Sceneview ReadMe

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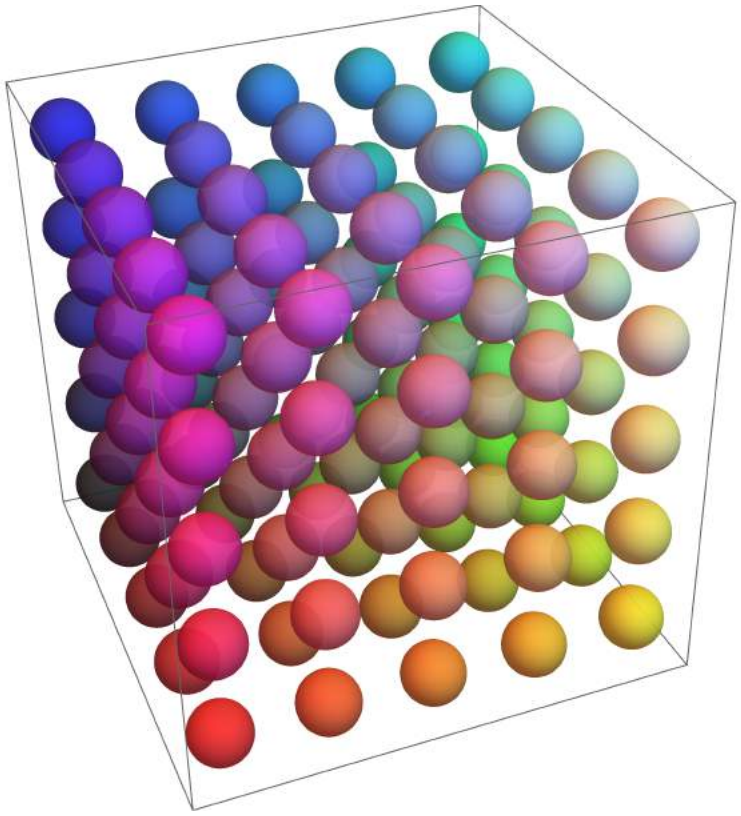
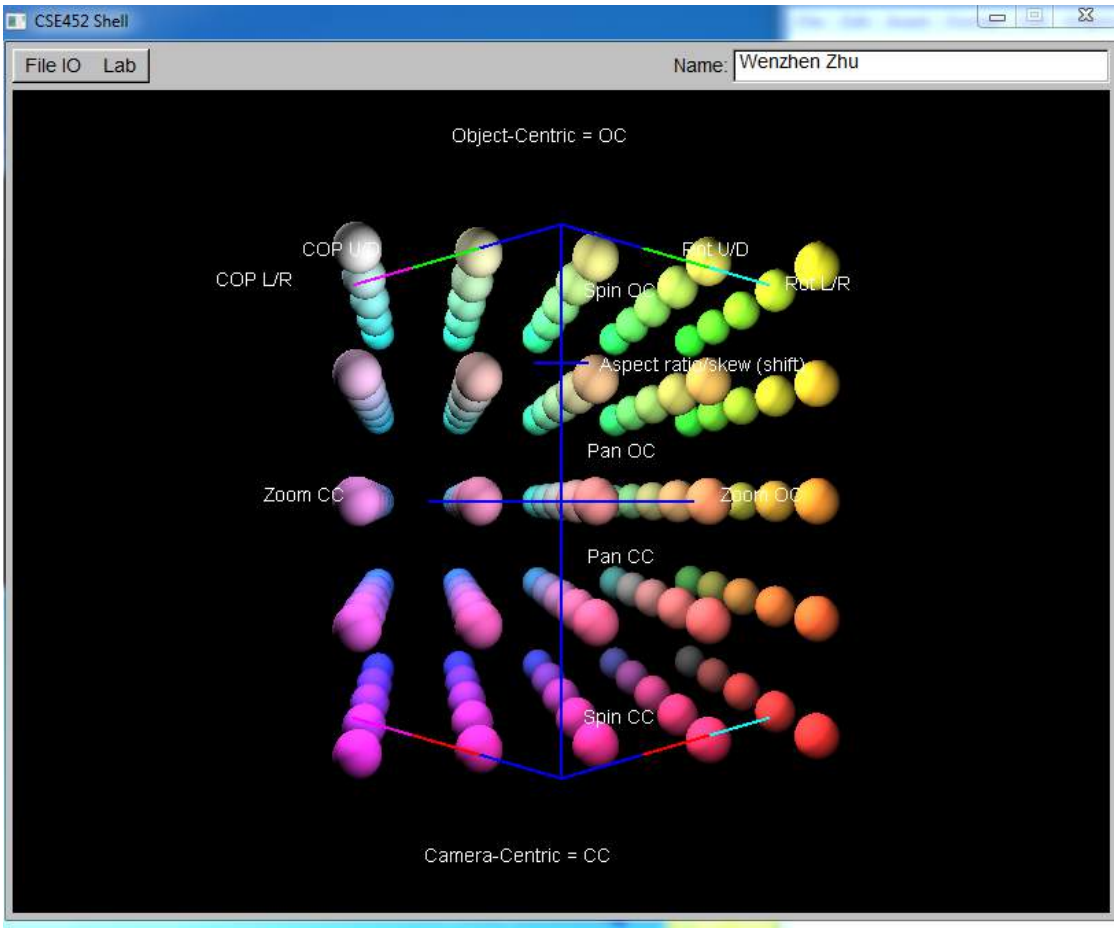
4/12/2016 (late day used: 1, free day left 1)

