Assignment 3: Investigating a File System

Total Points: 40

Due: November 4, 2016 (Friday) at 11:55 PM

Hello Detectives! We have been assigned a simple task today. Our team member, Gandalf, is working to extract data from an image (attached *Image.img*) of the disk that was partitioned with a *FAT16* File System. To make his job easier, our task is to write a program in *Python 2.7* that will extract File System information from the disk and present it in a readable format. The program we write should answer the following questions:

1. *How many bytes does the boot block occupy? (First block in the partition.)*
2. *How many bytes are there in each sector?*
3. *How many sectors are there in each cluster (each allocation unit)?*
4. *How many reserved sectors (blocks) are there?*
5. *How many File Allocation Tables are present?*
6. *How many entries (maximum number of entries) can Root Directory hold?*
7. *How many sectors does each File Allocation Table occupy?*
8. *What is the byte offset of the first File Allocation Table? (The byte offset where the first FAT begins.)*
9. *What is the byte offset of the second FAT table? (if any)*
10. *What is the byte offset of the first Root Directory entry? (Root directory entries begin here.)*
11. *What is the byte offset of the first Data Block? (Data region starts here.)*
12. *How much user's data (in bytes) can this disk partition hold? (Total size of the data region.)*

Some investigative leads:

- It is a *MS DOS 5.0* FAT16 File System.

Instructions:

- Write a Python Program to read respective entries from the Boot Block to answer questions *2* through *7*.
- *FAT16* stores entry values back-side-front (little-endian), so you may have to reverse the values you read before converting Hex to decimal to get your required answers.
- For questions *8* through *12*, you will have to perform some basic calculations within your program.

Bonus:

If you extract two files from this disk image successfully, you will be rewarded with five bonus points on this assignment. You will be able to extract one file by simply mounting the provided disk image.

Submission Guidelines:

- Save your Python Program file (*fat16_investigator.py*).
- Save any file you have extracted for the bonus problem.
- Create a *Read Me.pdf* containing:
    a. Your name
    b. Description about the steps you went through to complete this assignment
    c. Any special configuration, library, or module your program needs for execution
    d. References, if you received any online help
- Compress all the files into a single ZIP file and name your ZIP file *LastName_Assignment_3.zip* and upload it to **Moodle**.