“The Game of Life” – An Outreach Model for High School Students with Disabilities

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ABSTRACT
In this hands-on special session, attendees will learn about and use a Game of Life cellular automata framework (Java) to assist with outreach activities. Using the framework, students with no prior programming experience can create interesting behaviors within thirty minutes. The special session leaders have successfully used this approach for thirteen years in a one-week summer workshop for disabled high school students. The SIGCSE special session will include an introduction to the framework and keys to its success as an outreach activity, followed by participants solving, programming, and proposing specific problems. Attendees will be equipped to guide Game of Life outreach activities at their own outreach events.

Categories and Subject Descriptors
K.3.2 [Computer and Information Science Education]: Computer science education.

General Terms: Human Factors.

Keywords: Outreach, Game of Life, Disabilities

1.0 OBJECTIVE
With SIGCSE 08’s theme of “Diversity through Accessibility”, this special session will fit the mission by demonstrating a workshop model designed for high school students with disabilities to experience computer science and the art of programming [5]. The workshop is part of the larger DO-IT (Disabilities, Opportunities, Internetworking, and Technology) summer study program at the University of Washington. Over 50 high school students have participated in the workshop over 13 years.

The workshop model and Game of Life framework were designed for high school students with disabilities, but the model extends to outreach activities for all high school students. With the decline in Computer Science enrollments, it is critical that we recruit pre-college students to the discipline [6].

This special session is intended for high school and college/university educators who would like to adopt an outreach model to develop their own workshops that reach out to students, especially women, minorities, and persons with disabilities to draw them into computer science and programming. Because the Game of Life framework is based on cellular automata, complex behaviors can be created in few lines of code, which is especially appealing to students with little programming experience. Outreach workshops using the Game of Life framework can take as little time as two hours and as much as one week, depending on the complexity of the posed problems.

2.0 OUTLINE OF SESSION
Both participants will be joint special session leaders. The following list outlines the time allocated to the topics/activities proposed for the special session.

- Introduction to the special session [5 minutes]
- Background on workshop model [10 minutes]
- Background on Game of Life Framework and cellular automata [10 minutes]
- Examples of games/puzzles/image processing created by students in the workshop [10 minutes] (See Figures 1 and 2).
- Group brainstorm of activities/behaviors to program (Presenters will provide a list to get people thinking) [5 minutes]
- Hands-on creation of behaviors by session special attendees [25 minutes]
  - Presenters will provide thumb drives with necessary files and a wiki to download files (assuming a wireless connection is available at the conference center).
  - Attendees will work in small groups, such that each small group has a laptop available.
- Wrap-Up and discussion about adaptations to the workshop model to work for a 1-hour outreach session to a full week summer camp. [10 minutes]

Special session attendees will receive the following materials: handouts detailing the Game of Life framework, software for the Game of Life framework, examples of activities, examples of activities created by students with disabilities. In addition, a wiki will be available prior to the SIGCSE conference for potential attendees to download the software. The wiki will serve as a discussion center after the conference for attendees to continue conversations about using the framework for outreach activities and for uploading new behaviors.

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Providing opportunities for pre-college students to gain exposure to computer science is important to the growth and stability of our discipline. This special session provides attendees a model and resources to use for outreach opportunities. Similar to Alice, Lego Mindstorms, Robocode, and CS Unplugged, the intent of this special session is to provide an alternate format for outreach that gets students designing and programming quickly without the burden of complex IDEs and a semester of language instruction [1,2,3,4].

The special session will cover the outreach model and Game of Life framework (rules for programming cellular automata). When providing background about the framework to high school students with no programming background, this takes approximately 30 minutes. Since the special session attendees will be computer scientists, we expect this to take 10 minutes, as indicated in the previous section. Half of the special session will be dedicated to brainstorming ideas with session attendees and providing them an opportunity to create their own programs.

Feedback from the attendees will take the form of verbal brainstorming. Through these discussions, attendees can learn from each other and gain tips from the special session presenters.

ACKNOWLEDGMENTS
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REFERENCES