

GeometryEditor & GeoSite

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Part One: User's Point of View

Part Two: Developer's Point of View

Part Three: Technical Point of View

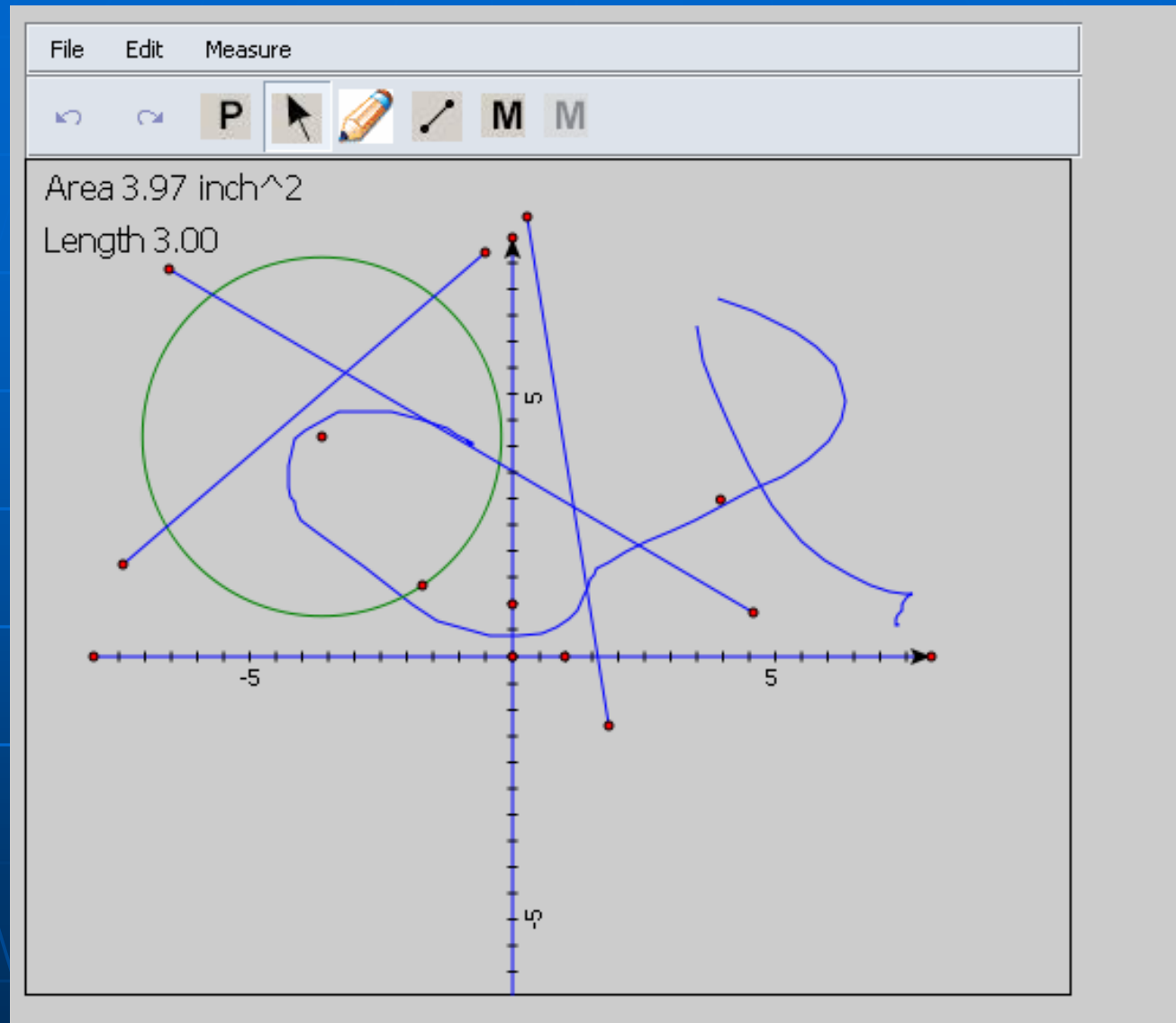
Part One: User's Point of View

Part One: User's Point of View

GeometryEditor
(previously GeoSVG)

