A1:

Date of announcement: 11:59 pm IST, August 16, 2021 (Monday)
Date of submission: 11:59 pm IST, August 30, 2020 (Monday)
Summary: The assignment is on 2D scalar and vector field visualization.
Dataset: IEEE Visualization 2008 Design Contest dataset
(http://sciviscontest.ieeevis.org/2008/data.html)

The dataset description is given in the dataset website. The datafiles are available at https://cloud.sdsc.edu/v1/AUTH_sciviscontest/2008/data_files/

The scalar field datasets are multifield.xxxx.txt.gz and vector field as velocity.xxxx.txt.gz, where xxxx refers to the timestep. There are 200 timesteps.

Tasks:

1. Choose sufficient timesteps to visualize the progression of the simulation. Use the same time-steps for both multi-field and velocity files.
    - Write in the assignment report -- how did you arrive at the timesteps? Data-driven methods are encouraged.
2. For the files chosen, identify one 2D plane you will be studying. The 2D plane can be x-y plane at a constant z value, y-z at constant x, and z-x plane at a constant y value.
    - Write in the assignment report -- how did you arrive at which plane you are going to explore?
3. For the multi-field files, choose 3-5 scalar fields you will be studying.
    - Write in the assignment report -- what is your rationale for the selection of variables?
4. For the vector field, use the curl as the vector field to visualize, as given in the data description webpage.
5. Outputs:
    - For scalar field visualization, use color mapping and contour mapping (or contour fill) for 5 contours; for vector field visualization, use quiver/arrow plots. Address the following in your report:
        - For contours, will you use the same contour values for all time steps?
        - For color-mapping, will you use the same min-max values to generate the color palette?
    - Experiment with different types of color palettes/spectrum (sequential, diverging, qualitative) using colorbrewer/matplotlib predefined palettes.
        - Write in the report - did any color palette outperform the others? How would you rationalize the performance?
    - Experiment with combining 2 visualization techniques in a single view.

    - Did such a visualization enable you to make joint inferences of different fields?
- Generate demo videos of the animation of change in scalar and vector fields over time.
- Write in your report -- do your visualizations help you infer the shadow instability as shown in the image in the contest website (and Fig.1)? What in your choice of the data for visualization allowed you to see the moving front?

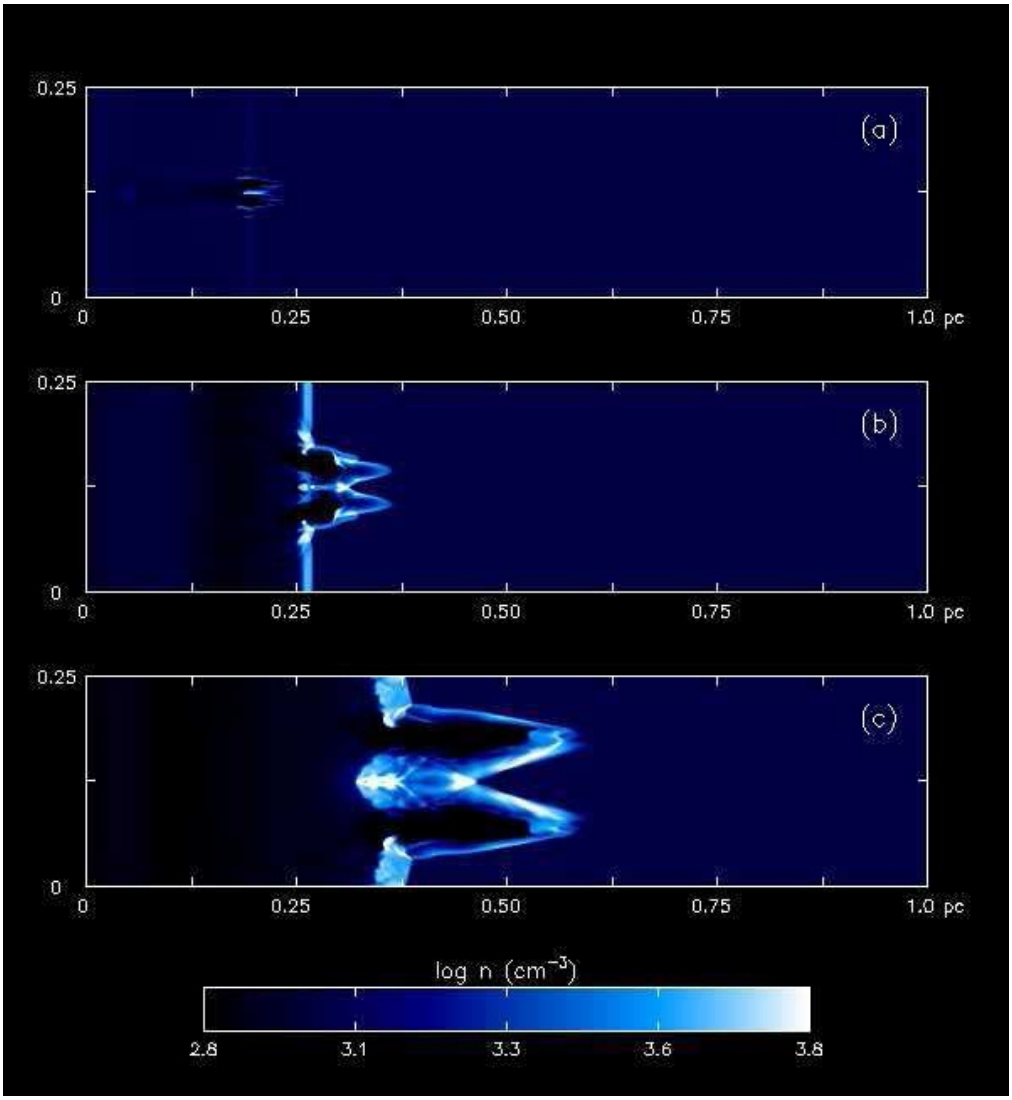

Figure 1: A shadow instability forming in one 2D slice through the data set over time (Source: http://sciviscontest.ieeevis.org/2008/)