Chapter XL
From Single to Multiplayer Mobile Bluetooth Gaming

Daniel C. Doolan
University College Cork, Ireland

Kevin Duggan
University College Cork, Ireland

Sabin Tabirca
University College Cork, Ireland

Laurence T. Yang
St. Francis Xavier University, Canada

ABSTRACT

The growth of mobile phone sales is phenomenal, with estimated sales for 2007/2008 expected to be approximately $1 billion. The majority of these devices are Java-enabled, giving rise to a huge market within the realm of computer games. Most of today's mobile games are designed to execute on as many phones as possible. Thus, they focus on MIDP 1.0 technology; such devices have very limited resources compared to the top-of-the-line phones of today. The primary reason for this is to maximize profits by having the game reach as wide a potential market as possible. Mobile technology is ever advancing, and the capabilities of the lower-end devices will continue to improve. Perhaps in the not-too-distant future, we will see all of the lower-end mobiles Bluetooth-enabled and supporting more advanced Java implementations. This chapter examines the world of mobile gaming. In particular, it looks at what is needed to produce a single-player game and what elements are necessary to modify it to allow for multiplayer gaming over a Bluetooth network. A framework is presented to allow for the rapid transformation of a single-player to multiplayer game, along with a game engine that can be used for the development of the graphical elements, such as the background and sprites. The multiplayer framework makes use of the Mobile Message Passing Interface (MMPI) to simplify the creation of the network connections and interdevice communication.

INTRODUCTION

The area of computer gaming is a huge multibillion-dollar industry. One of the first computer games developed was called Spacewar for the PDP-1 computer in 1961. The game consisted of two player-controlled spaceships flying about a central star, each trying to destroy the other. The first generation of PC-based games was generally text adventures or interactive fiction. This was due to the early computers having very limited resources and graphic capabilities. The Commodore 64 personal computer was introduced in 1982 and stayed on the market until it was discontinued in 1994. During that period, thousands of titles were developed for it, many of which included games such as Platoon, Ghostbusters, and Commando. The Commodore 64 had a processor of approximately 1Mhz and 64KB of memory. This is in stark contrast to many of the fairly standard smartphones of today such as the Nokia 6630 and 6680 that feature a 220Mhz processor and several megabytes of system memory. Other machines of the 1980s included such systems as the Apple II, Sinclair ZX Spectrum, Amstrad CPC 464, Atari, and IBM PC. All the games of this era were 2D type games with limited bit depth. In 1991, id Software produced one of the first first-person shooter games called Hovertank 3D (1991), which represented a breakthrough in gaming featuring the first use of real-time software-rendered 3D graphics. The following year, Wolfenstein 3D (1992) became the first commercially successful first-person shooter game (originally released May 5, 1992). The year 1993 saw the release of Doom on the PC, which was hailed as a breakthrough in 3D computer graphics and also supported networked multiplayer gaming. In the intervening years, the quality of level of realism of computer games has increased dramatically with releases of such games as Duke Nukem 3D, Quake, Half-Life, Halo, Age of Empires, and Settlers. 3D graphics libraries such as DirectX and OpenGL have also matured and are used in a substantial number of modern-day games. The year 2005 saw the release of the AGEIA PhysX (AGEIA, 2006) hardware-based physics engine, removing the need for complex physics-based calculations to be carried out in software. That and the advancement of graphics cards capable of carrying out many of the expensive operations in hardware meant that the games of today have a very high level of realism.

Such is the demand for mobile computing products that the European Union market penetration averaged 111% for the year ending 2006, while only four years before, it stood at 80%. Clearly no longer are we happy owning just one mobile phone. Luxembourg recorded a record high penetration rate of 156% in 2005, although this dropped to 138% in 2006.

All modern mobile phones are capable of running games, usually Java- or BREW-based. A typical example of this is the game DOOM RPG (Doom, 2005) (released September 19, 2005), which is available in both formats. The primary focus of this chapter is with regard to the development of Java-based games (MIDlets), specifically how one can develop a single-player game and rapidly transform it into a multiplayer game with minimal changes.

BACKGROUND

Games, games, games! Just about everybody loves to play games, each person having their own particular preference of game genre. Games are usually classified into a selection of genres that reflect the type of game play. There is a general lack of commonly agreed upon criteria for defining particular genres. This is further complicated as many games may overlap particular classifications; for example, a game could have elements of action, strategy, and role-playing. Many of the main game classifications include strategy, role-playing, adventure, platform, simulation, and sports. The majority of games available for mo-