How a manipulative looks like

- Menu
- Toolbar
- Graphical area



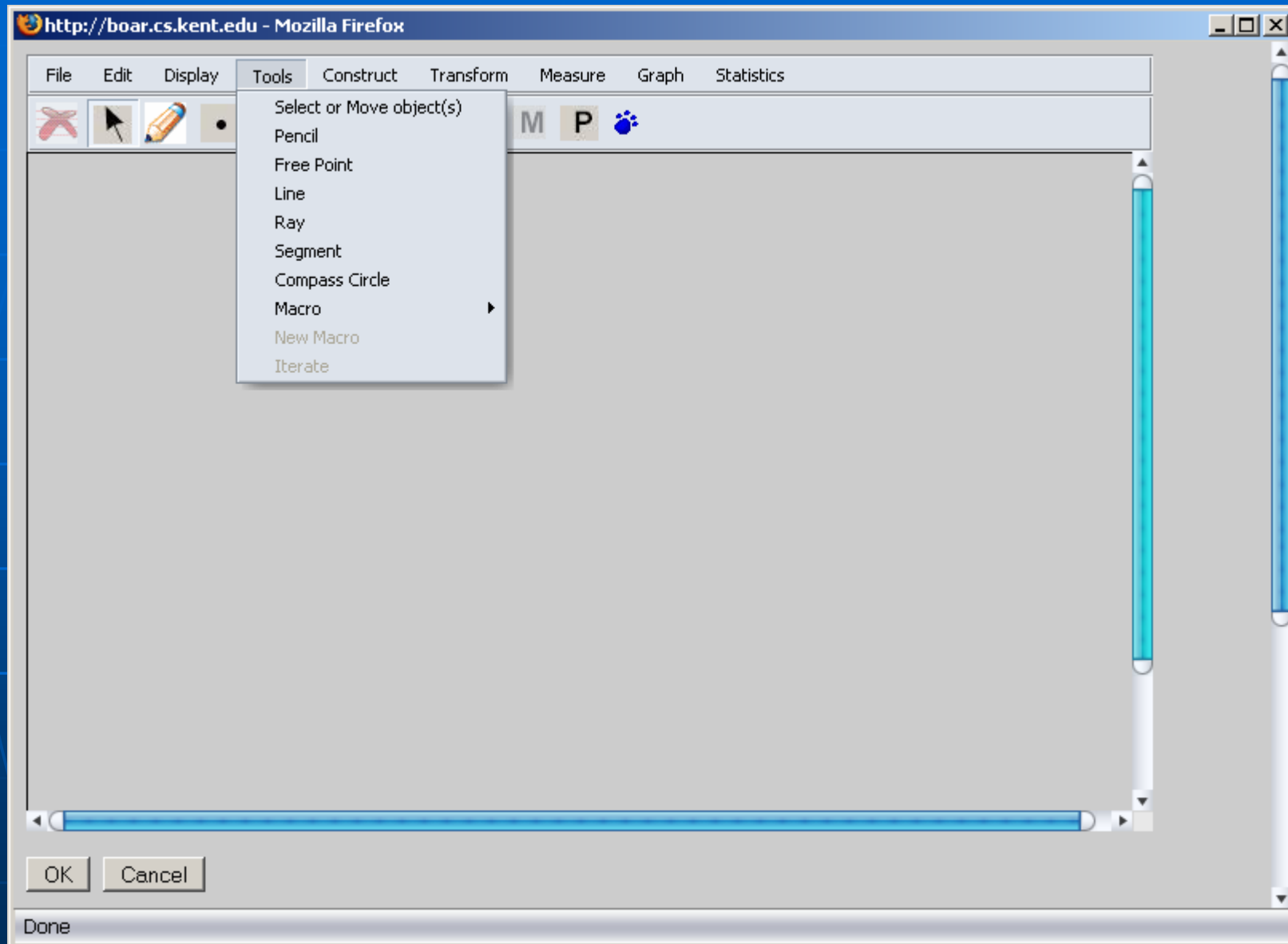
How a manipulative looks like

Working Environment

- Purely based on HTML and SVG (no longer use XUL)
- Full Features (menu, toolbar, the graphical area, and interaction between SVG and HTML) work
 - on Firefox on all platforms
 - on Windows IE with ASV
 - on Opera (partially test)
- Only graphical area works
 - on Mac Safari with ASV
 - on Netscape on all platforms

Authoring Supports

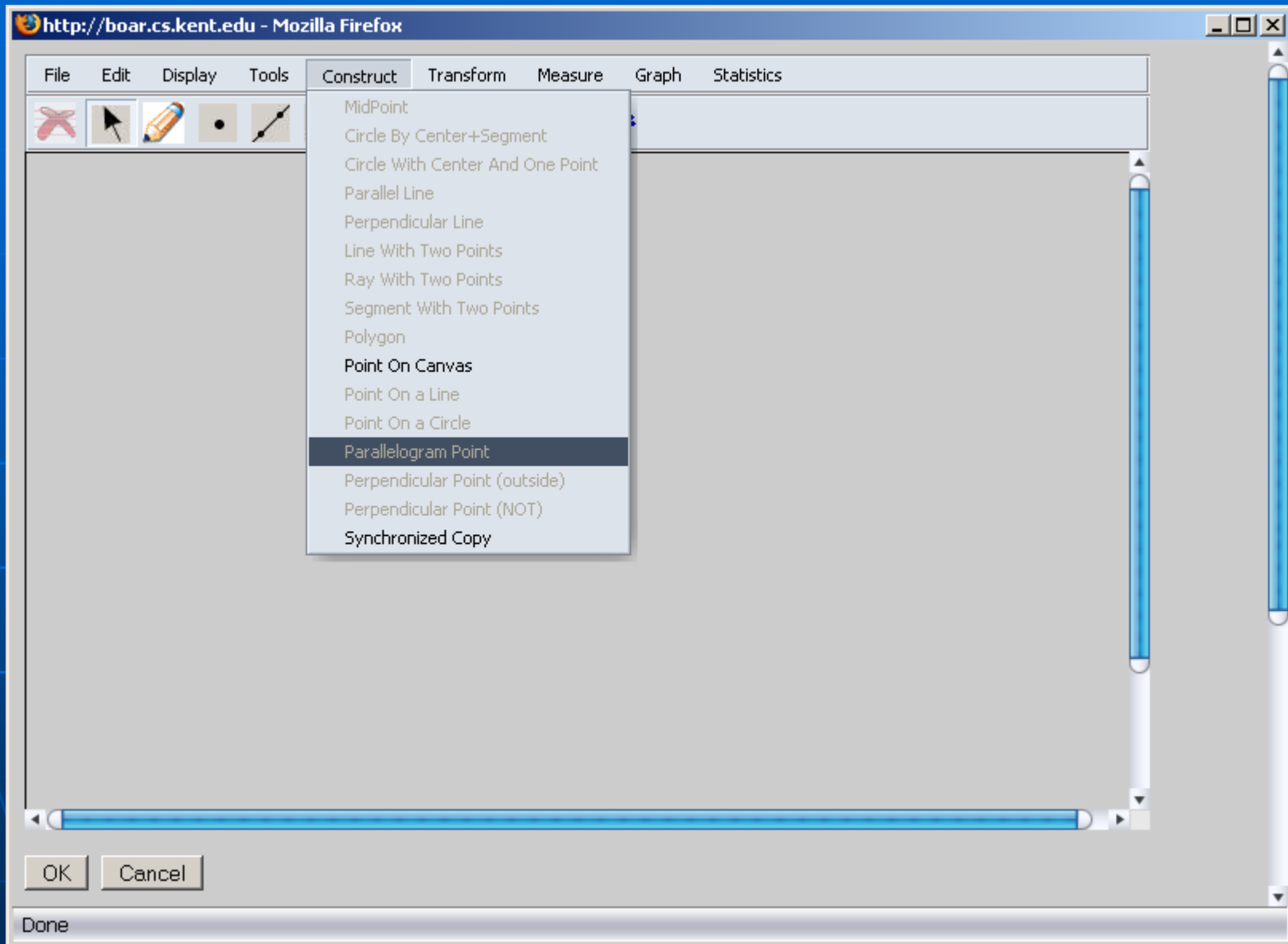
- Drawing tools
 - Selection and dragging
 - Pencil
 - Point
 - Line/Ray/Segment
 - Circle
 - Macro



Drawing tools

Authoring Supports (cont.)

