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
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
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
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 ......
Proof of $a^2 + b^2 = c^2$
Synchronized Copy Dialog

Area: 3.97 inch^2
Length: 3.00

Copy Points | Source Points | As Pivot | Properties
--- | --- | --- | ---
1 | ? | | Associated with a pre-defined point
2 | ? | ✓ | Can cause rotation
3 | ? | ✓ | Can cause rotation

Add One Copy Point | Delete Last Copy Point

Initial rotation angle: 0

Done
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 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 envelopes ***
- 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
  - 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](http://wme.cs.kent.edu/geosvg/documentation.html)
    - Click the link Documents for developers
    - Lots of samples at the end of the page

- Package
  - [http://wme.cs.kent.edu/geosvg/software.html](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
- 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!