

CMPS385: Assignment 5

Authors:

Ahmad Ghizzawi and Chukri Soueidi.

Run Instructions

```
$ make  
$ ./main
```

Changes Overview

Part 1:

Task 1:

- Imported `sgutils.h` and looked at the `dumpSgRbtNodes(..)` function.
- Read and used the data structure (list) suggested in the appendix.
- Added global variables `g_currentKeyFrame`, an iterator of `g_keyFrames` (a list of `RigTForm` vectors), and `g_rbtNodes` (vector of pointers to `SgRbtNodes`).
- Implemented the hotkeys required. N.B.: Keys 'i' and 'w' import and export a file *key.frames*, which is expected to be located in the cwd. This required adding and implementing `serialize/deserialize` functions in `quat.h`, `cvec3.h`, and `rigTForm`.

Task 2:

- Added the function `pow` and `cn` to `quat.h`.
- Implemented `slerp()` and `lerp()` functions and added a function called `slerpLerp()` for convenience. We referred to the book for the exact implementation.

Task 3:

- Added and implemented the functions `animateTimerCallback()` and `interpolateAndDisplay()` as suggested.
- Implemented the hotkeys required to play/stop as well as '+' and '-' by decreasing/increasing `g_msBetweenKeyFrames`.

Part 2:

- Added and implemented the functions `catmullRomInterpolate()` and `catmullRomInterpolateAndDisplay()` that animate using Catmull-Rom splines as explained in Chapter 9 of the book.
- Added the hotkey 't' to toggle between the linear and Catmull-Rom interpolation. Please note that Catmull-Rom is the default value.