- Construction
 - MidPoint of segment
 - Circle of a center and a segment
 - Parallel/Perpendicular Line
 - Polygon
 - Point on a Line/Circle
 - Perpendicular Point
 - Parallelogram Point



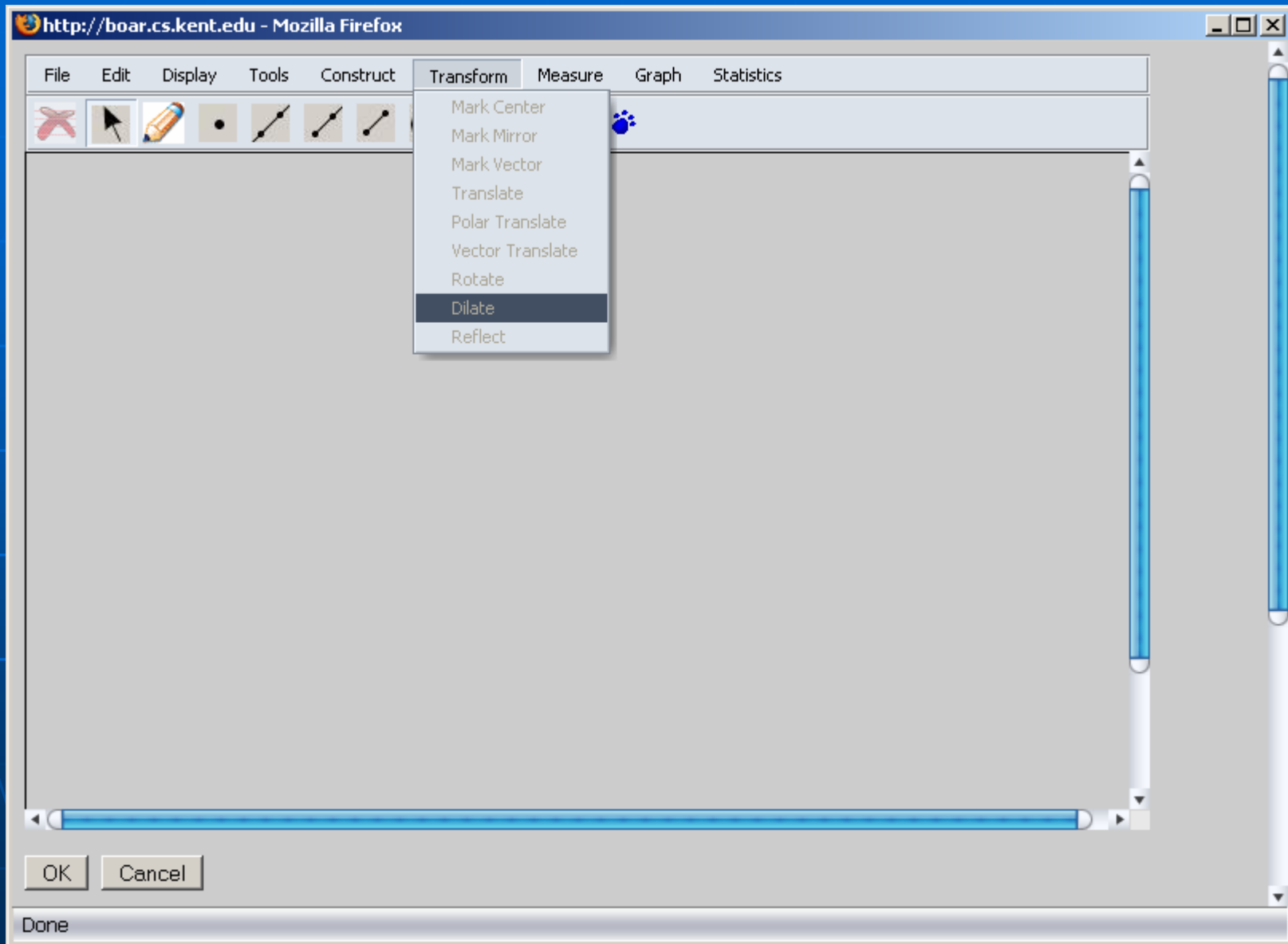
Construction

Authoring Supports (cont.)

- Advanced construction (dialog-based)
 - Synchronized Copy
 - Iteration
 - Calculation

Authoring Supports (cont.)

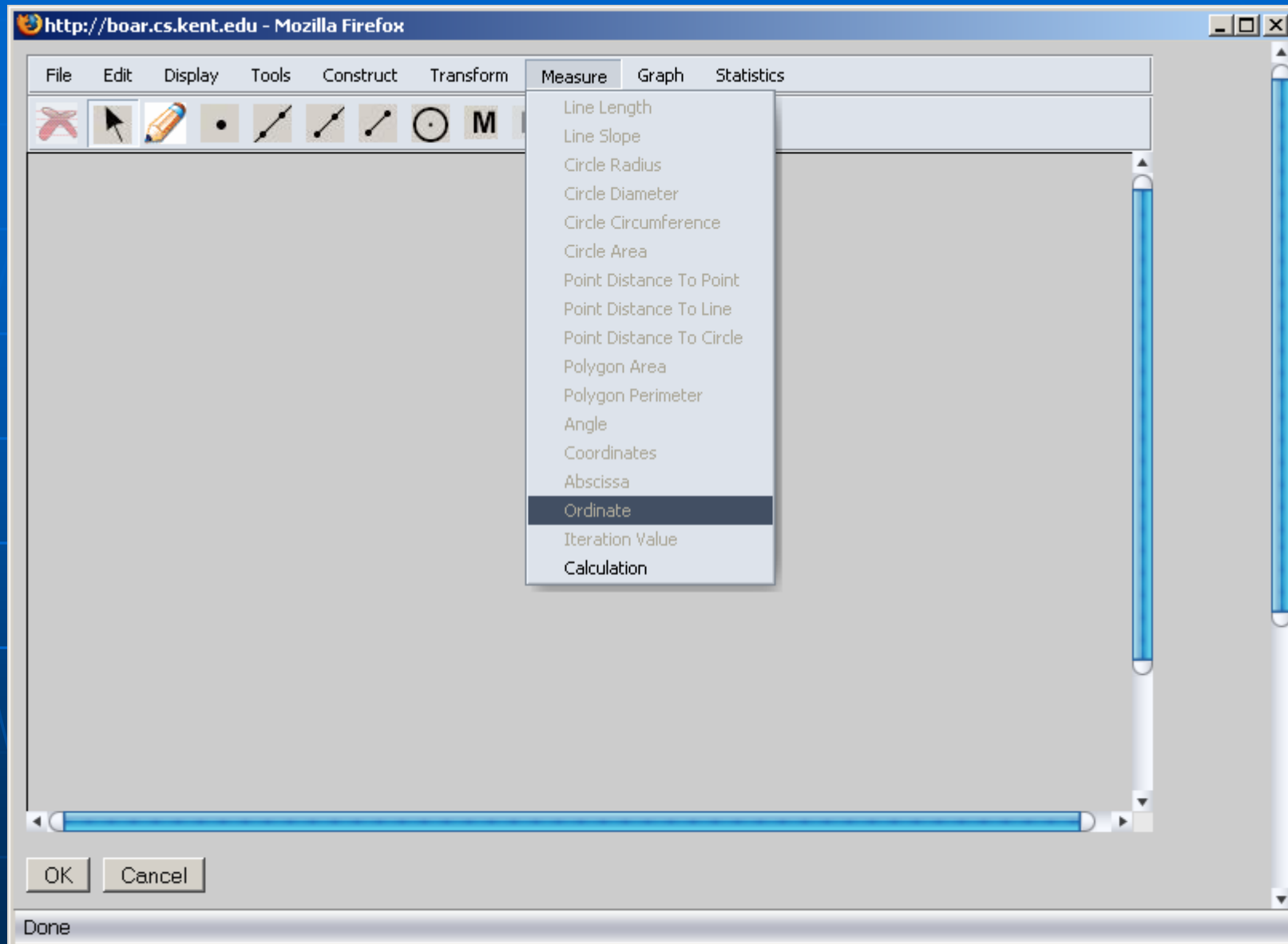
- Transformation
 - Translation
 - Rotation
 - Reflection
 - Dilation



