Microprocessor and Interfacing – CSE2006

Module 3 – Advanced ALP

2. File Management

File management is very important as far as an operating system (OS) is concerned because it is responsible for creation, storage, changing and deletion of important files and file systems. The disk operating system (DOS) takes care of the file management in any OS. Let us see some of the file management procedures that Microsoft DOS (MS DOS) handles.

Whenever DOS takes care of filing commands, it returns error status in the carry flag, every time. Thus, when the control returns to the program, if the carry flag is clear, then the file handling has been successful. If the carry flag has not cleared, it means that some error occurred during the file handle. Following sections give an overview of various file handling commands.

**1. Open file**

Open File Function (ah): 3Dh

Entry parameters:

al- file access value

0- File opened for reading

1- File opened for writing

2- File opened for reading and writing

ds:dx- Point at a zero terminated string containing the filename.

Exit parameters: If the carry is set, ax contains one of the following error codes:

2- File not found

4- Too many open files

5- Access denied

12- Invalid access

If the carry is clear, ax contains the file handle value assigned by DOS.

A file must be open in order to access it. If the carry flag is set, then there is some error in opening the file.

**2. Create file**

Function (ah): 3Ch

Entry parameters:

ds:dx- Address of zero terminated pathname

cx- File attribute

Exit parameters: If the carry is set, ax contains one of the following error codes:

3- Path not found

4- Too many open files

5- Access denied

If the carry is clear, ax is returned containing the file handle

When a new file is to be created for output, ‘Create’ is used. This creates a new file and so DOS understands that the file is for writing only. There is another parameter passed in cx called the initial file attribute settings. The six bits of cx contain the following values:

Bit - Meaning if equal to one

0 - File is a Read-Only file

1 - File is a hidden file

2 - File is a system file

3 - File is a volume label name

4 - File is a subdirectory

5 - File has been archived

**3. Close file**

Function (ah): 3Eh

Entry parameters: bx- File Handle

Exit parameters: If the carry flag is set, ax contains 6, the only possible error, which is an invalid handle error.

This call can close a file that is opened by both the Open command and the Create command. When you are done with your usage of files, you must close all the open files in order to avoid disk file corruption in case the user shuts down the system or resets the computer when the files are still open. Shutting down DOS automatically closes all the open files but this feature is not fully reliable and closing the files before shutting down is the perfect procedure.

**4. Read from a file**

Function (ah): 3Fh

Entry parameters: bx- File handle

cx- Number of bytes to read ds:dx- Array large enough to hold bytes read

Exit parameters: If the carry flag is set, ax contains one of the following error codes

5- Access denied

6- Invalid handle If the carry flag is clear, ax contains the number of bytes actually read from the file.

Some number of bytes from the file can be accessed using the read command. The cx register specifies the actual number of bytes. This file handle is passed in the bx register. The ds:dx register has the address of the buffer into which the read bytes are stored. If the read command is executed without error, the ax register contains the bytes actually read.

**5. Write to a File**

Function (ah): 40h

Entry parameters: bx- File handle

cx- Number of bytes to write

ds:dx- Address of buffer containing data to write

Exit parameters: If the carry is set, ax contains one of the following error codes

5- Accessed denied

6- Invalid handle

If the carry flag is clear, it indicates that ax register contains the number of bytes written to the file. This call is the opposite of Read command. The bytes are written to the ds:dx to the file instead of reading bytes from them. Error in Write command occurs when the number of bytes written is not equal to the number specified in the cx register. This indicates that disk is full.

**6. Seek command**

Function (ah): 42h

Entry parameters: al- Method of moving

1. Offset specified is from the beginning of the file.
2. Offset specified is distance from the current file pointer.
3. The pointer is moved to the end of the file minus the specified offset.

bx- File handle.

cx:dx- Distance to move, in bytes.

Exit parameters: If the carry is set, ax contains one of the following error codes

1. Invalid function

6- Invalid handle If the carry is clear, dx:ax contains the new file position

When a file pointer is supposed to move in a random-access file, this command can be used. When AL = 1, the pointer moves a positive distance from the current file position. When AL = 0, an absolute distance from the file, if AL = 2, the pointer moves some distance from the end of the file.

**7. Set Disk Transfer Address (DTA)**

Function (ah): 1Ah

Entry parameters: ds:dx- Pointer to DTA

Exit parameters: None

The Set DTA command is used in both the versions of DOS, namely DOS v1.0 and DOS 2.0. This command sets up a pointer to a 43-byte buffer area. This function is used before using 4Eh and 4Fh functions so that the memory allocation can be properly done.

**8. Find First File**

Function (ah): 4Eh

Entry parameters: cx- Attributes

ds:dx- Pointer to filename

Exit parameters: If carry is set, ax contains one of the following error codes

2- File not found

18- No more files

When files are supposed to be searched, then Find First File and Find Next File commands are used. The Find First File command is used to locate the first filename within a directory. The Find Next File command is used to find the other successive entries in the directory. Find First file is first used to find the first file in the directory and it calls a loop where it searches for similar entries in the same directory unless there are no more files in that name. This is called Error #18.

**9. Find Next File**

Function (ah): 4Fh

Entry parameters: none

Exit parameters: If the carry is set, then there aren’t any more files and ax will be returned containing 18.

This command is used to find the next successive files in the directory that specified by Find First File.

**10. Delete File**

Function (ah): 41h

Entry parameters: ds:dx- Address of pathname to delete

Exit parameters: If carry set, ax contains one of the following error codes

1. File not found

5- Access denied This function will delete the specified file from the directory.

The filename that is specified to be deleted must not contain any wildcard characters.

**11. Rename File**

Function (ah): 56h

Entry parameters: ds:dx- Pointer to pathname of existing file

es:di- Pointer to new pathname

Exit parameters: If carry set, ax contains one of the following error codes

2- File not found

5- Access denied

17- Not the same device

This command does two jobs:

1. It allows the users to rename a file
2. It allows to move a file from the present directory to the other.

**12. Change/Get File Attributes**

Function (ah): 43h

Entry parameters: al- Subfunction code

1. Return file attributes in cx
2. Set file attributes to those in cx cx- Attribute to be set if AL=01

ds:dx- address of pathname

Exit parameters: If carry set, ax contains one of the following error codes:

1. Invalid function
2. Pathname not found
3. Access denied

When the carry flag is clear and the subfunction is zero, the cx register will contain the attributes of the file. This call helps to set and reset and read the file’s attribute bits. It has the capacity to set the file to read only, set/clear the archived bit or to change the attributes in the file.

**13. Get/Set File Date and Time**

Function (ah): 57h

Entry parameters: al- Subfunction code

1. Get date and time
2. Set date and time

bx- File handle

cx- Time to be set (if AL=01)

dx- Date to be set (if AL=01)

Exit parameters: If carry set, ax contains one of the following error codes

1. Invalid subfunction
2. Invalid handle

When the carry is clear, the cx/dx register is set to the time/date.

**Weblinks:**

<http://www.hermit.cc/it/dos/dosstruc.htm>

<https://www.plantation-productions.com/Webster/www.artofasm.com/DOS/pdf/ch13.pdf>