Visual Computing - Assignment 2

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Idea

- A game prototype where you should navigate a 3D cubic labyrinth;
- The scene will be mostly dark, and the player will have the ability to light it using a spotlight and lamps spread throughout the map;
- The inside layout is occluded by walls and windows. The player has to position the camera in order to get a better view;
- The map will be populated with objects and mobs;
- Implemented in Python with Panda3D.

Topics

- Viewing and Transformations
  - Translation: The player's movement in the cube;
  - Rotation: The player is looking to the direction it's heading (Rotation around the origin) and an animal rotating around the cube (Arbitrary point rotation);
  - Scale: Scenario mobs with random scale.

Topics

- Viewing and Projections
  - Camera:
    - Outside view into the scene;
    - Manually rotate around the map;
  - Projection:
    - Most of the time, the projection will be in perspective;
    - Random events toggle the projection as a glitch effect (between perspective and orthogonal).

Topics

- Illumination:
  - Spot light source: The mouse direction, as a flashlight;
  - Point light source: The resource which the player can place on the map;
  - Directional light source: moon;
  - Ambient light: for objects;
- Shading:
  - Mobs will have a random choice about Flat or Phong shading;
  - Random event: lightning strike illuminates the whole scene for a brief moment (no shading by lighting, direct color).

Topics

- Geometric Modelling:
  - Player model, objects' models and mobs' models;
  - Map mesh dynamically created in rectangular blocks/walls;
- Textures:
  - Wall and models' textures;
  - Bump/normal mapping: applied to the walls;
  - Mapping styles: tiling on the walls;
  - Displacement map: place the labyrinth cube on top of terrain with displacement mapping.

Challenges

- Building a consistent-looking map:
  - Since the labyrinth is made of rectangular blocks we need to synchronize the textures in adjacent blocks, with the appropriate UVs and tiling;
- Tune the lights so as to properly illuminate the poorly lit scene, determine which cast shadows on what;
- Setup the layout of the cube so that it’s not extremely difficult to navigate, make it adequately visible and not occluded.

Questions?