Transformation

Authoring Supports (cont.)

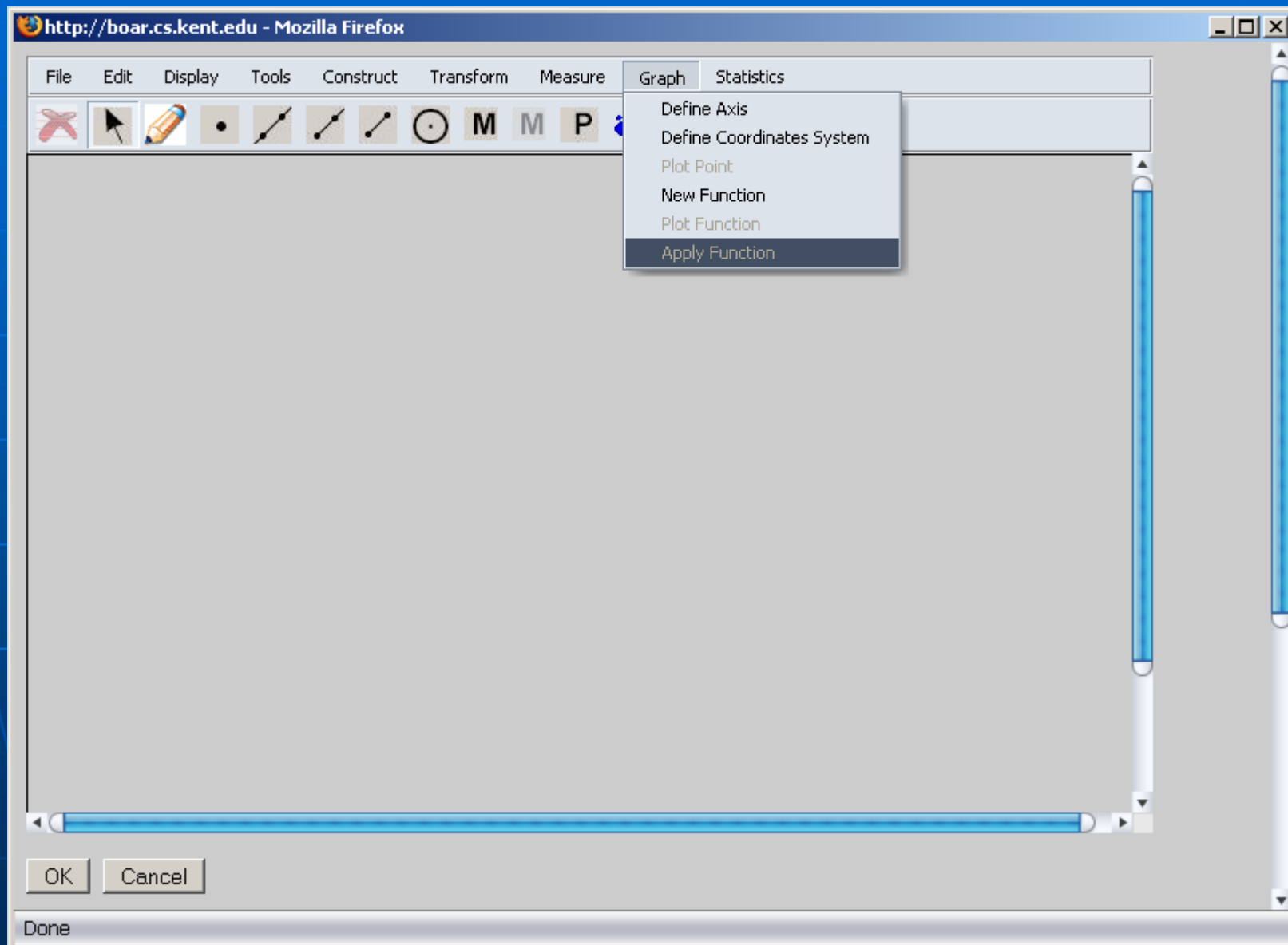
- Measurement
 - Line length, and slope
 - Circle radius, diameter, circumference, and area
 - Polygon perimeter, and area
 - Distance between a point and a point/line/circle
 - Angle
 - Coordinates, abscissa, and ordinate



