DCInternet

# Wireless Programming Using J2ME and MIDP

**Description:** This course introduces experienced Java programmers to the Java 2 Micro Edition (J2ME) with the Mobile Information Device Profile (MIDP), the profile defined within the J2ME for small mobile devices such as cellphones and PDAs. The course begins with the J2ME architecture, focusing on wireless programming via the Connected, Limited Device Configuration (CLDC) and the MIDP. Students learn the simple Core API of the CLDC – primarily by contrast to the Java 2 Standard Edition Core API. Students then study user-interface design, which is dramatically different from standard Java, including high- and low-level UI frameworks, and how to use commands and events. Students then study the MIDP Record Management System for limited persistent storage on the device, and then work on mobile networking. Students then develop effective coding techniques including multithreading, memory management, controlling object creation and reuse, string manipulation, and array-based memory management. The course ends with good MIDP programming practices and a discussion of MIDP in the larger context of networked applications and J2EE components.

**Audience:** Experienced Java developers moving into wireless technology.

**Prerequisites:** Java Programming or equivalent experience.

## Course Contents

### MODULE 1. THE JAVA 2 MICRO EDITION

#### 1.1 THE J2ME ARCHITECTURE

- Java 2 Editions
- Programming for Wireless Devices
- Standalone Applications
- Networked Applications
- It's a Jungle Out There
- The Need for J2ME
- The J2ME Software Layer Stack
- Virtual Machines
- Configurations
- Profiles
- The CLDC and the KVM
- The Mobile Information Device Profile
- J2ME in Context
- J2ME Programming Challenges
- The Wireless Toolkit
- Wireless Toolkit Setup
- The MIDP Emulator
- KToolbar
- Utilities
- J2SE Tools
- J2ME Development Process
- Code Security
- Deploying MIDlet Suites
- Cross-Platform Testing

#### 2.4 THE RECORD MANAGEMENT SYSTEM

- The Challenge of Persistence
- Common Scenarios
- The Record Management System
- The RecordStore Class
- A Single Class
- Scope of Record Storage
- Managing Record Stores
- Defining a Record
- Reading Record Data
- Record IDs
- Deleting Records
- Record Enumeration
- The RecordEnumeration Interface
- Version and Time Stamp
- Byte Arrays and Data Streams
- The Clean-Database Utility
- Data Compression
- Advanced Record Enumeration
- Filtering Enumerations
- Sorting Enumerations
- The RecordListener Interface
- MVC Using the Record Store
- "Live" Enumerations


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#### 1.2 THE CONNECTED, LIMITED DEVICE CONFIGURATION

- The K Virtual Machine
- Missing Pieces
- Language Simplifications
- Virtual Machine Simplifications
- The Java Application Manager
- The CLDC API
- Differences Between CLDC and J2SE
- Object Model Simplifications
- API Simplifications
- DON'T PANIC
- Compiling for CLDC
- The java.lang Package
- The java.util Package
- CLDC Collections API
- The java.io Package
- Object Serialization
- Implementing Persistence
- The javax.microedition.io Package

#### 1.3 THE MOBILE INFORMATION DEVICE PROFILE

- Relationship of MIDP to CLDC
- MIDlets
- MIDlet Lifecycle
- The MIDP User Interface Model
- Presentation
- User Input
- WTK Device Emulation
- MIDP Execution Environment
- MIDlet Suites
- Packaging and Deploying MIDlets
- Application Descriptors
- Loading Packaged Resources
- MIDP Deployment "Over the Air"
- MIDP in Context
- Future Directions



### MODULE 2. MIDP PROGRAMMING

#### 2.1 THE HIGH-LEVEL USER-INTERFACE API

- MIDP User Interface Design
- Patterns to Jettison
- Patterns to Preserve
- High and Low Levels
- The Displayable Hierarchy
- Organizing a UI by Screens
- The Wireless Toolkit
- Wireless Toolkit Setup
- The UIDemo MIDlet
- Forms and Controls
- The Form Class
- (Lack of) Layout Control
- The Item Class
- The TextField Class
- Input Validation
- The DateField Class
- The ChoiceGroup
- The Choice Interface
- Static Text and Images
- The MIDlet as Manager

#### 2.5 NETWORKING

- Challenges of Wireless Networking
- Wireless Network Diversity
- The CLDC Networking Package
- A Weakly-Typed System
- Supported Protocols
- The MIDP Implementation
- Hypertext Transfer Protocol
- HTTP Headers
- Common Gateway Interface
- Building an HTTP Client
- The Connector Class
- Making an HTTP GET Request
- Reading Information
- Controlling Download Size
- Local HTTP Service
- The WTK Network Monitor
- Monitoring the Briefing MIDlet
- The HttpConnection Interface
- HTTP POST Requests
- Two-Way Communication
- Mobile Access to Web Services

### MODULE 3. EFFECTIVE MIDP PROGRAMMING

#### 3.1 THREADS AND TIMERS

- Threads
- Thread Class and Runnable Interface
- Defining Thread Behavior
- Spawning a Worker Thread
- Timers and TimerTasks
- The Timer Class
- The TimerTask Class
- The Wireless Toolkit
- Wireless Toolkit Setup

#### 3.2 MEMORY MANAGEMENT

- Memory Management
- The WTK Memory Monitor
- Weak Spots
- Data Compression
- Memory Metrics
- Scribble Analysis
- Costs of Object Creation
- Reducing Object Usage
- Taking Out the Trash
- String Manipulation
- String Math – Behind the Scenes
- The Worst Thing You Can Do

- Flow Control
- The Datebook MIDlet
- Alerts
- Lists and TextBoxes
- Customizing High-Level UIs
- Tickers

#### 2.2 THE LOW-LEVEL USER-INTERFACE API

- The Canvas Class
- The Graphics Class
- Drawing Graphics
- Patience, Patience
- Rendering Text
- The Font Class
- Calculating Text Position and Size
- Selecting a New Font
- Working With Images

#### 2.3 EVENT HANDLING

- Delegation-Based Event Handling
- Costs and Benefits
- MIDP Event Architecture
- High-Level Event Handling
- The Command Class
- The CommandListener Interface
- Sequence of Events
- Commands and Menus
- Unicast Event Model
- Item State Changes
- Custom Events
- The Model/View/Controller Pattern
- Benefits of MVC
- Model/View Split in MIDP
- Model Events
- Low-Level Event Handling
- Key Codes and Game Actions
- Keypad Input
- Portable Key-Event Handling
- Key Names
- Pointer Input
- Discovering Event Support

#### 3.3 BEST PRACTICES

- Exception Handling
- Finally, You're Cleaning Up!
- MIDP Development Guidelines
- Effective Use of Threads
- Bandwidth Emulation
- Portable Code
- Conditional Shutdown

#### 3.4 MOBILE DEVICES IN DISTRIBUTED SYSTEMS

- Server-Side Support
- The Java 2 Enterprise Edition
- Enterprise Requirements
- J2EE Technology
- Three-Tier Architecture
- Three Tiers for J2EE
- Java DataBase Connectivity
- Enterprise JavaBeans
- Servlets
- Java Server Pages
- PC-Based Clients
- Fat and Thin Clients
- Mobile, Wireless Clients
- Mediation
- Supporting MIDP Devices
- WAP and WML
- Web Services



**Duración aproximada:**
35-40 horas (40 horas cuando se incluye una hora para descanso)

**Incluye**:
Material de los cursos, mochila y diploma de participación.

**Nota:**
El material está en inglés técnico.

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