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Exercise Sheet 1

Assignment 1.1 Circle Calculation [3 Points]

As an introductory example, write a C++ program that calculates the area and circumference of a circle. The user should be prompted to input the radius interactively. If the input is invalid, show a respective error message. A correct result should be displayed together with an appropriate output message. For π, please use the approximation of 3.1415.

Assignment 1.2 Scene Manager Class [7 Points]

In this task, we will create a simple 3D scene manager class. Each scene consists of multiple mesh objects. It should be possible to add a new mesh object to the scene and input the following properties:

- ID of object (can be assigned automatically),
- number of vertices,
- vector position of center,
- number of faces,
- name (need not be unique), and its
- scaling properties (only use one scale value).

Store the mesh objects in a single-linked list.

a) Design a data structure based on the exercise description for the scene manager class and a mesh object. [*1 Point*]

b) Implement the interaction with the program based on simple command line requests followed by user inputs, including the following actions: [*3 Points*]

- add a new mesh object,
- remove a mesh object,
- list the existing objects in ascending order, and
- exit the program.

c) When the program is terminated, the current objects should be stored in a text file. Hint: Separate the properties by a newline. [*1.5 Points*]

d) The saved data has to be read in from the file the next time the program is run. [*1.5 Points*]

Submission: October 22, 2019, 14:15 CEST, via Moodle