NumPy Assignment

For this assignment, you will need to write Python code using NumPy to solve the following problems.

1. Create a 2-dimensional NumPy array with shape (3, 4) containing random integers between 0 and 9.

2. Calculate the mean of all the elements in the array.

3. Calculate the sum of the elements in each row.

4. Calculate the product of the elements in each column.

5. Replace all the odd numbers with -1 in the array.

6. Create a new 2-dimensional NumPy array with shape (3, 4) containing random integers between 0 and 9.

7. Calculate the dot product of the two arrays.

8. Transpose the second array and calculate its dot product with the first array.

9. Calculate the determinant of the first array.

10. Calculate the inverse of the first array.

```python
import numpy as np

# 1. Create a 2-dimensional NumPy array with shape (3, 4) containing random integers
between 0 and 9.
a = np.random.randint(0, 10, size=(3, 4))
print("Array a:\n", a)

# 2. Calculate the mean of all the elements in the array.
mean_a = np.mean(a)
print("Mean of a:", mean_a)

# 3. Calculate the sum of the elements in each row.
sum_a = np.sum(a, axis=1)
print("Sum of rows of a:\n", sum_a)

# 4. Calculate the product of the elements in each column.
product_a = np.prod(a, axis=0)
```

```python
print("Product of columns of a:\n", product_a)

# 5. Replace all the odd numbers with -1 in the array.
a[a % 2 == 1] = -1
print("Array a after replacing odd numbers with -1:\n", a)

# 6. Create a new 2-dimensional NumPy array with shape (3, 4) containing random integers
between 0 and 9.
b = np.random.randint(0, 10, size=(3, 4))
print("Array b:\n", b)

# 7. Calculate the dot product of the two arrays.
dot_product = np.dot(a, b.T)
print("Dot product of a and b:\n", dot_product)

# 8. Transpose the second array and calculate its dot product with the first array.
dot_product_T = np.dot(a, b.T)
print("Dot product of a and b transpose:\n", dot_product_T)

# 9. Calculate the determinant of the first array.
determinant_a = np.linalg.det(a)
print("Determinant of a:", determinant_a)

# 10. Calculate the inverse of the first array.
inverse_a = np.linalg.inv(a)
print("Inverse of a:\n", inverse_a)
```