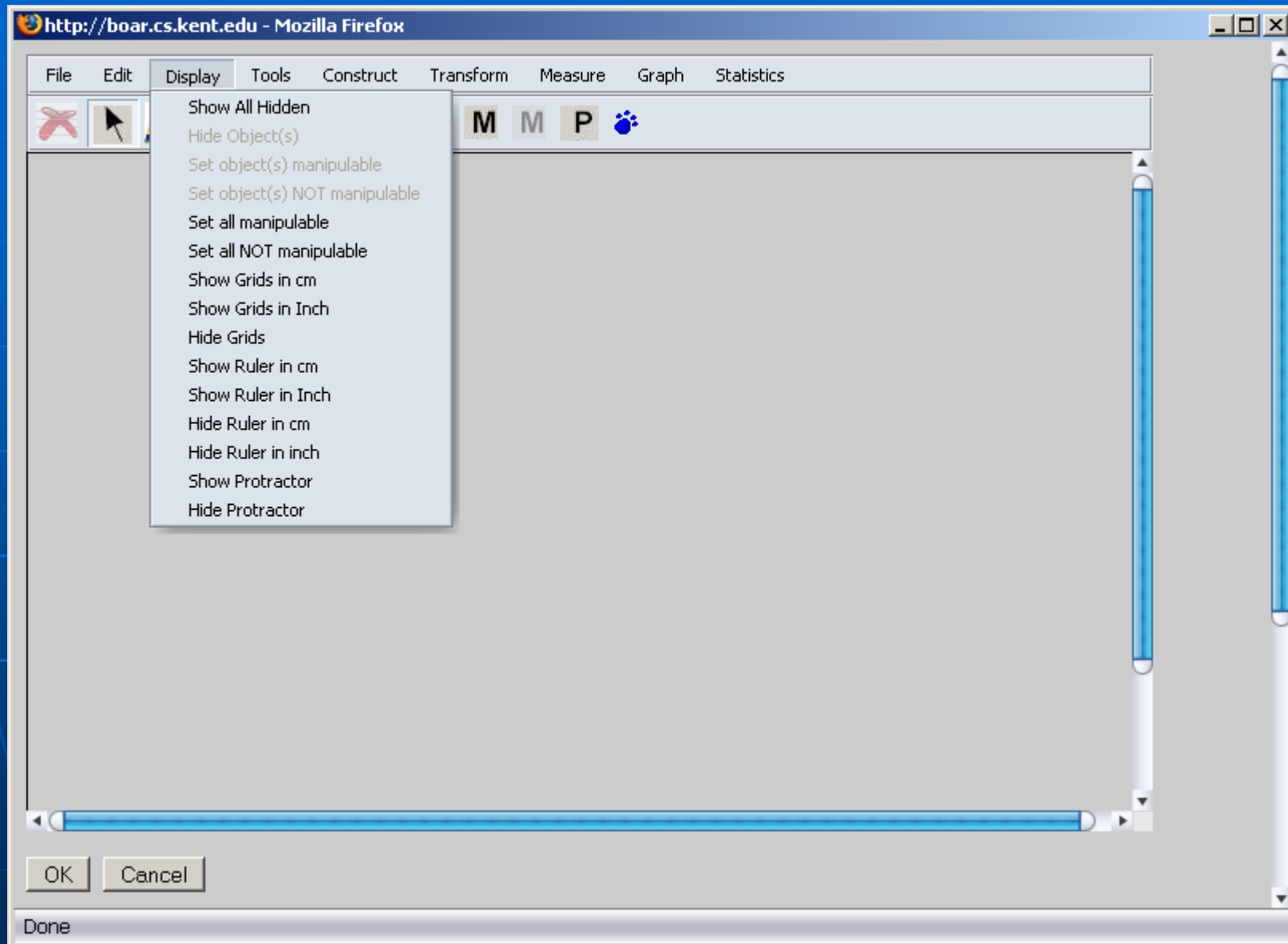
Measurement

Authoring Supports (cont.)

- Graphing and supports for different unit systems (partially done)
 - Coordinate system
 - Point plotting
 - Function definition and plotting
 - Rulers in different units (inch, cm or a coordinate system)
 - Protractor
 - Grids



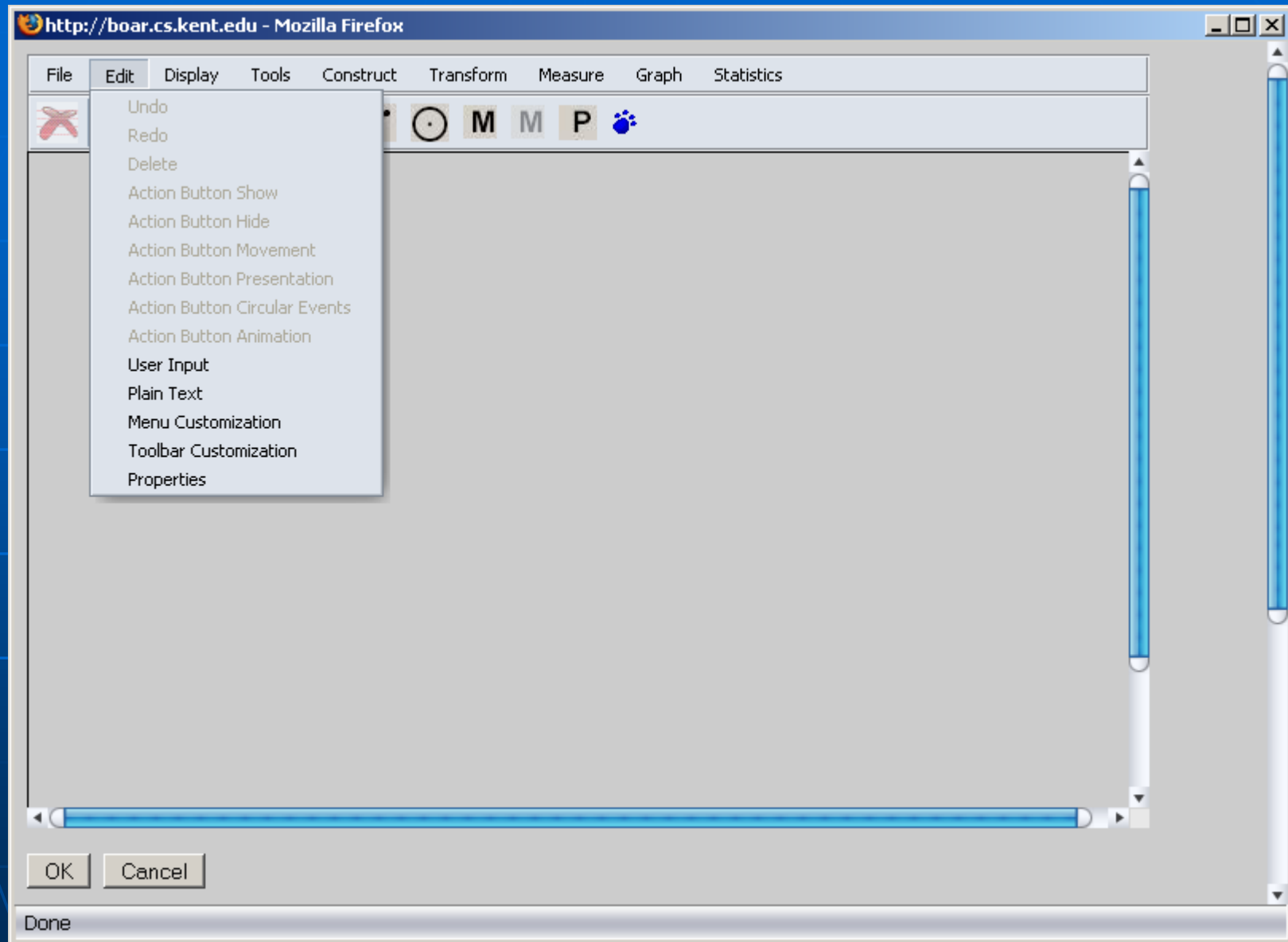
Graphing



Rulers, Protractor, and Grids

Authoring Supports (cont.)