Part I: making a scene

```
Graphics3D[Table[With[{p = {i, j, k} / 5}, {RGBColor[p], Opacity[.75], Ball[p, .06]}],
  {i, 5}, {j, 5}, {k, 5}]]
```






```
color = N@Flatten[Table[{i, j, k} / 5, {i, 5}, {j, 5}, {k, 5}], 2];

d2 = 10 *
    N@Flatten[Table[With[{p = {i, j, k} / 5}, p], {i, -2, 2}, {j, -2, 2}, {k, -2, 2}], 2];

data = Transpose[{Range[Length@d2], d2, color}];
```

Cube in hue

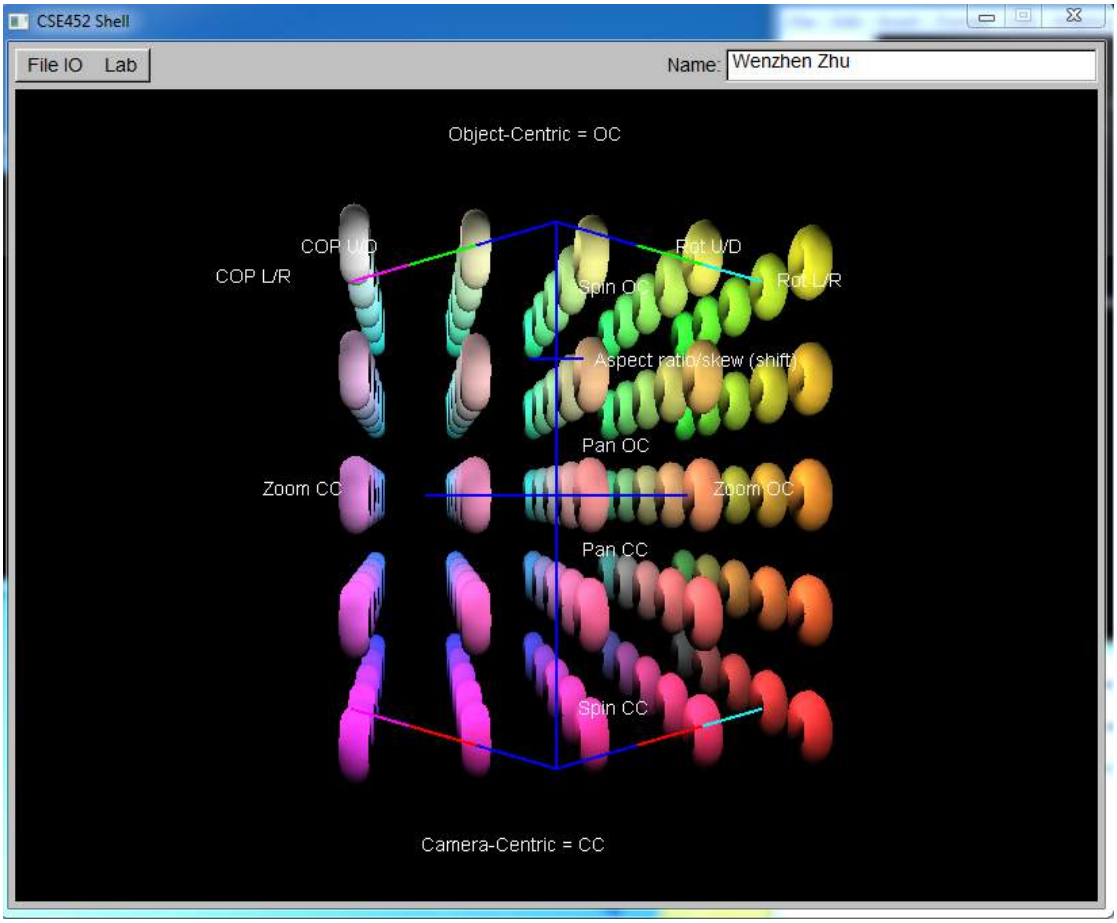
Sphere in hue

```
StringJoin@
 ("camera [\n  eye 20 0 3\n  focus 0 0 0\n  up 0 1 0\n  angle 45\n  near-far
     0.1 200 \n] \nlight [ \n  position 0 10 10 \n  color
     1 1 1 \n  function 1 0 0 \n] \nlight [\n  position
     10 0 0\n  color 1 1 1\n  function 1 0 0 \n]\n" <>
   ("mastersubgraph vertex" <> ToString@#[[1]] <> " [\n  trans [\n    translate " <>
      ToString@#[[2]][[1]] <> " " <> ToString[#[[2]][[2]] <> " " <> ToString[#[[2]][[3]] <>
      "\n    scale .8. .8. .8. " <> "\n    object sphere [\n " <>
      "         diffuse " <> ToString@ToString[#[[3]][[1]] <> " " <>
      ToString[#[[3]][[2]] <> " " <> ToString[#[[3]][[3]] <> "\n    ]\n  ]\n]\n" & /@
     data) <> "\n" <> "mastersubgraph root [\n" <>
   StringJoin[Table[{"trans [ subgraph vertex"} <> ToString@i <> " ]\n",
     {i, 1, Length@d2}]] <> "]")
```

