

## Mobile Application Development

### About Course

This course is specially designed to fulfill the requirements of Mobile Software Developers of various telecom companies given below. Here we target specially the wireless applications based on the client server architecture. As we are moving towards 4G communication world, we are trying to put more and more services on our mobile terminal, offered through the cellular systems. Because of the limited memory and processing capability of the mobile handsets, embedded technologies are coming as right design possibilities for these services.

This course creates a strong foundation for an embedded systems developer. After this course the student will be capable to design and implement the Mobile Applications using cutting edge development tools.

The Student will be capable to write applications to communicate with a **GSM** modem through a **Bluetooth** based environment. He will be comfortable in writing **Pocket PC** application and other small applications for handheld devices on **WinCE 5.0 and Symbian** Operating Systems.

**"Genius might be that ability to say a profound thing in a simple way."**

—Charles Bukowski

### Targeted Companies:

- L & T Software, Bangalore
- LGSoft, Bangalore.
- SASKEN, Bangalore.
- Stryker, Gurgaon
- Samsung India Software Operation, Bangalore.
- FreeScale, Noida
- Conexant, Noida
- Qualcomm, Hyderabad.
- Tata Elexi, Bangalore
- Persistent Systems
- ST Microelectronics, Noida
- Samsung India Software Center, Noida
- Jinvani Systech Inc. USA.
- Dilithium Networks, Noida.
- Mediatek Inc, Noida.
- Sirf Technologies, Noida.
- HCL
- Wipro

## Objective:

After completing this course, students will be able to:

- Gaining Expertise in C & C++ Programming with data structures.
- Hands on debugging expertise in MSDEV VC++ environment,
- Using VC++ 6.0, MFC, COM, DCOM, ATL, Active X.
- Developing Mobile Application in
- Understanding of Real Time Operating Systems.
- Understanding Bluetooth Based wireless communication between host and mobile device.
- Gaining expertise in Remote Controlling Applications, Controlling a device in a wireless environment through host PC.
- Controlling a GSM/GPRS modem through PC. Sending SMS through PC.
- Understanding Mobile Monitoring and Video Streaming Applications.
- Understanding Symbian (Series 60) platform of Nokia, N-series Mobile phones.

## Who is it for?

BE/B.Tech/MCA/MTech/MS in Computer Science, IT, Electronics, Electrical, Instrumentation and Communication Engg graduates.

This course is aimed at those wishing to enter into Mobile Application and System Software development world. In addition, the course will appeal to technical managers, analysts and strategists wishing to increase their technical understanding of the subject areas.

## Course Contents

### Introduction to Mobile Operating Systems.

- WinCE 5.0 Overview.
- Developing Mobile Applications using eVC++ 4.0
- Debugging Mobile Applications through WinCE 5.0Emulator.
- Symbian Overview (Nokia-N-Series Framework).
- Understanding Mobile Architecture.

## Modem Communication

- Communicating with a GPRS Modem
- Writing SMS based Applications.
- Writing Wireless Applications.
- Understanding Bluetooth SDK.
- Developing Bluetooth Applications.
- Controlling Device through Bluetooth.

## Client/Server Computing

- Computer Networks, Switching and Signaling
- Understanding Communication Protocols.
- Understanding IP Addressing and sub-netting concepts.
- Gaining Expertise in TCP/IP Fundamentals and its Architecture.
- Designing of some web based device controlling applications.
- Design and Development of a Client/Server Applications on TCP/IP protocol suite.
- Transferring real time sound data through Winsock interface.
- Design and Development of a multi-thread FTP Client/Server Application. The server should handle the security features with proper password authentication.

## Introduction to Window 32 bit Programming Environment

- Windows architecture overview.
- What are APIs? How API provide flexibility to the architecture.
- Structure of the windows programming and flow of control in the paradigm
- Tips to write professional coding, Hungarian notation, correct use the Preprocessor Directive, Calling Convention, Comments, Data Types.

- Migration from C/C++ to Window Programming
- First Scratch program in window API and the Significance of the Program.
- Migration from Win32 Programming to MFC programming in VC++.
- First Scratch Program in MFC without using App Wizard.
- Mapping of the above program with the MFC App Wizard.
- Guide Lines for Practical Session Home Work
- Development of a 64 bit calculator.
- Development of Tic-Tac-Toe Application Game.

## **Gearing Up To MFC AppWizard**

- Sequence of Steps take place when MFC based Windows program get execute in MFC.
- What is Message Map?
- How to use Message Map in MFC?
- What are Messages and How they are connected to message Map?
- Difference b/w Queued and Non-Queued Message.
- Concept of Handle.
- Working with Edit, Button Control.
- Creating Edit and Button Control Dynamically and Statically.
- How to Create Modal Dialog in MFC?

## **Guide Lines for Practical Session Home Work**

- Developing a chat application without using IPC mechanism in a Same Dialog Box.
- Developing a chat application using two different dialogs, one dialog work as server and another work as client. Use Handle to make communication possible b/w client and server.

