CIS 425 Assignment 4

**Haunted House**

Due Monday, April 10 at 11:59pm EDT.

You are outside. It is high noon, the sun is shining brightly from overhead. Objects are illuminated from above and some (trees? an awning? ...you decide) have shadows on the ground. You enter the haunted room from a door on the south wall by clicking the door (also the letter **D)**. No lights are on inside, the shades are down, and there is just a little ambient light. You can turn on a lamp suspended from the ceiling by clicking a light switch near the door ( also the letter **L)**. There is a window to the west. When you click the window shade (also the letter **S**) the shade opens. This provides a bit more ambient light inside. Items outside are visible but are not affected by lights in the room. You look around and there is a flashlight on a table. When you are very close to it, it turns on and comes to your hand. It is a spotlight, shining directly in front of you. There is a cauldron in the middle of the room, with a shiny orb next to it. When you get very close to the cauldron, the liquid inside it glows. A drop down menu lets you launch the shiny ball so it flies up and comes down, disappearing into the cauldron. At this point, something magical happens. You decide what that is.

Requirements and details:

1. All the above is required.
2. We should see a light fixture where the overhead light is.
3. The light outside is coming from far above - directional light - not from a particular point.
4. We should see the flashlight off, on the table. When we pick it up, we should see at least part of it, in front of us. It is up to you if we see part of your hand. The flashlight behaves like a spotlight, aimed straight ahead.
5. The program should use collision detection to know when you are near the flashlight. You should use collision detection (a sphere around the flashlight and a sphere around the cauldron) to know when you are near the cauldron. The cauldron can stay glowing when you walk away, or you may choose some other behavior.
6. The cauldron glows because it is made of emissive material.
7. Though we don't see the player, s/he moves about the room. Use the left arrow key to turn the player to the left and the right arrow to turn to the right (rotating while staying in the same place). Hold it down for longer to turn more. Smooth turning, in small units, is nicer than turning in large steps. The up arrow moves the player forward, and the down arrow moves the player backwards.
8. The opening of the front door, the moving of the orb and the rising of the shade should all be animated, using timers. For extra, the ambient light in the room can increase with a timer as the shade rises. But in any case, there should be greater ambient light when the shade is fully open.
9. (Extra: You can offer on screen (not console window) help explaining what can be done in the room. You might suggest a next task. You might even do this in a separate viewport, graying out or checking off steps as they are accomplished.)
10. There should be at least two different interesting things that could happen when the orb enters the cauldron. Which outcome happens should be randomly determined. You will need to use srand(time(0)) in setup.
11. So that I can see each of your possible outcomes without running your program many times, I should have the option, in a submenu of the dropdown menu, of selecting a specific outcome. (Eg, it can say outcome 1, outcome 2)
12. You have lots of options for what happens when the orb sinks. The action isn't limited to the pot! And use lots of new openGL!
13. One wall of the room should be a different color from the others. The floor, and ceiling should also be different colors.
14. At least one wall should be made of many small units, to better show the portions lit by the spotlight.
15. The orb should use specular shininess.
16. The overhead light should appear as some sort of light fixture on the ceiling. It should illuminate in all directions. You pick the color. Or you can select a color in the menu.
17. The right mouse button shows a pop-up menu with submenues. Menu items should include launching the orb, an option to pick the ourcome when the orb sinks. You can have other menu items to conrol light colors, turn on and off lights, have the cauldron start or stop glowing, or make something fantastic happen in the room.
18. Opening the door, turning on the light switch, opening the shade, should all be done with color picking (not naive color picking.)
19. You can have collision detection to prevent you from walking through walls, through objects in the room.
20. It would be nice if the walls of the house outside are a different color from the walls inside.
21. At least some of the items should get their color by explicitly setting arrays for their ambient, diffuse, and specular material properties.
22. Do not rely on default values for your lighting.
23. The player should view the room in perspective. Use gluPerspective.
24. For smooth display double buffering should be used.
25. Have fun building this!

Required keys:

D opens/closes the door.

L turns on/off the ceiling lamp.

S opens/closes the window shade.

Required Color picking:

Click the door to open it.

Click the light switch to turn on the light.

Click the window shade to raise the shade.

Required Collision detection:

Close to the flashlight, it comes to your hand and turns on.

Close to the cauldron, it glows.

Menu:

Launch orb.

Select among outcomes.

There is a lot of room for extras - swooping ghosts, crawling spiders, quidditch balls, witches riding by on broomsticks,... and whatever happens when the orb enters the cauldron!