

# 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.

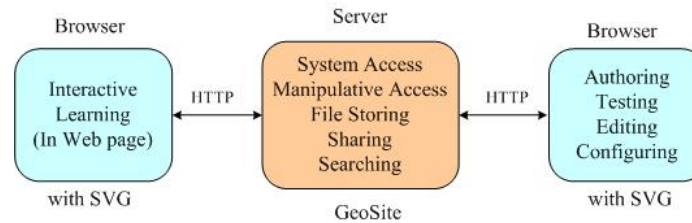
**Dynamic Geometry System (DGS):** software for authoring geometry manipulatives. It simulates ruler and compass constructions and allows users' interactive dragging without changing the underlying geometric relationships.

**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

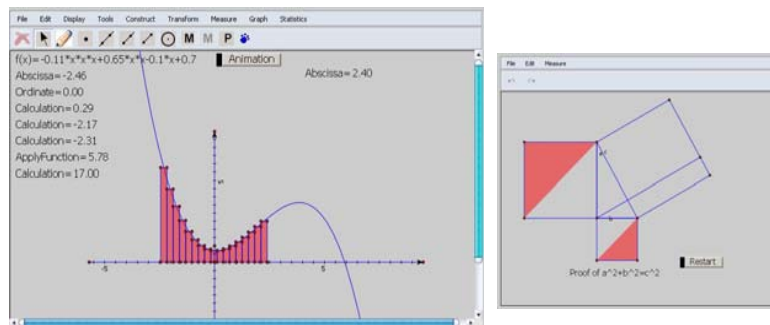
**GeoSite:** a Web application built upon and demonstrating the GeometryEditor system

## 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)



**URL:** <http://wme.cs.kent.edu/geosvg/>

## 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