1. Introduction and History
    - Possibly one or two short questions on history
2. Hardware
    - Vector vs raster displays
    - Understand how each work
    - Possible definition/explanation type of question
        - Display controller
        - Refersh buffer
        - Video controller
        - Resolution
        - Depth
        - Types of output devices (display and hardcopy) and how they work (e.g. crt, lcd, printers, plotters)
        - Dot size
        - Addressability
        - Fluorescence
        - Phosphorescence
        - Persistence
        - Refresh rate
        - Flisker
        - Critical fusion frequency
        - Horizonal scan rate
        - Bandwith
        - Shadow mask
        - Look-up table
        - Interlaced vs. non-interlaced
        - Sprites
        - Video mixing
        - RGB
        - Momoshrome
        - Ntsc
        - Pal

3. Interaction Techniques
    - Device, task, and dialog considerations
    - Hardware characteristics – understand and compare devices
        - Absolute/relative
        - Direct/indirect
        - Discrete/continuous
    - Location devices and keyboards
    - Basic interaction tasks
        - Selection
        - Text interaction
        - Quantity
    - 3D hardware devices
        - position, selection and rotation
    - composite interaction tasks
    - user interface styles
        - WYSISYG
        - Direct manipulation
        - Iconic
        - Menu selection
        - Command
        - Natural language
        - Question and answer

4. Graphics Software
   - What is openGL, GLUT, GLUI and what do they do
   - Terminology/definitions
     - Rendering
     - Models
     - Geometric primitives
     - Bitplane
     - Framebuffer
     - single and double buffering
     - event-driven

5. Algorithms for 2D primitives– understand each algorithm and be able to discuss the advantages/disadvantages
   - Scan converting lines
     - Brute-force algorithm
     - Incremental algorithm
     - Midpoint line algorithm (Bresenham)
     - Issues with each algorithm
   - Scan converting circles
     - Brute force (equation of a circle)
     - Use cos θ and sin θ
     - Symmetry
     - Midpoint circle algorithm (Bresenham)
       - Second order differences
   - Scan converting ellipses
     - Equation of ellipse
     - DaSilva's algorithm
   - Filling algorithms
     - Coherence (spatial, span, scan-line, edge)
     - Fillling rectangles
     - Problem of boundary pixels
     - Incremental Algorithm
       - Verticies and horizontal edges
       - slivers
     - Scan-line algorithm
       - Brute-force
       - Edge-coherence algorithm
       - Active edge table
     - Filling regions of pixels
       - Interior and boundary defined regions
       - Flood fill
       - Boundary fill
       - Span filling
       - Pattern filling

6. Clipping – understand the different techniques, be able to compare them and be able to do an example
   - Scissoring
   - Clipping against rectangles
   - Clipping lines
     - Looking at endpoints
     - Solving simultaneous equatios (brute force)
     - Cohen-sutherland algorithm
     - Midpoint subdivision variation
     - Cyrus-Beck Algorithm
   - Clipping circles & ellipses
     - Subdividing

- Clipping polygons
    - Sutherland-Hodgman Algorithm

7. Antialiasing
    - What is aliasing
    - Antialiasing techniques – how to do each technique and advantages/disadvantages of each
        - Increase resolution
        - Prefiltering
            - Unweighted area sampling
            - supersampling
        - Postfiltering

8. 2D Transformations
    - know the transformation matrices and be able to apply them in an example
        - translations
        - scaling
        - rotation
        - shearing
        - symmetries
    - Understand homogeneous coordinates and why they are used
    - Understand the general transformation matrix and be able to compose one
    - Understand what affine transformations are
    - Understand what Rigid body transformations are
    - Understand how to compose transformations and be able to do this in an example
    - Understand window to viewport transformations

9. 3D Transformations
    - know the transformation matrices and be able to apply them in an example
        - translations
        - scaling
        - rotation
        - shearing
        - reflections
    - understand how to transform an arbitrary plane
    - know how to transform coordinate systems and be able to do an example

10. Viewing in 3D – understand each type of projection and be able to complete an example of each (e.g. be able to compute the 2D projection)
    - parallel projections
        - orthographic
        - oblique
    - perspective projections
        - one vanishing point
        - two vanishing points
        - three vanishing points