Programming Project 1

Before you begin, download the supporting file provided on Canvas. Click on the icon to the right of the file and choose Download.

In your project folder, create a new folder named **Project1** and move the file you downloaded into this folder. Because this is a multi-file assignment, you will later compress (zip) this folder to submit your work.

Once you are ready, follow the instructions for each part to complete this project.

Part 1: Create a Program

1. In IDLE, open the file named **project1Part1.py**. Add your name as the author and the assignment due date. Follow the steps below and the guidance from the comments in the file.
2. This program will continually prompt the user for grades. It will display the letter grade each time the user enters a valid number. The value **must** be in the range of **1-100**, or **999** to stop the program. The program will then calculate and display the average of all grades entered. **Assumption:** The user will enter only numeric values.
3. Begin with initializing a count **(0)**, total **(0)**, and a named constant called sentinel **(999)**. *Hint: Remember named constants **must** be a variable name that is in uppercase.*
4. Use a priming read to prompt the user for a number between 1 and 100 or 999.
5. Use an input validation loop to validate the input from step 4. If the input is invalid, continually prompt the user for a new number until the input is valid. *Hint: You will need to use a while loop with a compound Boolean expression.*
6. Create a while loop that continually prompts the user for a number while the number is not equal to the sentinel value.
    a. Increment the count by one and add the number to the total.
    b. Determine the letter grade using the table below and display the result based on the condition. *Hint: The last value can be in an else clause, since every other value after 68 will fall in this range.*
    c. Prompt the user for a new number, like you did in step 4.
    d. Validate the input, like you did in step 5.

Letter Grade	Value Range	Print Statement
A	Greater than or equal to 92	{**number**} is an A!
B	Greater than or equal to 84	{**number**} is a B.
C	Greater than or equal to 76	{**number**} is a C.
D	Greater than or equal to 68	{**number**} is a D.
F	Less than 68	{**number**} is an F.

7. After your while loop has finished, calculate the average by dividing the total by the count. **Consideration:** The user may enter the sentinel value immediately, or enter one or more valid grades.
8. Display the average grade, as an integer. Use the output image below as a reference.

9. Once you are done, rename the file as **project1*yourlastname*Part1.py** (For example: project1DavisonPart1.py), and move to Part 2.

```
Enter a number (1-100, 999 to quit): 75
75 is a D.
Enter a number (1-100, 999 to quit): 81
81 is a C.
Enter a number (1-100, 999 to quit): 95
95 is an A!
Enter a number (1-100, 999 to quit): 999
The average grade was 83.
```

Part 2: Flowchart

1. Go to Drawio and click Start. Create a new diagram from the Blank Diagram template and click Create. *Note: The Blank Diagram template is the default option.*
2. Include textbox from the General group of shapes, third option. Add your name and date to the textbox. Resize this appropriately and move it to the top-left of your page.
3. Use the instructions and program from Part 1 to create a flowchart that matches the expected flow of events. You **must** use the correct symbols in your diagram.
4. When you are finished creating your flowchart, click File, Export as, and chose PNG. Use a border width of **50** and select **Light** for Appearance. Download the image file and rename as **project1*yourlastname*Part2.png** (For example: project1DavisonPart2.png).
5. Once you are done, save and close all files. Compress (zip) the **two** files, rename your zip folder **project1*yourlastname*.zip**. Then, submit the zipped folder on Canvas as an attachment to Project 1.

Extra Credit: Program Modification (up to 10 points)

You can earn up to an additional 10 points on your Project. You can earn five extra credit points for correctly including the following modification to your program, and another five points for including the modeling of the modification in your flowchart.

Your code must be syntactically correct, error free, and correctly depicted in your flowchart to receive credit.

1. Modify the display for your average grade to end with a space, instead of a new line character. *Hint: You will need to include end=" ".*
2. Determine the average letter grade, like you did in step 6b, and display the result. Use the output image below as a reference.
3. Update your flowchart to include this modification and export, like you did in part 2. I only need the final files in your submission.

4. Once you are done, save and close all files. Compress (zip) the **two** files, rename your zip folder **project1*yourlastname*.zip.** Then, submit the zipped folder on Canvas as an attachment to Project 1.

```
Enter a number (1-100, 999 to quit): 95
95 is an A!
Enter a number (1-100, 999 to quit): 88
88 is a B.
Enter a number (1-100, 999 to quit): 81
81 is a C.
Enter a number (1-100, 999 to quit): 99
99 is an A!
Enter a number (1-100, 999 to quit): 999
The average grade was 90. 90 is a B.
```