Assignment 1 (15%)

Due: March 4

This assignment uses the skills that we discuss in the first week of the course: using NumPy and pandas.

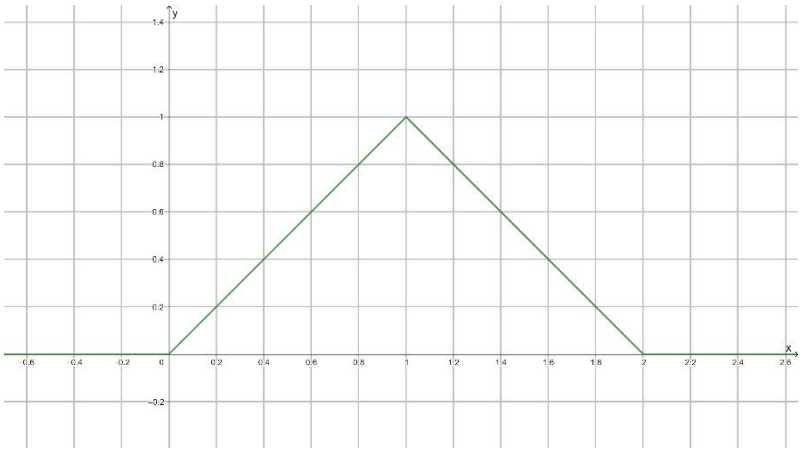
Instructions

Submit a Jupyter notebook or Python script through D2L Dropbox. Your submission should include answers to the following questions:

1. The 'triangle' function is defined as:

$$T(x) = \begin{cases} 0, & 0 < x \\ x, & 0 \leq x < 1 \\ 2 - x, & 1 \leq x < 2 \\ 0, & 2 \leq x \end{cases}$$

The plot of the triangle function looks like this:



This function can be implemented in Python as follows:

```
def tri_func(x):
     if x <= 0:
          return 0
     elif 0 < x <= 1:
          return x
     elif 1 < x <= 2:
          return 1-x
     else:
          return 0
```

Write a vectorized version of the triangle function.

2. Use pandas to load the file 'data1.csv' in a DataFrame. Write a program to remove every second row from the DataFrame and place the removed rows in a new DataFrame.

3. ♦ - The diamond symbol indicates that this problem is part of the preparation for the final project. Many students approach this course with specific questions from their own research or work. Even if this is not always the case, our focus is on the practical application of Python for data analysis.
    a. Identify a data analysis question that you would like to answer. Some examples are as follows:
        i. Can customer churn rate be used to predict customer acquisition cost?
        ii. Does our drug produce a significant decrease in cancer cell growth?
        iii. Given past data about election campaign contributions, can we predict the success of a political candidate?
    b. Find a data source that could be used to answer your question. List the variables you would use to answer the question and their respective data types.

Please refer to the rubric at the end of this document for evaluation details.

Requirements

a. Working Jupyter notebook or Python script.
b. Make sure to include clear comments in your code.

Submission

Submit your assignment through Dropbox on Mar 4.

Evaluation

This assignment is graded out of 16 points using the following rubric and is worth 15% of the final grade.

Learners may receive partial scores or a zero for unacceptable work.

Criteria	Does Not Meet Expectations 1	Partially Meets Expectations 2	Meets Expectations 3	Exceeds Expectations 4	Max Points
Code Functionality	Inadequate comprehension of concepts and conventions presented in course materials. Syntax, runtime, and semantic errors throughout.	Partial comprehension of concepts and conventions presented in course materials. Some runtime and semantic errors and almost no syntax errors.	Adequate comprehension of concepts and conventions presented in course materials. No syntax or runtime errors and almost no semantic errors.	Broad and in-depth comprehension of concepts and conventions presented in course materials. No syntax, runtime, or semantic errors.	4
Required Components	Response is missing/does not address required components indicated in the instructions.	Response is missing/does not address some of the required components indicated in the instructions.	Response includes all components and meets the requirements indicated in the instructions.	Response includes and exceeds the requirements indicated in the instructions.	4
Python-specific Code	Offers brute-force solutions to problems. No functions, for/while loops, or iteration is used.	Brute-force solution with no built-in functions. Iteration used incorrectly or inconsistently.	Some iteration used to solve problems. Built-in functions are used incorrectly or inconsistently.	Well written code firmly using Python's particular style. Built-in functions are used when possible, and iteration is used correctly. Some list or dictionary comprehensions used where applicable.	4
Writing Quality	Unclear organization. Many grammatical, spelling, or punctuation errors.	Some signs of logical organization. A few grammar, spelling, or punctuation errors.	Organization supports purpose. Well-constructed body of code. Almost no grammatical, spelling, or punctuation errors.	Organization fully and imaginatively supports purpose. Well-constructed body of code. No grammatical, spelling or punctuation errors.	4