## **Handling Mouse and Keyboard**

- Interaction .with Mouse and Keyboard Event Programming.
- Concept for the mouse programming and uses.
- Mouse Events.
- Concept for keyboard programming.
- Keyboard Events.

- Working With Timers, Application of Timers.
- Using Status Bar & Toolbar.

### **Guide Lines for Practical Session Home Work**

- Developing a drawing Application with mouse events, displaying the cursor position in the status bar and use timer to display system current time.
- Developing Editor Application using keyboard events.

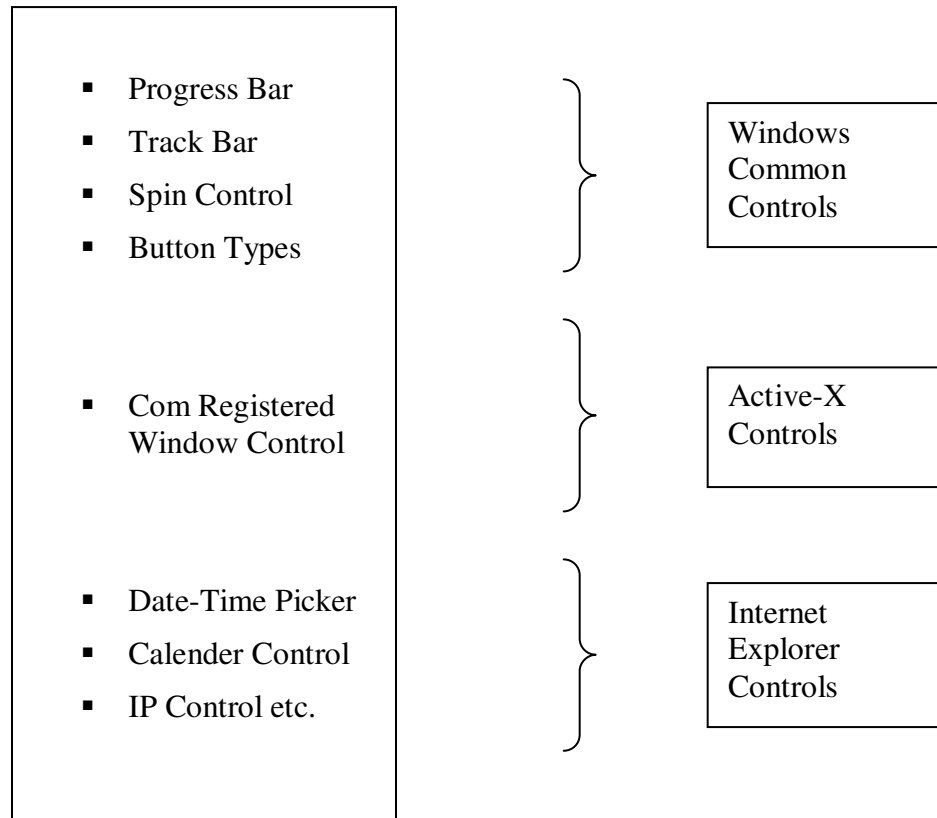
### **The Frame - Document – View –Architecture**

- Relation b/w Frame-Document-View Architecture.
- Discussion of Base Classes of Frame-Doc-View.
- Hierarchy of the MFC classes Frame Work.
- Role of virtual function in Hierarchy of MFC classes.
- Precedence of function in the App, Doc, View and Frame classes.
- Relation b/w Doc – View architecture.
- Creating Menu and Handling Functions for App, Doc, View and Frame.
- Creating Context Menus.
- How to Create Dialogs in the Doc-View Environment.

### **Guide Lines for Practical Session Home Work**

- Create SDI application, make a menu named MyMenu under this create a submenu named Show Timer. On clicking the menu a dialog box open containing a edit control or static control to display the timer. Right click on the Dialog to popup a context menu having two buttons- START TIMER, STOP TIMER. Click these buttons to Start or Stop the Timer.

## Window Common Control Programming



### Guide Lines for Practical Session Home Work

- Developing an integrated application which makes the use of all the controls in it.
- Develop a Font Viewer which looks like same as the original Font Viewer.

## Window Memory Management for 32 bit Platform

- Difference b/w Thread and Process.
- Address Space of Process.
- How virtual memory Works.
- Concept of Heap & Stack.

- Different dynamic memory allocation technique and function, there difference and uses
  - Malloc, New, Free, Delete
  - VirtualAlloc, GlobalAlloc
  - HeapAlloc, VirtualFree
- Memory Mapped Files.
- Some Tips for Managing Dynamic Memory.

## **Multithreaded Environment**

- Window Message Processing.
- Single Thread Application
- Parent Thread and Child Thread relationship.
- Flow of Execution of a program with Threads.
- Communication b/w Worker Thread and Main Thread.

### **Guide Lines for Practical Session Home Work**

- Create a MFC Chat Application using client/server programming in which all clients execute in the multithreaded environment. Any message send from one client or by server will be broadcast to all the clients and to the server also.

