Putting the 'Fun' Back in Fundamentals: Using Games to Teach Object-Oriented Design Early

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Over the last several years, object-oriented design and implementation has become a mainstay in introductory computing courses. Mainstream programming languages like C++, C#, and Java as well as recommendations by the ACM/IEEE Joint Task Force on Computing Curriculum have helped to spur the acceptance of object-oriented approaches in the classroom. Unfortunately, deployments of object-oriented techniques in the classroom have met with mixed results. Some instructors and researchers have noted a lack of materials for object-oriented approaches, insufficient time and background for instructors to learn object-oriented techniques, as well as the additional overhead incurred by students who must learn object-oriented techniques along with traditional procedural approaches to programming. However, those who have encountered success with the object-oriented paradigm note that object-oriented principles must be introduced early on (an "objects-first" approach), that assignments should be complex and compelling from the earliest stages, and that object-oriented design as a way of thinking is paramount.

Over the last several years, members of the Innovations in Computing Education research group have been using the construction of games as a way to motivate objects-first curriculum reform. In this presentation, we will examine several games-based projects that were presented to first year students. The games to be discussed include Tetris, Asteroids, Othello (Reversi) and SuperNibbles/Tron Light Cycles. We examine each of the projects from the standpoint of design methodology and best object-oriented practices. Besides being fun and motivating, use of these games effectively exercises object-oriented techniques. We will also discuss students' experiences with these projects and lessons learned by the instructors.