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Abstract: There are many efforts around the world to introduce children to computer programming, such as code.org, Khan Academy, LEGO Mindstorms and the Raspberry Pi. Visual programming languages have come to play a prominent role in this movement. However, most of these efforts focus exclusively on the computer and neglect an equally important concept, the network. Nevertheless, the majority of computer applications we and our children interact with daily rely on the network to provide their functionality. The web, texting, Twitter, Facebook and other social networks, multiplayer games, Pandora, Netflix, Amazon, Siri, Google Maps and YouTube are just a few of the most popular examples.

Teaching distributed programming presents an opportunity, because children already use the technology every day and their natural curiosity will provide excellent motivation for them to learn more about it. We believe that with the help of a carefully designed visual representation, an intuitive user interface and a sophisticated cloud-based infrastructure, it will be possible to teach some of the key underlying concepts of distributed computation to high school students. To this end, we have developed a new web-based learning environment called NetsBlox. NetsBlox introduces a few carefully selected visual abstractions that enable children to create distributed computing applications. These include multi-player games as well as client-server applications where student programs have access to publicly available online data sources, such as weather, air pollution, seismic activity, etc., making it possible for them to create novel science projects.

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