## **Process Synchronization in Win32 Environment**

- What is Process Synchronization?
- Need of Process Synchronization.
- Multithreading: How to use Synchronization Classes
- Mutex, Semaphore, Events, Critical Section
- Thread Blocking Functions?
- WaitForSingleObject, WaitForMultipleObject

### **Guide Lines for Practical Session Home Work**

- Developing an integrated application which make the use of the synchronization classes and thread blocking function in order to maintain the synchronization b/w processes.

## Dynamic Link Libraries

- Concept of DLL and LIB
- Advantage and Disadvantage of DLL and LIB
- Type of DLL, Regular DLL , Extended DLL
- Difference b/w Regular DLL and Extended DLL.
- Creation and Calling DLL directly through Win APIs.
- Creation of the LIB.

### Guide Lines for Practical Session Home Work

- Developing a paint application in which apply all the special affects in the DLL and Call the DLL function from the program.

## Projects

### **1. “Design & Development of Camcorder application for WinCE 5.0 based handheld devices PDA, Smart Phones and Pocket PCs” *Miracle Corporate Solutions Ltd. NOIDA***

This Camcorder application is designed on DSHOW frameworks of Windows Operating Systems. DirectShow is a COM based multimedia framework, used to develop complex audio/video applications in windows environment. It gives you a flexible plug-in architecture. We can easily integrate any third party audio/video codec to this application very easily. It can be configured through windows registry settings and can be used with hardware codec support also. It works in viewfinder mode, still mode and video mode, User can record a video or can take a still snap through this applications.

### **2. “Bluetooth Based Controlling Application”, *Miracle Corporate Solutions Ltd. NOIDA***

Bluetooth is a FH-CDMA based short distance wireless communication protocol suite. In this project we learn to control remotely various devices in a wireless domain using Bluetooth connectivity mechanism. It includes understanding of Bluetooth protocol stack, BT device driver and application development on this device driver. It gives a thorough understanding of Wireless Communication. We also control the GSM modem and other such BT enabled wireless devices from host PCs.

### **3. “Development of a Media Player for WinCE 5.0 based PDA/Smart Phones” *Miracle Corporate Solutions Ltd. NOIDA***

Media Player is a Smart Phone application. User can play any kind of media content (asf, avi, wmv, mp4, mov ) through this player. You can configure the player for different frame rates and display settings. You can perform fast forward and reverse operations on this Media Player. This player will be developed on Windows CE 5.0 platform to support Smart Phones.

**4. “Bluetooth Entertainment Server Application”, *Miracle Corporate Solutions Ltd. NOIDA***

This is a VC++ application that interacts with various mobile phones through BT environment. It made a search on all the neighboring mobile phones those are in the range of 15meters. It sends them a request message to connect with the server. If mobile accepts the message from the server, it starts receiving various entertaining stuff from BT Server through Bluetooth wireless connectivity mechanism. We implement entire Bluetooth communication flow as follows.

- Searching the mobile phones.
- Pairing UP the mobile phones.
- Browsing services and Profiles.
- Connecting to a Service Profiles.
- Pushing Images/MMS/Audio automatically from server to each mobile phone,
- Handling events from Mobile phones.
- Releasing the threads and resources.

**5. “Wireless Active Sync Application for Pocket PC on WinCE 5.0”, *Miracle Corporate Solutions Ltd. NOIDA***

This is a Pocket PC application specially targeted for HTC mobile phones. It can synchronize all the data contents of mobile phones automatically with a server through GPRS connectivity. User need not to bother about the limited memory of his mobile phone. This application automatically creates a back up of your phonebook, Image Folder, MMS folder and other data contents on the server. It is automatically launched with the phone boot up. This application is developed on eVC++ 4.0 environment for Pocket PC emulator.

**Training Features**

1. 70% of the training would be Hands on Learning through Real Time Exercises and Projects.
2. Students will develop the Mobile Application and will run it on Real Mobile Phones.
3. Guidance and Interaction with Corporate Leaders and Experts.
4. Complete Placement Assistance.
5. Recommendation to All Client Companies.
6. Free Lifetime membership of Miracle Embedded Group ( A network of already placed candidates) .
7. Provide a strong foundation in the emerging disciplines of Mobile Application, Telecom Systems and its applications for professionals in the software development industry.
8. Will improve the required skill set of the system software professional.

9. Program will provide excellent exposure in VC++ 6.0 and eVC++ 4.0, and its applications in up coming field like Telecom, Wireless communications, Network Management, Automation and Process Controls.
10. Incorporates the required skills and experience on Embedded Systems and RTOS in the professionals for the exponentially growing industrials demands on this line.

### **Points to Note:**

- The study material and references will be provided to the trainees by Miracle Embedded Systems.
- This reference material is developed by our corporate trainers and software engineers from top notch industries.
- There will regular attendance of the student. One has to show at least 75% attendance then only he will be eligible for certification.
- The grades will be assigned on the basis of regular test results.
- There will be recognitions and rewards for well performing candidates.

**Soft Copy available, mail to: [embedded@miracleindia.com](mailto:embedded@miracleindia.com)**

**Training Partners for this Course: Microsoft Inc.**