- Action buttons
 - Show/Hide
 - Movement
 - Presentation
 - Circulation Events
 - Animation
 - Synchronized Copy (to be finished)



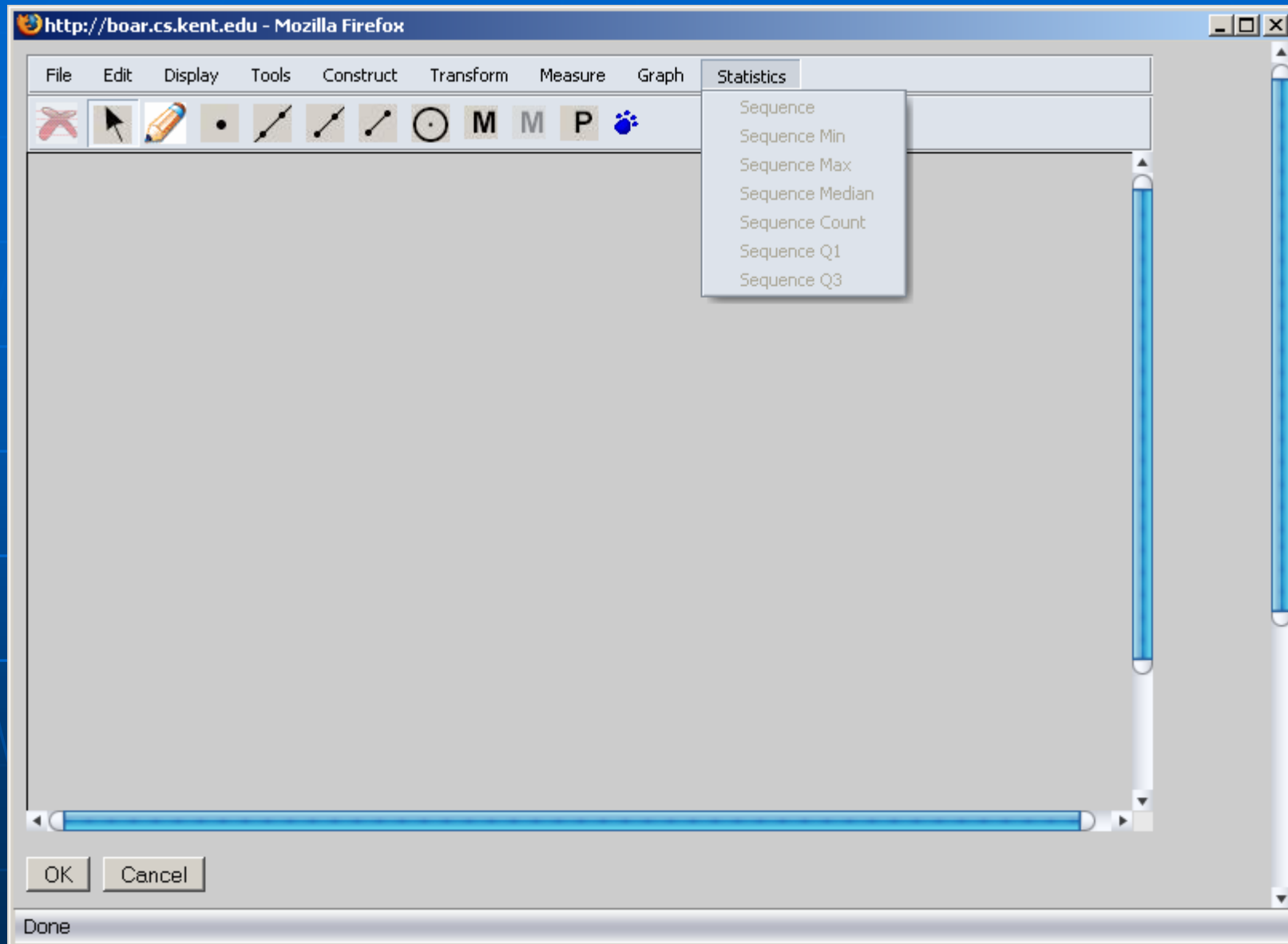
Action Buttons

Authoring Supports (cont.)

- Simple user input and text block support in the SVG area

Authoring Supports (cont.)

