A Game-Centered, Interactive Approach for Using Programming Exercises in Introductory Physics CHRIS ORBAN, Ohio State Univ - Columbus — Incorporating computer programming exercises in introductory physics is a delicate task that involves a number of choices that may have a strong affect on student learning. We present an approach that speaks to a number of common concerns that arise when using programming exercises in introductory physics classes where most students are absolute beginner programmers. These students need an approach that is (1) simple, involving 75 lines of code or substantially fewer, (2) easy to use, with browser-based coding tools, (3) interactive, with a high frame rate to give a video-game like feel, (4) step-by-step with the ability to interact with intermediate stages of the "correct" program and (5) thoughtfully integrated into the physics curriculum, for example, by illustrating velocity and acceleration vectors throughout. We present a set of hour-long activities for classical mechanics that resemble well-known games such as "asteroids", "lunar lander" and "angry birds". Importantly, these activities take advantage of the game-like environment to give students a feel for the physics. We plan to assess learning gains using an animated version of the Force Concept Inventory originally developed by M. Dancy.

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