Virtual Reality Visualization with the Oculus Rift
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**Introduction**
- Expand the use of virtual reality into application beyond entertainment
- Explore how to view data in a 3D world
- Develop a technique to express two data sets into a series of coordinates in 3D space
- Show how to navigate through the data

**Setup and Tools**
- Hardware used: Oculus Rift headset, Logitech game controller, and MacBook
- Software: Xcode, C++, Oculus Software Development Kit (SDK) and Open GL
- Oculus SDK used to project two 2D images into each eye to create a 3D effect
- Oculus SDK also used head movement to change viewing angle
- OpenGL used to create 3D shapes

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**Layout of Text File**

To the left you can see the text file for the complex Tree.

I used basic streams to read/write to and from the text files.

To the right you can see the user entered text file.

**Visual Output**

Above is an example of a random complex Tree graph.

Below is an example of a simple graph inputted by the user.

**Methods**

- Created own method to draw a Binary Search Tree (BST) in a three coordinate plane (x,y,z)
- First node is created at reference point (0,0,0)
- If Boolean _left is true then it will draw the next node on the left else on the right (adjusted in coordinates, either (-1,-1) or (1,-1))
- Every 6th node it adds a –z coordinate i.e. (-1,-1,-2)
- Every 4th node it adds a +z coordinate i.e. (1,1,3)

**Conclusions**

- Programmed in C++ and used Open GL and Oculus SDK
- Also used multiple 3rd Party Components such as glew, glm & zlib
- User can enter their own data to create a custom graph
- Can change color and shape of nodes

**Future Improvements**

- Work is needed to adjust joystick controls
- Computers with higher processing power can create larger graphs
- Work can be done to have multiple graphs at once
- The research done for this project can be used in future research, other projects, or can pick up where this project left off