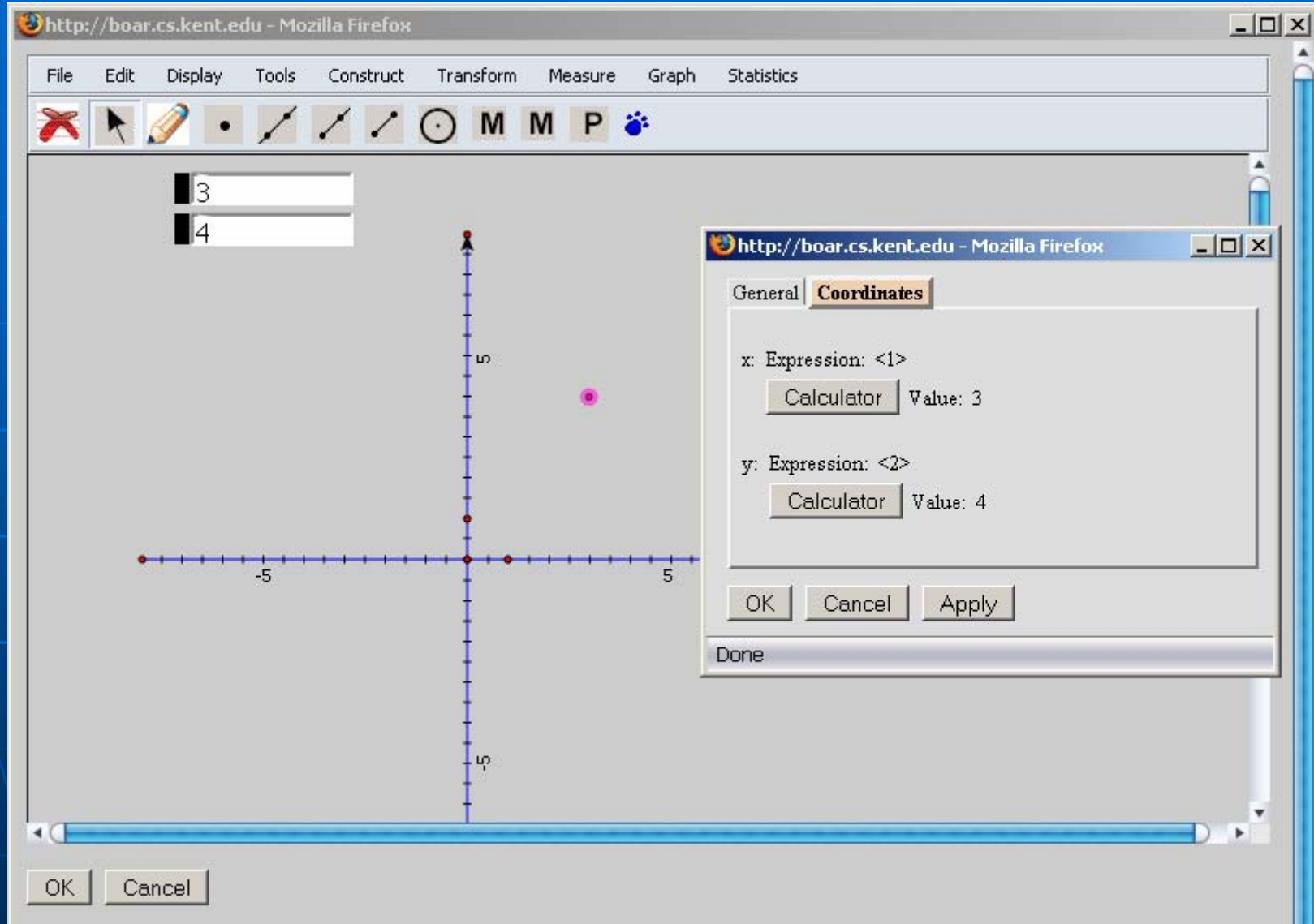
- Basic statistics supports
 - Min/Max, Median, Q1/Q3, and Count of a sequence of measurements of user inputs



Basic statistics supports

Dialogs Assisting Authoring

- Property dialogs
- Calculator
- Synchronized Copy dialog
- Iteration dialog
- Transformation dialogs
- Menu/Toolbar customization dialogs
- Animation dialog
- And so on



Property Dialog

http://boar.cs.kent.edu - Mozilla Firefox

File Edit Display Tools Construct Transform Measure Graph Statistics

Restart

Proof of $a^2+b^2=c^2$

OK Cancel

Horizontal: Expression: 50
Calculator Value: 50

Vertical: Expression: 50
Calculator Value: 50

Cancel OK

Done

Translation Dialog

The image shows a screenshot of a geometry software interface. The main window is titled "http://boar.cs.kent.edu - Mozilla Firefox" and contains a coordinate plane with x and y axes ranging from -5 to 5. A pink point is plotted at (3, 4). To the left of the plane are two input fields containing the numbers "3" and "4".

Overlaid on the top right is a "Coordinates" dialog box. It has a "General" tab and a "Coordinates" sub-tab. It contains two rows of input fields: "x: Expression: <1>" with a "Calculator" button and "Value: 3", and "y: Expression: <2>" with a "Calculator" button and "Value: 4". At the bottom are "OK", "Cancel", and "Apply" buttons, and a "Done" status bar.

Overlaid on the bottom right is a "Calculator" dialog box. It has a title bar "http://boar.cs.kent.edu - Calculator - ...". It contains an "Expression:" field with "<1>" and a "Value: 3" display. Below are buttons for "Clear", "Backspace", "Values", "Functions", and "Units" (all dropdown menus). A numeric keypad is present with buttons for digits 0-9, ".", "PI", "/", "x", and "Cancel". At the bottom are "OK" and "Done" buttons.

Calculator

http://boar.cs.kent.edu - Mozilla Firefox

File Edit Display Tools Construct Transform Measure Graph Statistics

Area 3.97 Inch²
Length 3.00

Copy Points	Source Points	As Pivot	Properties
1	?	<input type="radio"/>	<input type="checkbox"/> Associated with a pre-defined point ?
2	?	<input type="radio"/>	<input checked="" type="checkbox"/> Can cause rotation
3	?	<input type="radio"/>	<input checked="" type="checkbox"/> Can cause rotation

