

# Abstract

Programming is difficult to learn, even at the early stages. Beginner programmers need to master abstract algorithmic thinking and problem-solving. The complex syntax, the extensive vocabulary of programming languages and semantic issues make it difficult for novices to acquire the necessary programming skill set. Although block-based tools support the first steps, transitioning from these to text-based programming is challenging. This paper presents an intermediate frame-based tool that can facilitate the transition from block-based editing to frame-based languages, mainly from Scratch to Python. This frame-based Python editor is developed as an addition to the Pytch application, developed at Trinity College Dublin. The editor was designed to combine aspects of block-based and frame-based editing to allow users to discover the programming mindset and improve problem solving while familiarising themselves with correct Python syntax. A functional frame-based editor prototype has been developed and integrated with the Pytch environment. The frame-based Python editor's preliminary evaluation tools, a workshop and a survey have been created. The study finds that the developed frame-based Python editor is likely successful at easing the transition from Scratch to Python, however further evaluation is needed. The prototype developed in this project can be used as a basis for further development, due to its modular and scalable structure.