Torus in hue (Extra credit)

I write the scripts to help to generate .sc file

```
StringJoin@
 ("camera [\n  eye 20 0 3\n  focus 0 0 0\n  up 0 1 0\n  angle 45\n  near-far
     0.1 200 \n] \nlight [ \n  position 0 10 10 \n  color
     1 1 1 \n  function 1 0 0 \n] \nlight [\n  position
     10 0 0\n  color 1 1 1\n  function 1 0 0 \n]\n" <>
   ("mastersubgraph vertex" <> ToString@#[[1]] <> " [\n  trans [\n    translate " <>
      ToString@#[[2]][[1]] <> " " <> ToString[#[[2]][[2]] <> " " <> ToString[#[[2]][[3]] <>
      "\n    scale .8. .8. .8. " <> "\n    object torus [\n " <>
      "         diffuse " <> ToString@ToString[#[[3]][[1]] <> " " <>
      ToString[#[[3]][[2]] <> " " <> ToString[#[[3]][[3]] <> "\n    ]\n  ]\n]\n" & /@
     data) <> "\n" <> "mastersubgraph root [\n" <>
   StringJoin[Table[{"trans [ subgraph vertex"} <> ToString@i <> " ]\n",
     {i, 1, Length@d2}]] <> "]")
```



Part II:

MyScene.h

- struct node stores object, transformation matrix, and inverse matrix
- class Node (base)
  - vector<Node *> children stores children pointers
  - draw
  - getMatrix
- class Object (derived from Node)
  - stores shape and material information
  - draw
  - getMatrix
- class Trans (derived from Node)
  - stores transMat (transform matrix)

- draw
- getMatrix
- addTrans

- class Subgraph (derived from Node)
  - stores name of a subgraph
  - draw
  - getMatrix
- my variables
  - Subgraph root;
  - map<string, Subgraph*> subgraph;
    - Keep track of named mastersubgraphs so we can instantiate them later
  - Cube cube;
    Cylinder cylinder;
    Cone cone;
    Sphere sphere;
  - Torus torus;