

Embedded Systems with VC++ 6.0

Synopsis

“Getting the Right Knowledge to the Right People at the Right Time”

Miracle Corporate Solutions (P) Ltd is leading in the software training industry with its unique and result oriented training methodologies on cutting edge domains. We have more than 2000 success stories in a very short span. We believe in quality and commitments.

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 operating systems.

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

—Charles Bukowski

Course Objectives:

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.

Suitable for

Technical professionals; IT and business managers who need to learn about current and future mobile wireless technologies; students studying or researching wireless communications and cell-phone technologies

Prerequisites

A degree (B.E., B.Tech, MCA, M.Tech) in Electronics/Electrical, Computer Science or Information Technology.

Programming experience in C. Working capability on any one operating system (Windows, Linux).

Delivery

This is instructor led Embedded Systems and Mobile Communication training. Each section of the material covered by the tutor is followed by hands-on practical exercises for which worked examples of the solutions are typically provided.

Contents

Advance C Programming

- Basics of C programming
Compilation, Linking, Debugging, Execution
Header Files, Source Files
Declaration & Definition
- Data Types, Scope of variables
Static ,Global ,Local Variables, Loops, Conditional Statement
- Macros, Functions
- Arrays & Pointers & Structures
- Memory APIs, File I/Os.
- String Manipulations.
- VC++ 6.0 Environment (DLL/ Lib /EXE, Workspace Creation)
- Debugging
- Assignments

VC++ 6.0 Win32/MFC Applications

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?

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- 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.

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- 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.

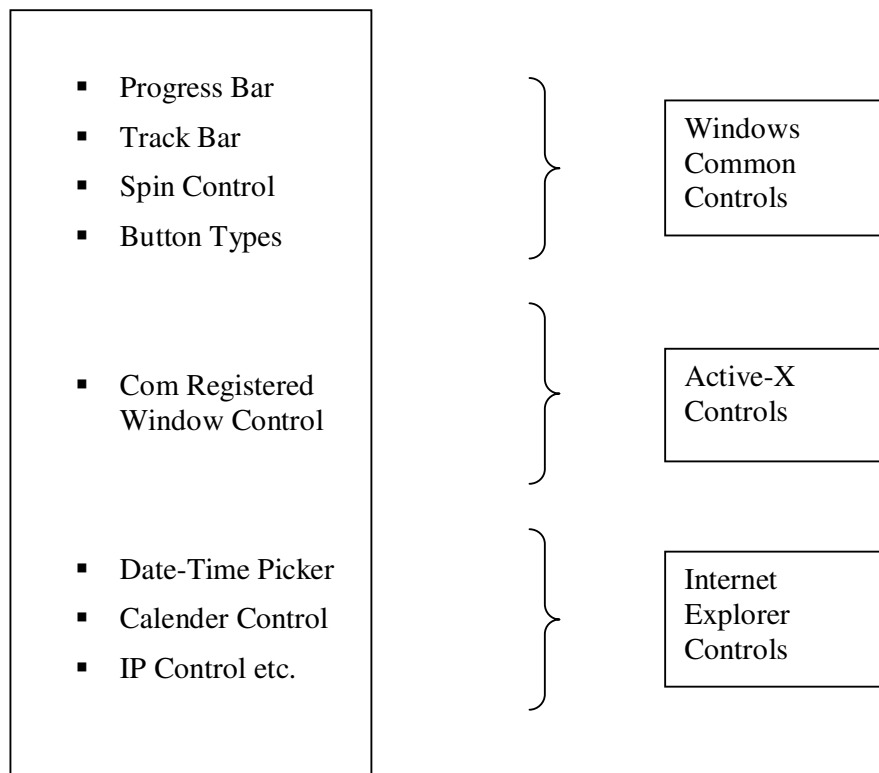
Playing With Graphic Device Interface

- What is GDI.
- What is Device Context?
- Type of Device Context.
- Difference b/w CClientDC, CPaintDC, CWindowDC, CMetaFileDC and there practical use.
- Writing in the View Area.
- Drawing in the View using GDI tools like Pen, Brush.
- Drawing a Bitmap in View as Background.
- Using TextMetric Class

Guide Lines for Practical Session Home Work

- Developing an application which makes the full use of the GDI tools, the best option is to develop a Paint Application which completely behave as the original Microsoft paint application.

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.

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- 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

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- 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.

Data Structure curriculum

Introduction to DS.

- BIG –Oh notation, Algorithm complexity analysis.

Array and pointer:

- Array notation(pointer, direct etc)
- Pointer fundamentals, Pointer operations. Parameter passing as pointers etc.

Linked list Basic

- Data structures, Memory representations, Creation, Destructions,
- Insertion, Deletions(Interview specific)

Linked list Advanced

- Reversing link list(different methods)
- Doubly LL, Circular LL
- Interview questions on LL

Stack and queue

- Stack Fundamentals, implementation
- Queue Fundamentals, Implementation

Advance DS overview

- Trees, Binary Trees, Has Table etc.

Sorting and searching methods

- Various sorting techniques(Merge sort, Quick sort etc)
- Various search techniques(binary search, Radix search etc)

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.

Projects

1. “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.

2. “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.

3. “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.

FACULTY:- CORPORATE PROJECT LEADER FROM CMM LEVEL 5 COMPANY

NOTE: - All training will be given by Corporate Trainers only. All trainers from IIT (M.Tech.) background having four to seven years experience in respected field, working with CMM Level 5 companies

NOTE: The trainee has to sign the Non disclosure Agreement (NDA) before joining any industrial project.

