

3D ELECTRIC CIRCUIT EMULATION SOFTWARE



CHALLENGE

Client:

Modlin Education Pty Ltd (www.modlin.org) is a leading multimedia education company offering flexible customized solutions for both individual students and corporations.

Modlin Education Pty Ltd was contracted to develop a 3D system intended to emulate the behavior of an electronic discovery system that helps children learn about the world of technology as they create their own inventions using electronic building blocks without any knowledge about electronics. The software was supposed to enable assembling an electric circuit on the screen before making a physical analog with real blocks. Modlin Education Pty Ltd decided to outsource the project to an offshore vendor that had strong expertise in developing 3D applications. After thorough consideration, the company chose Intetetics Inc. as a software vendor that met the strictest requirements. Our tasks involved the following:

- creating a functional specification to cover the essential functionality of the software;
- developing the graphic design of the system and the 3D models of the blocks;
- programming the

functional features of the system;

- tuning the system performance;
- testing the functionality of the system implemented.

Other important requirements were that the software should be both Windows and Mac OS compatible and that it should have a special limited version available online via a Web browser.

SOLUTION

Since the software had to heavily utilize 3D graphics, to be Windows and Mac OS compatible, and to have a Web version, we chose the Macromedia Director technology to implement the system. Autodesk 3D Studio Max was selected as a 3D-modeling tool.

Our 3D designer team modeled the blocks so they looked as the original blocks and at the same time contained as few small details as possible to increase the performance of the application. The model dimensions were thoroughly adjusted to ensure that different blocks could be assembled in the same way as the real ones.

The programming team developed an algorithm that allowed the user to assemble the blocks in circuits and simulate the electric processes that occur

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in the real system. Such features as saving a circuit and loading a previously saved one, zooming, printing, and others were also implemented. The quality control engineers tested the system on the Windows and Mac OS platforms from both functionality and performance perspectives.

Technologies Utilized

- MS Windows 98SE/ME/2000/XP, Mac OS 9.2/X
- Macromedia Director MX 2004
- Autodesk 3D Studio Max

RESULTS

The software that we developed allows the user to design an electric circuit on the screen and verify it on the computer before

assembling the system using real blocks. The circuit can be zoomed, saved, loaded, or printed out. Using Macromedia Director, a professional multimedia authoring tool, allowed us to create an impressive 3D interactive application. The program window consists of two parts:

- a tabbed area with blocks that the user can choose to build an electric circuit;
- a working area for the user to assemble circuits from available sets of blocks and simulate how the system works.

Among the most important features of the system are the following:

- blocks drag-and-drop capability;
- blocks automatic “snap” orientation;

- eight 45° block rotation positions;
- verification of the block positions based on actual shape of blocks;
- two operation modes move and action;
- save and load functionality;
- context Help.

The compatibility for the Mac OS system ensures that the software can be marketed to the Mac community which is especially important because Macintosh computers are commonly used in the education area.

The system helps the customer promote the original product more efficiently by letting the potential customers try how the system works before buying it. The application is available as a free trial and as a paid stand-alone product.