


3-2019

# An Interactive, Graphical Simulator for Teaching Operating Systems

Joshua W. Buck

Saverio Perugini

Follow this and additional works at: [https://ecommons.udayton.edu/cps\\_fac\\_pub](https://ecommons.udayton.edu/cps_fac_pub)

 Part of the [Graphics and Human Computer Interfaces Commons](#), and the [Other Computer Sciences Commons](#)

---

# An Interactive, Graphical Simulator for Teaching Operating Systems

Extended Abstract

Joshua W. Buck and Saverio Perugini

Department of Computer Science

University of Dayton

Dayton, Ohio

joshua.buck993@gmail.com

saverio@udayton.edu

## ABSTRACT

We demonstrate a graphical simulation tool for visually and interactively exploring the processing of a variety of events handled by an operating system when running a program. Our graphical simulator is available for use on the web by both instructors and students for purposes of pedagogy. Instructors can use it for live demonstrations of course concepts in class, while students can use it outside of class to explore the concepts. The graphical simulation tool is implemented using the React library for the fancy UI elements of the Node.js framework and is available as a web application at <https://cpudemo.azurewebsites.net>. The goals of this demonstration are to showcase the demonstrative capabilities of the tool for instruction, share student experiences in developing the engine underlying the simulation, and to inspire its use by other educators. An article describing this software simulation and demonstrating its pedagogical capabilities is available at <https://arxiv.org/abs/1812.05160>.

## CCS CONCEPTS

• **Social and professional topics** → **Computing education**; • **Applied computing** → **Computer-assisted instruction**; • **Software and its engineering** → **Process management**; **Scheduling**.

## KEYWORDS

Node.js; operating systems pedagogy; process scheduling; React library; semaphore processing.

## ACM Reference Format:

Joshua W. Buck and Saverio Perugini. 2019. An Interactive, Graphical Simulator for Teaching Operating Systems: Extended Abstract. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education (SIGCSE '19)*, February 27-March 2, 2019, Minneapolis, MN, USA. ACM, New York, NY, USA, 1 page. <https://doi.org/10.1145/3287324.3293756>

---

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

*SIGCSE '19, February 27-March 2, 2019, Minneapolis, MN, USA*

© 2019 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-5890-3/19/02.

<https://doi.org/10.1145/3287324.3293756>

## ACKNOWLEDGMENTS

This material is based upon work supported by the National Science Foundation under Grant Numbers 1712406 and 1712404. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

The source of the underlying simulation engine is a course project designed by John A. Lewis in which students design and implement a program that simulates some of the job and CPU scheduling, and semaphore processing of a time-shared operating system.