**IN501 - Functional Specification for the Programming Project**

**Overview**

This project will help you demonstrate your ability to create a program in Python. Below is a functional specification for the program you are going to design, code, and test. You will use the following when coding this program:

variables

if else statements

loops – while and for loops

functions

open/create/read/write/closing files

read user input

convert data types (e.g., string to integer)

a data structure to store the data from the STUDENTDATA.TXT file

**Functionality**

Based on a menu selection, analyze student records from the [STUDENTDATA.TXT](https://kapextmediassl-a.akamaihd.net/IST/IN501/2301E/STUDENTDATA.TXT) file. The menu items describe the processing you will have to do in your program.

Assume a grading scale of:

A: 90%–100%

B: 80%–89%

C: 70%–79%

D: 60%–69%

F: < 60%

Use the student file that is called [STUDENTDATA.TXT](https://kapextmediassl-a.akamaihd.net/IST/IN501/2301E/STUDENTDATA.TXT) as input. It has the following fields, which are comma delimited:

Student ID – NNNN (4 numbers)

First Name – Up to 10 letters

Last Name – Up to 10 letters

Grade – NN.N (Grade percentage: e.g., 84.8. Round up when doing calculations.)

Degree – Either MSIT or MSCM

Your program will use a console/command line–based user interface, not a graphical user interface.

Your program will display readable results to the display.

You will write records to a file.

Your program will overwrite any output files.

Your program should exit gracefully.

Output files will be in the same format as the input file noted above.

Invalid records mean that all fields are not present, a grade in the file is above 100 or below 0, or the degree program is listed as something other than MSCM or MSIT.

Validate all user input.

You will comment your program.

**Menu options**

Your program must have a menu. The menu functionality is below:

Display average grade for all students

Display average grade for each program

Display highest grade record

Display lowest grade record

Display students in MSIT

Display students in MSCM

Display all students in sorted order by student ID

Display invalid records

Create new file with invalid records called BADRECORDS.TXT. Display a message that

says BADRECORDS.TXT has been created

Exit program