

## Lecture 7: CS6250 Graphics & Visualization

### Data Representation for Visualization

- Attributes
- Types of Datasets
- Data Abstractions in General
- VTK specifics
- Examples

## Attributes

What physical properties correspond to attribute data?

How can we model these types of data?

## Attributes

What are some options for ways to attach attribute data to a dataset?

## Type Specific Model of Attributes

In this model, we explicitly list all possible types for attribute data.

### Scalars

Examples?

### Vectors

Magnitude and direction. How can we represent this?

### Normals

How are they different from vectors?

### Texture Coordinates

What are these? How are they used?

## Attribute Data Continued



## More Attribute Data Types

### Tensors

A generalization of vectors and matrices. 3x3 matrices in VTK.

Stress and strain tensors are examples.

VTK treats only real-valued symmetric 3x3 tensors.

### User-defined

You can extend this set of types of attribute data.

## Dataset Types

In addition to defining the types of cells and attributes, there can also be types of datasets. This corresponds to different ways of organizing the cells that make up the dataset.

There is a high-level choice to make first. Whether the dataset will be regular or irregular. If it is regular, what does vtk call it?

### Polygonal Datasets

Can consist of vertices, polyvertices, lines, polylines, polygons, and triangle strips.

## Structured Points

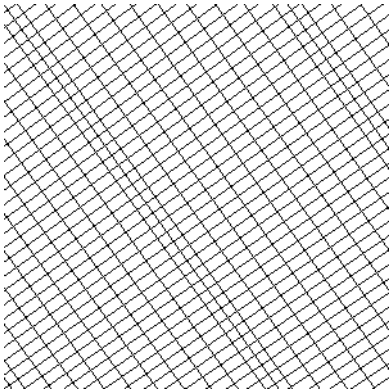
Examples: Images, volumes, 1D point arrays, etc.

Must be regular in both geometry and topology.

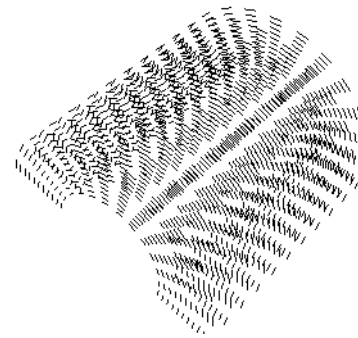
What are some potential problems?

What are some benefits?

## Rectilinear Grid



## Structured Grid



## Unstructured Points

## Unstructured Grid

