Replace the red ball by the apple geometry defined in the file `Apple.obj`. Scale and position the apple object such that it is located on the playing field and conveniently fits into one unit cell. Apply the texture file `Apple_BaseColor.png` to the apple object. Also apply the file `Apple_Normal.png` as a normal map and the file `Apple_Roughness.png` as specular map.

8. Add a display board showing the snake game with a camera located at the head of the snake and looking into the direction of motion of the snake (Hint: implement this with a render target, see chapter 12 of the lecture).

9. Make sure that the snake, the apple, the boundary walls and the display board cast shadows on the ground and the playing field.

2 Hints

- The demo video also shows a clock and a score counter on the display board. Feel free to implement this, as well, but that's just optional.
- All textures files, the sound files and the Apple geometry definition file are located in the `resources` directory.
- If you find more suitable texture files, feel free to use them.

3 Coding style

Stick to the coding style guide which can be found in the `README.md` file for chapter 3 in the gitlab repository.

4 Handing in the solution

No group work allowed. Every course participant has to write her or his *own* code! Submit your code by creating a zip-archive from the folder `Assignment4` and upload it to the Moodle page. The app should run without further modification by unpacking the zip file and loading the html-file through a web server.