GeometryEditor: An Open Web-based Dynamic Geometry System

**Terminology**

*Virtual Manipulative:* an interactive, computer-based, visual representation of a dynamic object that presents opportunities for constructing mathematical knowledge.

*Dynamic Geometry System* (DGS): software for authoring geometry manipulatives. It simulates ruler and compass constructions and allows users’ interactive dragging without changing the underlying geometric relationships.

*Scalable Vector Graphics* (SVG): a language for describing two-dimensional graphics in XML. It’s a W3C standard.

*GeometryEditor:* a Web-based DGS that utilizes the Web to a great extent

*GeoSite:* a Web application built upon and demonstrating the GeometryEditor system

**GeoSite Architecture**

**Design and Implementation of GeometryEditor**

- Geometry Engine implemented in SVG for geometric objects rendering and animation
- GeometryEditor.js: a layer between the Geometry Engine and a client Web application
- Around 30 types of dialogs and their related Javascript files
- Math formulae rendered in MathML (Mathematical Markup Language)

**Features of GeometryEditor and GeoSite**

- No software installation on client machines
- Working on Firefox, Opera, and Windows IE with ASV
- Easy integration of GeometryEditor into a Web application
- Fully customizable GUIs of an GeometryEditor instance
- Dynamic calculator to create sophisticated mathematical formulas
- Immediate and automatic manipulative publishing
- Easy manipulative sharing
- Standard input/output interfaces (APIs) of manipulatives for interaction with the enclosing page
- Special Web page composer for defining interaction between manipulatives and enclosing pages
- Atomic (Java applet, SVG, or Flash based) or composite (with HTML involved) manipulatives
- Standard manipulative serialization APIs and submittable manipulative
- Keywords and search over GeoSite(s)
- Web services for retrieving manipulatives or part of a page
- Transparent cooperation with Computer Algebra System
- Possibility to migrate to mobile devices
- Distributed System formed by multiple client Web applications

**Contribution by Everyone**

With manipulative interfaces standardized, everyone can contribute to the GeoSite:

- Programmers can contribute authoring software like the GeometryEditor or ad-hoc programmed manipulatives
- Educators can contribute software-generated manipulatives or education pages

**URL:** [http://wme.cs.kent.edu/geosvg/](http://wme.cs.kent.edu/geosvg/)

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