

A Mobile Web-based Approach to Introductory Programming

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ABSTRACT

In this paper an approach for teaching introductory programming courses using mobile web-based technologies is introduced. This approach focuses on using standard Web technologies, such as HTML, JavaScript, and Cascading Style Sheets to make teaching computer programming fun, especially for users of mobile devices. This approach is supported by the CMER Academic Kit for integrating mobile devices into the Computer Science Curriculum.

Categories and Subject Descriptors: K.3.2 [Computing Milieux]: Computer and Information Science Education – *computer science education, curriculum, human factors, literacy*.

General Terms: Algorithms, Design, Experimentation, Languages.

Keywords: Mobile application development, mobile devices, BlackBerry, programming for fun, teaching computer programming, teaching tools.

1. Introduction

With the widespread use of mobile devices such as smartphones and pocket personal computers, there is a great need for innovation in Computing education to reflect today's reality [2]. For example, students in introductory programming courses usually develop and test their programming assignments on a platform similar to the one on which they will be tested by the instructor or teaching assistant. However, this is not the case for mobile applications which are developed on one platform such as Microsoft Windows or Linux and deployed on a totally different platform such as a BlackBerry smartphone [1]. A great opportunity exists for introducing students to different programming models which will not only be very practical but can also inspire students to be excited about learning. Those students, equipped with the most current training in this field, may play a key role in driving innovations in the mobile space. This paper presents a mobile web-centric approach for teaching introductory programming courses.

2. The Approach

Several papers have been published describing approaches for teaching introductory programming, that have ranged from using computing games, to robotics, to special environments such as Alive, Scratch, and Greenfoot. Each approach has its pros and cons, but I believe the context in which programming is taught is important and relevant for student learning. I believe that the use of the Web and Mobile Devices as a context is particularly interesting as these technologies provide a medium that the students are familiar with and could easily relate to. The approach focuses on using HTML, Cascading Style Sheets (CSS), and

JavaScript for developing simple Web applications, and later to use the same technologies for developing mobile applications that will run on their own devices. This approach is attractive as student use simple tools to build powerful applications, and students do not need to worry about cryptic error messages as the applications they develop run in browsers which are forgiving.

3. Software Tools

The software tools needed depend on which mobile platform you wish to target. For BlackBerry smartphones for example, you'll need the BlackBerry Widget SDK (or WebWorks) which is a free open source project. This tool, which is an Eclipse Plugin, comes with all the necessary utilities for developing, compiling, and running mobile applications on the BlackBerry simulators. These simulators, which are available free of charge, provide a low-barrier entry to get started with mobile application development. However, for some applications that make use of the camera or GPS, it is best to test the applications on a real device and students are also excited about this. However, in order to run Widgets on devices, they need to be signed and the instructor and/or students need to apply for signing keys from RIM (www.blackberry.com/SignedKeys). There is a \$20 cost, and given the low cost, it is recommend that each student obtains his/her own signing keys.

4. Instructor Resources

The CMER Academic Kit [3] has been created to facilitate the integration of mobile devices into the Computing curricula. The kit, which is available free of charge, takes a mobile approach to teaching Computing content with a focus on Java ME, BlackBerry application development, and Web-based Mobile Apps. The academic kit contains 30 weeks worth of teaching material including lesson slides, labs, tutorials, quizzes and assignments.

5. Conclusion

The popularity of mobile devices among students is inspiring faculty to look for ways to teach students how to develop mobile applications, and the use of HTML and JavaScript present a powerful opportunity for teaching introductory programming for mobile devices. This approach is supported by the CMER Academic Kit which is available free of charge for academic use.

6. References

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