REAL TIME OPERATING SYSTEM PROGRAMMING-II: Windows CE, OSEK and Real time Linux

Lesson-4:
Files, Registry and Databases for storing data

1. WCE Files

Chapter-10 L04 "Embedded Systems - Architecture,
Programming and Design" , Raj Kamal, Publs.: McGraw-Hill,
Inc.

File Creation function arguments

- CreateFile─ to create a file

- Long pointer for character string,

- 32-bit desired access parameter,

- 32-bit shared mode specification,

- Long pointer for security attributes,

- 32-bits to specify creation and distribution,

- 32-bit specify flags and attributes and

- Handle for template file

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File Creation function arguments

- file name ─ Character string

- file access parameter ─ GENERIC_READ or GENERIC_WRITE or both.

- Set 32-bit shared mode specification ─ 0 or FILE_SHARE_READ, FILE_SHARE_WRITE

- Security attributes long pointer─ NULL

- 32-bits ─ to specify creation and distribution CREATE_NEW, OPEN_EXISTING, CREATE_ALWAYS (new file after truncating existing), OPEN_ALWAYS (create new file if not existing else open) or TRUNCATE_EXISTING.

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File Creation function arguments

- 32-bit specify flags and attributes─ FILE_FLAG_WRITE_THROUGH, FILE_FLAG_RANDOM_ACCESS, FILE_ATTRIBUTE_NORMAL, FILE_ATTRIBUTE_READONLY, FILE_ATTRIBUTE_ARCHIVE, FILE_ATTRIBUTE_SYSTEM, FILE_ATTRIBUTE_HIDDEN, FILE_ATTRIBUTE_NORMAL

- Handle for template file ─ NULL (WCE does not support file template)

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2. WCE and Windows Files

WCE and Windows Files

- WCE uses most of the Win32 file APIs

- Uses standard file I/O procedures CreateFile, OpenFile, ReadFile,WriteFile, SetEndOfFile and CloseFile

- create, open, read, write, truncate and close functions for the files (not for execute-in-place files in ROM).

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WCE and Windows Files

- WCE files and Windows attribute flags same
- Flags for read only, compressed, archive and system hidden

WCE Files

- Up to 256 storage devices or partitions on the storage devices
- A installable file system driver installed for flash and other file systems
- Object store as a default RAM based file system

WCE Files

- In WCE, current directory concept missing.

- WCE filename and complete path specification─ maximum 260 bytes of MAX_PATH length

- There is no mention like C or D drive when using the files.

- File has three characters extension format after the dot sign. The extension defines the file type. For example, .txt for text file.

WCE Files

- Memory-Mapped files and objects─ supported for reading the files as byte streams

- Uses compact flash and RAM with backup battery

3. Registry

Chapter-10 L04 "Embedded Systems - Architecture,
Programming and Design" , Raj Kamal, Publs.: McGraw-Hill,
Inc.

Registry system

- Keys and their values as in a hash table

- Keys─ multiple level keys.

- Registry ─ permitted data types: 32-bit numbers, string or free-for binary data .

Standard registry API functions

- Registry─ an API for system database.
- RegCreateKeyEx
- RegOpenKeyEx
- RegSetValueEx
- RegQueryValueEx
- RegDeleteKeyEx
- RegDeleteValueEx
- RegCloseKey

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4. WCE Databases

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Database format

- Series of un-lockable records with saving of a property(ies) and data together in a record.

- No record contains another record within it.

- Each record has four level indices for sorting

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Database record properties

- Maximum number of records $2^{16} - 1$
- Record size 2^{17}
- Data types─ Double 64-bit signed, boolean, collection of bytes, 0-temined Unicode string, 16-bit signed, 16-bit unsigned, 32-bit signed, 32-bit unsigned, time and date structure

5. WCE Functions for Databases

Functions for Databases

- CeMountDBVol
  - to mount an external flash or media a database volume to store database files
- CeCreateDatabaseEx
  - to create new database
- CeOpenDatabaseEx
  - to open created database

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Functions for Databases

- CeSeekDatabaseEx
  - to set pointer to database record
- CeSetDatabaseInfoEx
  - to set the sort order of opened database

Functions for Databases

- CeReadrecordPropsEx
  - to read a record of given property(ies)
- CeWriteRecordProps
  - to write a record of given property
- CeDeleteDatabaseEx
  - to delete records, properties or complete database

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Functions for Databases

- CloseHandle ( )
  - to close the Handle
- CeUnmountDBVol
  - to mount an external flash or media a database volume to store database files

WCE Notification

- Notifies to a process that a thread has modified the database

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Summary

We learnt

- WCE Registries for hash table like registry entries

- WCE has file systems and databases.

- Database has series of un-lockable records with saving of a property(ies) and data together in a record.

- No record contains another record within it.

- Each record has four level indices for sorting.

End of Lesson-4 of chapter 10 on
Files, Registry and Databases for storing data