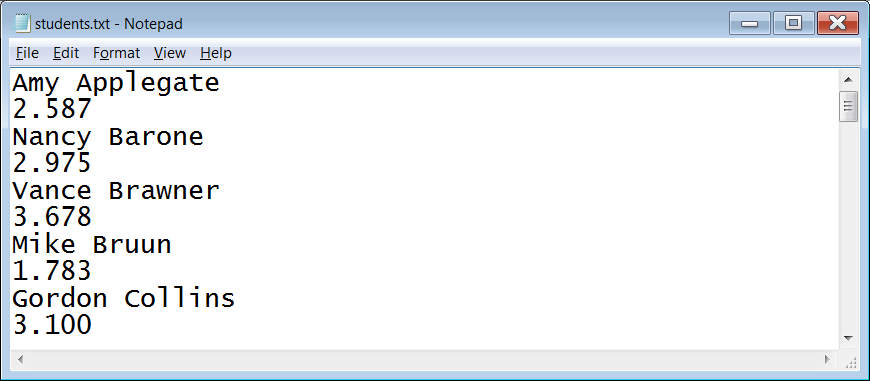
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| **Computer Science 1-Honors** | **Lab 17A**  **Practice/Perform Major Python Assignment** |
| **Manipulating Text Files of Students** | **60, 70, 80, 90, 100 & 110 Point Versions** |
| **Assignment Purpose:**  The purpose of this program is to demonstrate knowledge of reading in from a text file, interpreting the information, and writing to one or more other text files. | |

Write a program that reads the data from a text file called **"students.txt"** and then manipulates the data in various ways. The file is organized to store 2 different pieces of student information. Specifically, the file stores the **name** and **gpa** of each student. Each piece of information is on a separate line in the file. The first five records of the text file are shown below.



Keep in mind that since **"students.txt"** is a *text* file, all of the information is *stored* and *read in* as *strings*. While this is fine for the **name**, it is no good for the **gpa**.You need to convert the **gpa** string to a real number with **float**.

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| **Lab 17A Student Version** | **Do not copy this file, which is provided.** |
| **1 # Lab17Ast.py  2 # "Manipulating Text Files"  3 # This is the student, starting version of Lab 17A.  4 # At minimum, students need to implement the  5 # <readData> and <displayData> procedures.  6   7   8 def heading():  9 print() 10 print("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*") 11 print("Lab 17A, Manipulating Text Files") 12 print("60 Point Version") 13 print("By: JOHN SMITH") # Substitute your own name here. 14 print("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*") 15 print("\n") 16  17  18 def readData(studentNames,studentGPAs): 19 pass  20  21  22 def displayData(studentNames,studentGPAs):  23 pass  24  25  26 def computeAndDisplayAverageGPA(studentGPAs): 27 pass 28  29  30 def capitalizeNames(studentNames):  31 pass  32  33  34 def writeData(studentNames,studentGPAs):  35 pass  36  37  38 def sortDataByGPA(studentNames,studentGPAs):  39 pass  40  41  42  43 ########## 44 # MAIN # 45 ########## 46  47 heading()  48 studentNames = [] 49 studentGPAs = [] 50 readData(studentNames,studentGPAs) # Do for 60 point version 51 capitalizeNames(studentNames) # Do for 80 point version 52 sortDataByGPA(studentNames,studentGPAs) # Do for 110 point version 53 displayData(studentNames,studentGPAs) # Do for 60 point version 54 computeAndDisplayAverageGPA(studentGPAs) # Do for 70 point version  55 writeData(studentNames,studentGPAs) # Do for 90/100 point version** | |

**60 Point Version Specifics**

For the 60-point version you need to implement procedures **readData** and **displayData**. The **readData** procedure needs to read in all of the information from the **"students.txt"** file and store it in the 2 parallel arrays: **studentNames** and **studentsGPAs**.The **displayData** procedure displays the data from these arrays in an organized manner, distinguishing the student names from their GPAs and skipping a line after each student record. (HINT: Refer to program example **TextFiles18.py**.)

**60-Point Version *Monitor* Output**

Since the output is so long, only the first 3 and the last 3 student records are shown below.

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|  ----jGRASP exec: python Lab17Av60.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 17A, Manipulating Text Files 60 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Student Name: Amy Applegate Student GPA: 2.587  Student Name: Nancy Barone Student GPA: 2.975  Student Name: Vance Brawner Student GPA: 3.678   **: : : :**   Student Name: Michael Ward Student GPA: 3.451  Student Name: Cheryl Willis Student GPA: 3.576  Student Name: Ziggy Zighlander Student GPA: 3.777    ----jGRASP: operation complete. |

**70 Point Version Specifics**

For the 70-point version you need to compute the average of all of the student GPAs and display it at the end of the program output, along with the student count. This means you are now required to convert the GPAs to real numbers (using the **float** command) when you read them in from the file. Keep in mind that the average needs to be rounded to 2 decimal places. Computing the average can either be done by implementing the **computeAndDisplayAverageGPA** procedure (heading is provided) or it can be done in the **displayData** procedure as the student information is being displayed, similar to what is done in program example **TextFiles18.py**.

