Scientific Visualisation Course 1999
Assignment 2

Due: 7/10/99

1. (a) Using the wind velocity data set: `.../avs/data/field/vector.fld`
   Discuss three appropriate visualisation techniques and outline the benefits and issues of each technique.

   (b) Create networks using the above techniques, include the network layout in your answer and document and issues / design decisions. Place the networks in your home directory named `ass2a.net`, `ass2b.net`, `ass2c.net`.

2. (a) Create an AVS 5 network using animated variables and animated filenames which will output a sequence of images to disk with unique, 0 padded names. The actual visualisation network may be one of those used previously. Place this network in your home directory as `ass2d.net`.
   Include a network drawing in your assignment documenting the important animation related features.
   Note: take into account any requirements for video production.

   (b) Using Vislab tools, convert your images into a playable. The animation should last at least a few seconds.
   Bear in mind presentation (eg. titles, speed), however do not spend too much time on this, it is a learning exercise for your projects.
   Your assignment should specify the exact commands to execute to play your movie and outline the steps taken (applications used) to produce the movie.

   (c) Write a reasonably detailed article (approx 300–500+ words) explaining the issues involved in making a computer animation. Steps should include image generation (do not cover the actual visualisation), requirements for / limitations of video conversion, movie presentation and so on.
   Do not cover the actual steps needed to produce a video.

3. Draw a series of simple binary images (eg. overlapping filled circles/squares) each of which demonstrates a binary operator: AND, NAND, OR, NOR, XOR.

4. Given the vertices of a triangle write the equation to calculate the surface normal. Convert it into a format suitable for direct coding in a standard computer language. eg. write 3 equations which could be directly evaluated using simple maths to produce the 3 components of a normal vector, given the 3 (x, y, z) triangle vertices. The normals should be normalised (0–1).

5. Research and explain how computer graphics display systems differ from television/video systems. Your answer should include explanations of at least the following terms and comparisons of the differences between the two systems,
   interlacing, refresh rate, component vs composite systems, resolution, field rate, frame rate.
   Include diagrams.
   Some extra marks will be awarded for a comparison of tape systems (eg. VHS, S-VHS, Betacam, etc) and for discussing some of the differences between PAL and NTSC video standards.