

# assignment4

September 25, 2023

## 1 Assignment 4

### 1.1 Try to submit as an HTML file

Print your Emory ID below

```
[ ]: # Write down your answer here:2579381
```

Import the numpy, matplotlib, and pandas packages

```
[ ]: # Write down your answer here:
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

(a) Create a sequence

- Create a value  $n = 42$
- Create a list with the values  $0, 1, \dots, n$
- Count the length of the list

```
[ ]: # Write your own code
n=42
list_zero_ten = list(range(n+1))
len(list_zero_ten)
```

```
[ ]: 43
```

(b) Counting True/False statements in a list

- Create `list_age = [58, 23, 63, 18, 76, 35, 48, 68]`
- Create an empty list “`list_eligible_retire`”
- Use a for-loop without numbering
  - Determine whether the age is  $\geq 65$
  - Store the True/False result in “`list_eligible_retire`”
- Use “`np.sum()`” to count how many workers are eligible for retirement

Hint: Use the “append” function.

```
[ ]: # Write your own code
list_age=[58,23,63,18,76,35,48,68]
```

```
list_eligible_retire=[]
for x in list_age:
    if x>=65:
        list_eligible_retire.append(True)
    else:
        list_eligible_retire.append(False)
np.sum(list_eligible_retire)
```

[ ]: 2

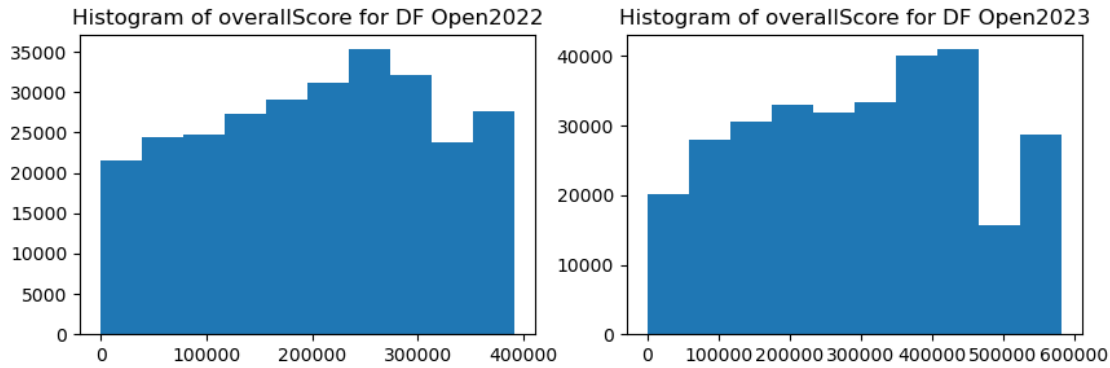
(c) Graphs from multiple datasets

- Create a list with the two “DF Open” datasets for 2022, and 2023
- Run a for-loop over each dataset
  - Compute a histogram of “overallScore” for each year
  - Label the title with the name of the dataset

Note: the dataset showcases the data from the 2022 and 2023 crossfit games

```
[ ]: # Note "overallScore" is the final score each candidate achieved

# Hint: Before you write the loop, test your code out by opening an individual
↳dataset
# Once you're sure the code works and you're familiar with the data, run the
↳loop
open_2022 =pd.read_csv("data/df_open_2022.csv")
open_2023=pd.read_csv("data/df_open_2023.csv")
datasets=[open_2022,open_2023]
fig, list_subfig = plt.subplots(1, 2, figsize = (10,3))
plt.tight_layout
x=2022
count=0
for year in datasets:
    list_subfig[count].hist(x = year["overallScore"])
    list_subfig[count].set_title("Histogram of overallScore for DF Open"+str(x))
    x=x+1
    count=count+1
```



For questions (d) and (e), use the following table:

(d) Loops with multiple lists

- Create three lists

```
list_lower = [93, 90, 87, 83, 80, 77, 73, 70, 67, 63, 60, 0]
```

```
list_upper = [100, 92, 89, 86, 82, 79, 76, 72, 69, 66, 62, 59]
```

```
list_letters = ["A", "A-", "B+", "B", "B-", "C+", "C", "C-", "D+", "D", "D-", "F"]
```

- Create a for loop that prints the message:

“If a students gets a grade between .... and ..., their letter grade is ...”

```
[ ]: # Hint: Use a for-loop with numbering
# Start the index at zero
# In the body of the loop, extract the elements in each list by the index
↪ position
list_lower = [93, 90, 87, 83, 80, 77, 73, 70, 67, 63, 60, 0]
list_upper = [100, 92, 89, 86, 82, 79, 76, 72, 69, 66, 62, 59]
list_letters = ["A", "A-", "B+", "B", "B-", "C+", "C", "C-", "D+", "D", "D-", "F"]
count=0

for i in range(len(list_letters)):
    lower_bound = list_lower[i]
    upper_bound = list_upper[i]
    letter_grade = list_letters[i]
    message = "If a student gets a grade between " + str(lower_bound) + " and "
    ↪ str(upper_bound)+ " their letter grade is " + str(letter_grade)
    print(message)
```

If a student gets a grade between 93 and 100 their letter grade is A

If a student gets a grade between 90 and 92 their letter grade is A-

If a student gets a grade between 87 and 89 their letter grade is B+

If a student gets a grade between 83 and 86 their letter grade is B  
 If a student gets a grade between 80 and 82 their letter grade is B-  
 If a student gets a grade between 77 and 79 their letter grade is C+  
 If a student gets a grade between 73 and 76 their letter grade is C  
 If a student gets a grade between 70 and 72 their letter grade is C-  
 If a student gets a grade between 67 and 69 their letter grade is D+  
 If a student gets a grade between 63 and 66 their letter grade is D  
 If a student gets a grade between 60 and 62 their letter grade is D-  
 If a student gets a grade between 0 and 59 their letter grade is F

(e) Classification with double loops

- Suppose that 7 students get the following grades:

```
list_studentgrades = [84, 62, 92, 74, 97, 80, 79]
```

- Print the following message:

“The student got a numeric grade of .... and their letter grade was ...”

```
[ ]: # (a) Hint: Use a double for loop structure:
#---- for studentgrade in list_studentgrades:
#----     index = 0
#----     for letter in list_letters:
#----         Body
#----         index = index + 1

# (b) Inside the body, use an if/else statement to print the correct letter
↪grade.
# You can make your code more concise by doing similar steps to question (d).
list_studentgrades = [84, 62, 92, 74, 97, 80, 79]
for studentgrade in list_studentgrades:
    index = 0
    for i in range(len(list_letters)):
        lower_bound = list_lower[i]
        upper_bound = list_upper[i]
        letter_grade = list_letters[i]
        if lower_bound <= studentgrade <= upper_bound:
            print("The student got a numeric grade of " + str(studentgrade) + "
↪and their letter grade was " + letter_grade)
    index = index + 1
```

The student got a numeric grade of 84 and their letter grade was B  
 The student got a numeric grade of 62 and their letter grade was D-  
 The student got a numeric grade of 92 and their letter grade was A-  
 The student got a numeric grade of 74 and their letter grade was C  
 The student got a numeric grade of 97 and their letter grade was A  
 The student got a numeric grade of 80 and their letter grade was B-  
 The student got a numeric grade of 79 and their letter grade was C+