**70-Point Version *Monitor* Output**

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|  ----jGRASP exec: python Lab17Av70.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 17A, Manipulating Text Files 70 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Student Name: Amy Applegate Student GPA: 2.587  Student Name: Nancy Barone Student GPA: 2.975  Student Name: Vance Brawner Student GPA: 3.678  **: : : :**  Student Name: Michael Ward Student GPA: 3.451  Student Name: Cheryl Willis Student GPA: 3.576  Student Name: Ziggy Zighlander Student GPA: 3.777     **# of Students: 36** **Average GPA: 2.97**   ----jGRASP: operation complete.  NOTE: **5** points will be deducted if the **Average GPA** is not rounded to **2** decimal places. |

**80 Point Version Specifics**

For the 80-point version you need to CAPITALIZE all of the letters in all of the student names. You can do this by implementing the **capitalizeNames** procedure (heading is provided) or it can be done as you are reading in the names in the **readData** procedure.

**80-Point Version *Monitor* Output**

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|  ----jGRASP exec: python Lab17Av80.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 17A, Manipulating Text Files 80 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Student Name: AMY APPLEGATE Student GPA: 2.587  Student Name: NANCY BARONE Student GPA: 2.975  Student Name: VANCE BRAWNER Student GPA: 3.789    **: : : :**    Student Name: MICHAEL WARD Student GPA: 3.451  Student Name: CHERYL WILLIS Student GPA: 3.576  Student Name: ZIGGY ZIGHLANDER Student GPA: 3.777   # of Students: 36 Average GPA: 2.97   ----jGRASP: operation complete. |

**90 Point Version Specifics**

For the 90-point version you need to implement the **writeData** procedure. Nothing new will be displayed on the screen, but a new file needs to be created called **"CAPS.TXT"** which will store all of the newly CAPITALIZED student names along with their corresponding GPAs.

**90-Point Version *File* Output**

NOTE: The *monitor* output is identical to the 80-point version.

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| **This is one continuous file shown in 3 columns:** |

**100 Point Version Specifics**

For the 100-point version you need to implement the **writeData** procedure in a slightly more complicated manner. Instead of creating the **"CAPS.TXT"** file from the 90-point version, your program needs to create a file called **"HonorRoll.txt"**. Aside from the filename, the main difference between the 2 files is that **"CAPS.TXT"** stores all of the student records, while **"HonorRoll.txt"** only stores the records of students whose GPAs are above **3.5**.

**100-Point Version *File* Output**

NOTE: The *monitor* output is identical to the 80-point version.

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| **This file is much shorter than "CAPS.TXT".** |

**110 Point Version Specifics**

For the 110-point version you need to implement the **sortDatabyGPA** procedure and sort the student data by GPA in *descending* (largest to smallest) order. This is not just a matter of typing the code for the *Bubble Sort* because you need to sort *parallel arrays*. If you simply perform a *Bubble Sort* on the **studentsGPA** array, that array will be sorted, but the **studentsNames** array will still be in its original order – which means the names no longer match the GPAs – which is not good. What you have to remember is that when you swap the GPAs from the **studentGPAs** array, you must also swap the corresponding names from the **studentNames** array.

NOTE: The *monitor* output and *file* output are both unique for the 110-point version.

**110-Point Version *Monitor* Output**

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|  ----jGRASP exec: python Lab17Av110.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 17A, Manipulating Text Files 110 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   Student Name: PAUL REIMAN Student GPA: 4.0  Student Name: MICHELLE RITTER Student GPA: 4.0  Student Name: LAURIE ROSEMBERG Student GPA: 4.0  Student Name: CHRIS STARK Student GPA: 4.0  Student Name: LAURA COLLINS Student GPA: 3.999  Student Name: VANCE BRAWNER Student GPA: 3.789  Student Name: ZIGGY ZIGHLANDER Student GPA: 3.777  **: : : :**    Student Name: BART REAGOR Student GPA: 2.867  Student Name: PATTI SKINNER Student GPA: 2.743  Student Name: AMY APPLEGATE Student GPA: 2.587  Student Name: MALI COZART Student GPA: 2.345  Student Name: TRACY SPRINGER Student GPA: 2.345   Student Name: DIANE SIMCOX Student GPA: 2.175  Student Name: MARY PRIDGEN Student GPA: 1.958  Student Name: ANN SEABORN Student GPA: 1.785  Student Name: MIKE BRUUN Student GPA: 1.783  Student Name: TOM TOOCH Student GPA: 1.456  Student Name: TODD DEANS Student GPA: 1.23  Student Name: STEVEN JOHNSON Student GPA: 0.785   # of Students: 36 Average GPA: 2.97   ----jGRASP: operation complete. |

**110-Point Version *File* Output**

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| **The honor students in this file will also be sorted by GPA.** |