NetsBlox: Visual Programming Environment for Teaching Distributed Programming
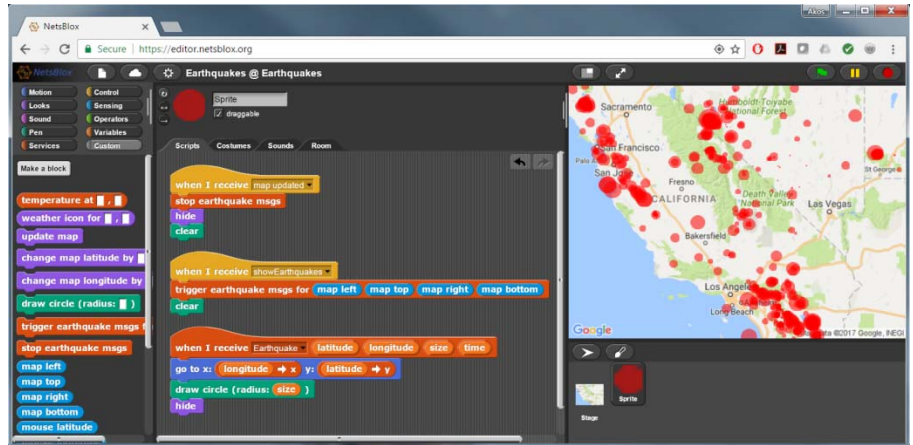
Akos Ledeczi and Brian Broll, Vanderbilt University
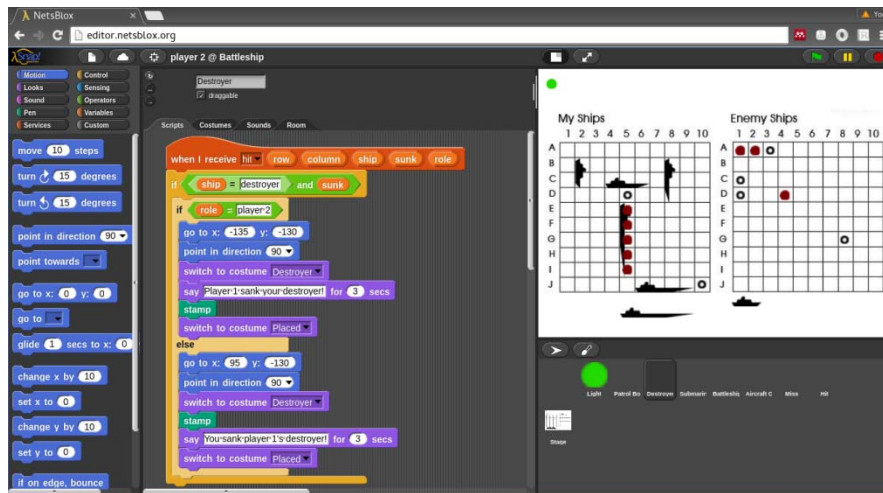
akos.ledeczi@vandebilt.edu

http://netsblox.org

NetsBlox is an open-source web- and cloud-based visual programming environment. Its visual notation is based on Scratch from MIT and uses the open source JavaScript code base of Snap! from Berkeley. Both of these are extremely successful tools in K12 computer science education. NetsBlox adds the capability of networking and enables distributed programming at a level accessible to young learners. This helps teach 21st century skills and makes programming more engaging.
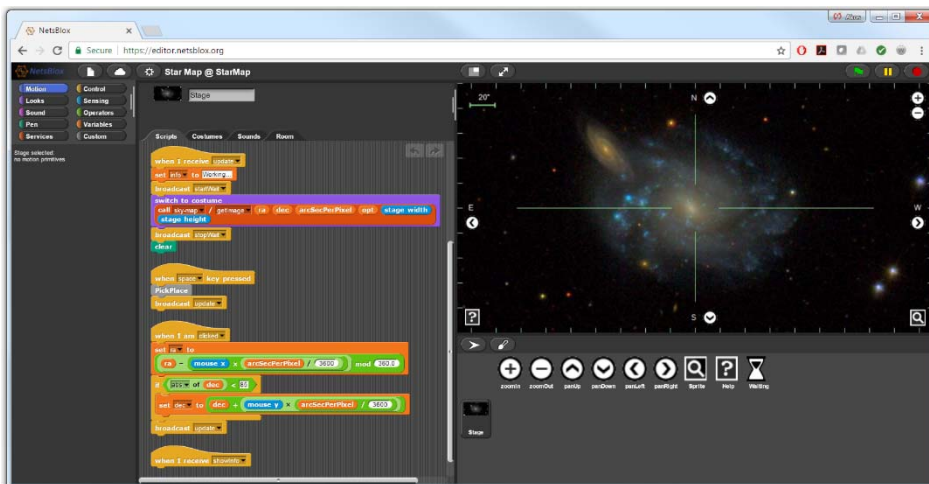

Historical earthquake data for California

NetsBlox also enables programs running on separate computers to talk to each other. Hence, students can write multiplayer games such as Tic Tac Toe or Battleship and other truly distributed programs.

NetsBlox supports collaborative program editing similar to how Google Docs work. This opens up new ways of project-based learning, new ways of teaching as well as enables pair programming even when students are not sitting at the same table. Unlimited undo/redo is also supported.

2-player Battleship game

Interactive map of the sky via the Sloan Digital Sky Survey

NetsBlox opens up the internet with its vast array of public domain scientific and other data sources making it possible to create STEM projects, such as displaying seismic activity anywhere on Earth using an interactive Google Maps background. Similarly, weather, air pollution, and many other data sources such as the Open Movie Database and the Sloan Digital Sky Server are available. We are adding new services on a regular basis. The same facility can help implement more complicated multi-player games by providing server-side support.

STEAM Services

- Google Maps (global)
- Geolocation Services (global)
- USGS Earthquake Data (global)
- Current Weather Conditions (global)
- US Air Quality Information
- Traffic Data
- Sloan Digital Sky Survey
- ThingSpeak IoT Database (global)
- Water Watch
- 2017 Solar Eclipse Path and Temperature Data
- Charting
- Pixabay Image Database
- Google Trends (global)
- Twitter (global)
- The Movie Database (global)
- British Museum Collection
- Trivia
- Key-Value Store

Game Services

- N Player Game
- Connect N
- Battleship
- Hangman
- Twenty Questions

Representative Networking Projects

- Chat Room
- Text Messaging
- Mesh Network Around the Table
- Shared Whiteboard
- Morse Code Messaging
- Multi-Player Games

Unique Features

- Online Collaboration (like Google Docs)
- Full Undo/Redo (per sprite undo queues)
- Replay History (YouTube like interface)