

# Solution to Homework 1 by Bashidoshi Musa

## Solution to Q1

```
In [8]: # Write a program that calculates the overtime pay;
# Assume 40 hours per week and $45.00 per hour
# Assume $50 per hour for overtime pay

def overtime_pay():
    hours_per_week = int(input("Enter the number of hours you work per week: "))
    basepay_per_week = int(input("Enter your base salary per week: "))
    pay_per_week = hours_per_week * 45
    overtime = hours_per_week - 40
    overtime_pay = overtime * 50

    if hours_per_week > 40:
        print("Congratulations! Your salary per week is ${} with an overtime pay
    elif hours_per_week == 40:
        print("Congratulations! Your salary per week is ${} and you have no overt
    elif hours_per_week < 40:
        print("You didn't meet up the expected working hours per week therefore y
    else:
        pass

overtime_pay()
```

Enter the number of hours you work per week: 50

Enter your base salary per week: 1800

Congratulations! Your salary per week is \$1800 with an overtime pay of \$500.

## Solution to Q2

```
In [16]: # Write a program that requests the user to enter a list of 10 float values
mylist1 = []

while len(mylist1) < 10:
    list_item = (float(input("Enter your digit:")))
    mylist1.append(list_item)
print(mylist1)
```

```
Enter your digit:3
Enter your digit:4
Enter your digit:5
Enter your digit:6
Enter your digit:7
Enter your digit:8
Enter your digit:9
Enter your digit:10
Enter your digit:11
Enter your digit:12
[3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0]
```

```
In [20]: #Use list comprehension to recreate a new list of the same values from mylist1.
mylist2 = []

for i in mylist1:
    mylist2.append(i)
mylist2
```

```
Out[20]: [3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0]
```

```
In [21]: #Sort the values in mylist2
mylist2.sort(reverse = True)
mylist2
```

```
Out[21]: [12.0, 11.0, 10.0, 9.0, 8.0, 7.0, 6.0, 5.0, 4.0, 3.0]
```

### Solution to Q3

```
In [22]: #Write a program that creates a single dictionary consisting of the following:
my_dict1 = {"School": "MTSU", "Textbooks": 14, "Level": "Elementary", "Hobby": "Dancing", "Height": "4.5inch", "Food": "Amala"}
print("This is the original dictionary:", my_dict1)

#Update the dictionary with your credentials.
my_dict1.update({"School": "Unical"}) #First method
#or my_dict1["School"] = "Unical" #Second method which I prefer to use
my_dict1["Textbooks"] = 16
my_dict1["Level"] = "Ultimate"
my_dict1["Hobby"] = "Playing guitar"
my_dict1["Height"] = "5.0inch"
my_dict1["Food"] = "Spaghetti"
print("This is my updated dictionary:", my_dict1)
```

This is the original dictionary: {'School': 'MTSU', 'Textbooks': 14, 'Level': 'Elementary', 'Hobby': 'Dancing', 'Height': '4.5inch', 'Food': 'Amala'}

This is my updated dictionary: {'School': 'Unical', 'Textbooks': 16, 'Level': 'Ultimate', 'Hobby': 'Playing guitar', 'Height': '5.0inch', 'Food': 'Spaghetti'}

```
In [25]: #Add new key-pair values
my_dict1.update({"Age": 25})
my_dict1.update({"is_graduated": "Yes"})
my_dict1.update({"have_disability": "No"})
my_dict1.update({"is_location_USA": "No"})
print("This is my updated dictionary after adding new Key-pairs:", my_dict1)
```

This is my updated dictionary after adding new Key-pairs: {'School': 'Unical', 'Textbooks': 16, 'Level': 'Ultimate', 'Hobby': 'Playing guitar', 'Height': '5.0inch', 'Food': 'Spaghetti', 'Age': 25, 'is\_graduated': 'Yes', 'have\_disability': 'No', 'is\_location\_USA': 'No'}

```
In [26]: #Removing the key-value pair Hobby:Dancing and deleting last entry of the updated dictionary
my_dict1.pop("Hobby")
my_dict1

my_dict1.popitem()
my_dict1
```

```
Out[26]: {'School': 'Unical',
          'Textbooks': 16,
          'Level': 'Ultimate',
          'Height': '5.0inch',
          'Food': 'Spaghetti',
          'Age': 25,
          'is_graduated': 'Yes',
          'have_disability': 'No'}
```

### Solution to Q4

```
In [45]: #Create an array of ones of size 20 by 11 called myarray1
import numpy as np
myarray1 = np.ones((20, 11), dtype=float)
myarray1
```

```
Out[45]: array([[1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.],
 [1., 1., 1., 1., 1., 1., 1., 1., 1., 1., 1.]])
```

```
In [46]: #Multiply scalar of 0.5 by the array
myarray1 = 0.5 * myarray1
myarray1
```

```
Out[46]: array([[0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],
 [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5]])
```

In [47]: *#Update the 6th row with a value of 10.5*

```
myarray1[5] = 10.5
myarray1
```

```
Out[47]: array([[ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5]])
```

In [48]: *#Update the 7th row with a value of 11.5*

```
myarray1[6] = 11.5
myarray1
```

```
Out[48]: array([[ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5],
 [11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5]])
```

In [49]: *#Update the 1st column with a value of 9.5*

```
myarray[:, 0] = 9.5
myarray1
```

Out[49]: array([[ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5],  
 [ 9.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5]])

In [54]: *#Slice the 5th row to the 11th in myarray1*

```
myarray1[4:11, :]
```

Out[54]: array([[ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5, 10.5],  
 [ 9.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5, 11.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5],  
 [ 9.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5]])

```
In [55]: #Slice the 6th column to 9th column in myarray1
myarray1[:, 5:9]
```

```
Out[55]: array([[ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [10.5, 10.5, 10.5, 10.5],
 [11.5, 11.5, 11.5, 11.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5]])
```

```
In [56]: #Merge the 6th column with 8th column using np.hstack
h_merge = np.hstack((myarray1[:, 5], myarray1[:, 7]))
h_merge
```

```
Out[56]: array([ 0.5,  0.5,  0.5,  0.5,  0.5, 10.5, 11.5,  0.5,  0.5,  0.5,  0.5,
  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,
  0.5,  0.5,  0.5, 10.5, 11.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,
  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5])
```

```
In [60]: #Merge the 5th column with 10th column using np.vstack
v_merge = np.vstack((myarray1[:, 4], myarray1[:, 9]))
v_merge
```

```
Out[60]: array([[ 0.5,  0.5,  0.5,  0.5,  0.5, 10.5, 11.5,  0.5,  0.5,  0.5,  0.5,
  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5],
 [ 0.5,  0.5,  0.5,  0.5,  0.5, 10.5, 11.5,  0.5,  0.5,  0.5,  0.5,
  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5,  0.5]])
```

**This is the end of the Assignment**

***I appreciate you all DSM 2022 Organisers, God bless you all!***

```
In [ ]:
```