Initial rotation angle: 0

Cancel OK

Done

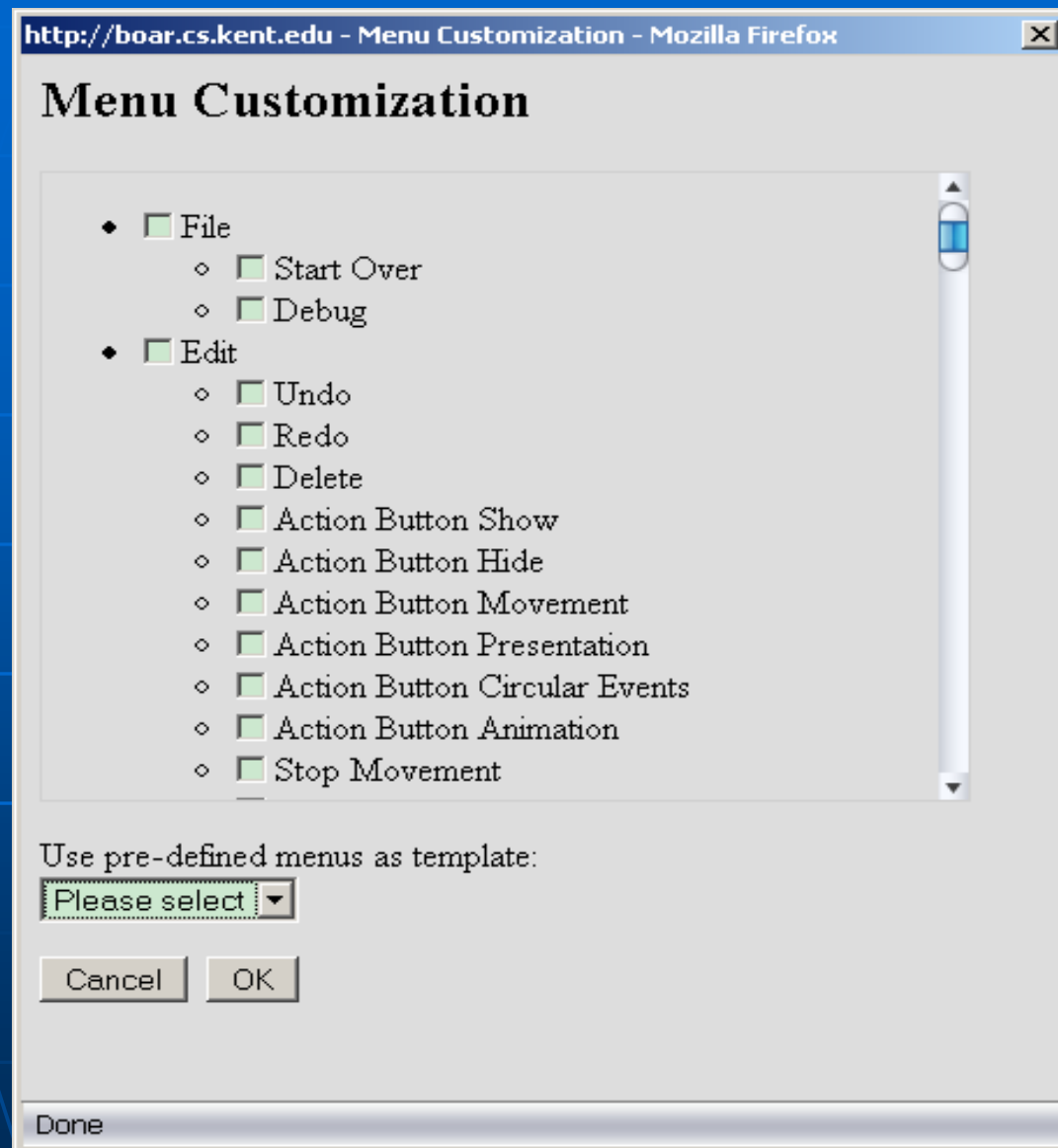
Synchronized Copy Dialog

Dialogs Assisting Authoring (cont.)

- They are all pop-up browser windows
 - Must set the browser to allow pop-up windows from the Web site using the GeometryEditor system
 - Mechanism to simulate modal windows as in installable applications (details in technical point of view)

Menu and Toolbar Customization

- System commands
 - Each system command can be represented as a menu item or a toolbar button, or both
- Customization
 - An author can customize what menu items and toolbar buttons to be with a manipulative
 - Learning view



Menu Customization Dialog

Menu and Toolbar Enabling and Disabling

- Menu items and toolbar buttons can be enabled or disabled based on the objects selected and the current system status
 - More details in technical point of view

Undo and Redo

- Unlimited undo and redo for
 - Object(s) creation
 - Object(s) deletion
 - Object(s) movement
 - And some other operations

Delete

- Deletion of selected objects

Macro Support

- Grouping several steps into one command
- Objects involved with a macro are divided into (more in technical point of view)
 - Givens
 - Selected by a user from an object on the canvas
 - Automatically generated
 - Associated with an object on the canvas (to be finished)
 - Results
- A macro can come from a data string or a URL (more in developer's point of view)
- Examples

Synchronized Copy

- Synchronized copy dialog
 - The mathematical relations among copied objects are always the same as the source objects
- Action button for synchronized copy (to be finished)
 - An author can define a button. When the button is clicked, a group of objects will be duplicated.

Features to be finished (GeometryEditor)

- System unit definition ***
- Locus and envelops ***
- Arcs *
- Conics *
- Animation dialog ***
- Action Button for synchronized copy ***
- Integration of MathML into the calculator **
- Around 40 small improvements and new features */**/***

Status of GeometryEditor

- The first trial version will be ready hopefully by the end of this semester
- A progress table
 - <http://boar.cs.kent.edu/geosite/GeometryEditor/doc/2007/tasks.html>
 - although it can be understood only by me
- User manual and training materials needed

Part One: User's Point of View

GeoSite

GeoSite Features

- A Web application based on
 - GeometryEditor: for manipulative authoring
 - FCKeditor: for HTML section authoring
- Web-based authoring
 - No software installation required
 - Manipulatives and HTML pages publishing immediately

GeoSite Features (cont.)

■ Resource sharing

- Manipulatives and pages are grouped under different users
- Viewing, copying, or linking other users' manipulatives is easy
- An author's manipulative can be manipulated by other users, and manipulation results can be submitted
- An author on GeoSite A can create pages that embed manipulatives from GeoSite B; Macros can also be requested across multiple GeoSites

GeoSite Features (cont.)

■ Interaction

- Manipulatives are interactive
- Manipulatives and HTML sections are interactive
 - HTML sections can retrieve data from manipulatives
 - HTML sections can drive manipulatives

Status of GeoSite

- Will be my focus after GeometryEditor is done
- User account management
- Features mentioned in previous slides
- Web services across multiple GeoSites

GeoSite Examples

- Manipulative viewing
- The authoring window
 - All the GeometryEditor built-in authoring features
 - Some plug-in features into the GeometryEditor (more in developer's point of view)
- Manipulative and HTML section interaction

Part Two: Developer's Point of View

About how to integrate
GeometryEditor into your system

Links

- Documentation

- <http://wme.cs.kent.edu/geosvg/documentation.html>
 - Click the link [Documents for developers](#)
 - <http://boar.cs.kent.edu/geosite/GeometryEditor/samples/index.html>
 - Lots of samples at the end of the page

- Package

- <http://wme.cs.kent.edu/geosvg/software.html>

Part Three: Technical Point of View

About how the GeometryEditor is developed:
algorithms, SVG, Javascript,
browser technology and a Java version

System Composition

- Graphical core
 - 220KB, 15,000 lines of codes, 110 classes
- GeometryEditor.js: a layer between the graphical core and a client Web application
 - 50KB, 2,000 lines of codes
- Around 20 types of dialogs and their related Javascript files
- Open source libraries used:
 - [Dynarch.com DHTML menus](#)
 - [FCKeditor](#)

Technical Details

- To be finished

Thank you!