Assessment 0

Python Challenges

1 **Python 1** 3 PTS

Complete the function according to its docstring.

PYTHON3.6

```
            char_count[char] += 1
        else:
            char_count[char] = 1

    return char_count
    '''
    Return a dictionary which contains
    a count of the number of times each character appears in the string.
    Characters which with a count of 0 should not be included in the
    output dictionary.

    Parameters
    ----------
    string: str

    Returns
    -------
    dict
        A dictionary with counts of each character in string
    '''
    pass
```

RESET INPUT RUN TESTS

CODING

SHOW TEST RESULTS

2 **Python 2** 3 PTS

Complete the function according to its docstring.

PYTHON3.6

```
def invert_dictionary(d):
    dict_ = {}

    for k, v in d.items():
        if v in dict_:
            dict_[v] += dict_.update({v:k})
        else:
            dict_[v] = dict_.update({v:k})
    return dict_

    '''
    Given a dictionary d, return a new dictionary with d's values
    as keys and the value for a given key being
    the set of d's keys which shared the same value.

    Parameters
    ----------
    d: dict

    Returns
```

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Probability Challenge

3 **Probability 1** 3 PTS

Complete the function according to its docstring.

PYTHON3.6

```python
def cookie_jar(a, b):
    return (a*b)/.5
    '''
    There are two jars of cookies.
    Each has chocolate and peanut butter cookies.
    Input 'a' is the fraction of cookies in Jar A which are chocolate.
    Input 'b' is the fraction of cookies in Jar B which are chocolate.
    A jar is chosen at random and a cookie is drawn.
    The cookie is chocolate.
    Return the probability that the cookie came from Jar A.

    Parameters
    ----------
    a: float
        Probability of drawing a chocolate cooking from Jar A
    b: float
        Probability of drawing a chocolate cooking from Jar B

    Returns
    -------
    float
```

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NumPy Challenge

4 **NumPy 1** 3 PTS

Complete the function according to its docstring.

PYTHON3.6

```python
import numpy as np

def array_work(rows, cols, scalar, matrixA):

    matrix_ = np.empty(rows, cols, matrixA)
    # scalar_ = np.dot(matrix, scalar
    return matrix_


    '''
    Create matrix of size (rows, cols) with elements initialized to the
    scalar value. Right multiply that matrix with the passed matrixA
    (i.e. AB, not BA).  Return the result of the multiplication.  You
    needn't check for matrix compatibility, but you can accomplish this i
    a single line.

    Parameters
    ----------
    rows, cols: int, int
        Size of matrix to be created
```

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Pandas Challenge

5 **Pandas 1** 3 PTS

Complete the function according to its docstring.

PYTHON3.6

```python
def data_frame_work(df, colA, colB, colC):
    df[colC] = df[colA]+df[colB]

    '''
    Insert a column (colC) into the dataframe that is the sum of
    colA and colB. Assume that df contains columns colA and colB and
    that these are numeric.

    Parameters
    ----------
    df: Pandas DataFrame
    colA, colB, colC: str, str, str
    '''
    pass
```

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CODING

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Math Challenges

6 **Math 1** 3 PTS

Given the following matrix and vector:

$$\mathbf{X} = \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$$

$$\mathbf{y} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$$

What is the product $\mathbf{Xy}$?

Note: hitting enter will submit the challenge, indicate the separate lines of your matrix by typing \n where the break would be.

5 \n 13

CONCEPTUAL

Probability and Statistics

No Time Limit 9/9 attempted Save And Exit

7 **Prob/Stats 1** 3 PTS

Consider a sample of data S obtained by flipping a coin x, where 1 denotes the coin turned up heads, and 0 tails.

$$S = \{1, 1, 0, 1, 0\}$$

What is the sample's mean?

.6

CONCEPTUAL

8 **Prob/Stats 2** 3 PTS

Continuing with the data from the previous challenge, what is the probability of observing these data (3 heads) assuming that a coin with an equal probability of heads and tails was used?

.03125

CONCEPTUAL

9 **Prob/Stats 3** 3 PTS

A probability distribution
P is dependent on two categorical values
x and
y.
x can take on values T and F, while
y can take on values of a, b, and c. The following joint distribution table describes the joint probability
$P(x, y)$:

	a	b	c
T	0.2	0.1	0.2
F	0.05	0.15	0.3

What is P(x=T | y=b)?