

CSI_4_FSD

SOFTWARE DEVELOPMENT COURSEWORK

Student ID: 4238064

SUBMITTED TO: BRAHIM EL BOUDANI

Table of Contents

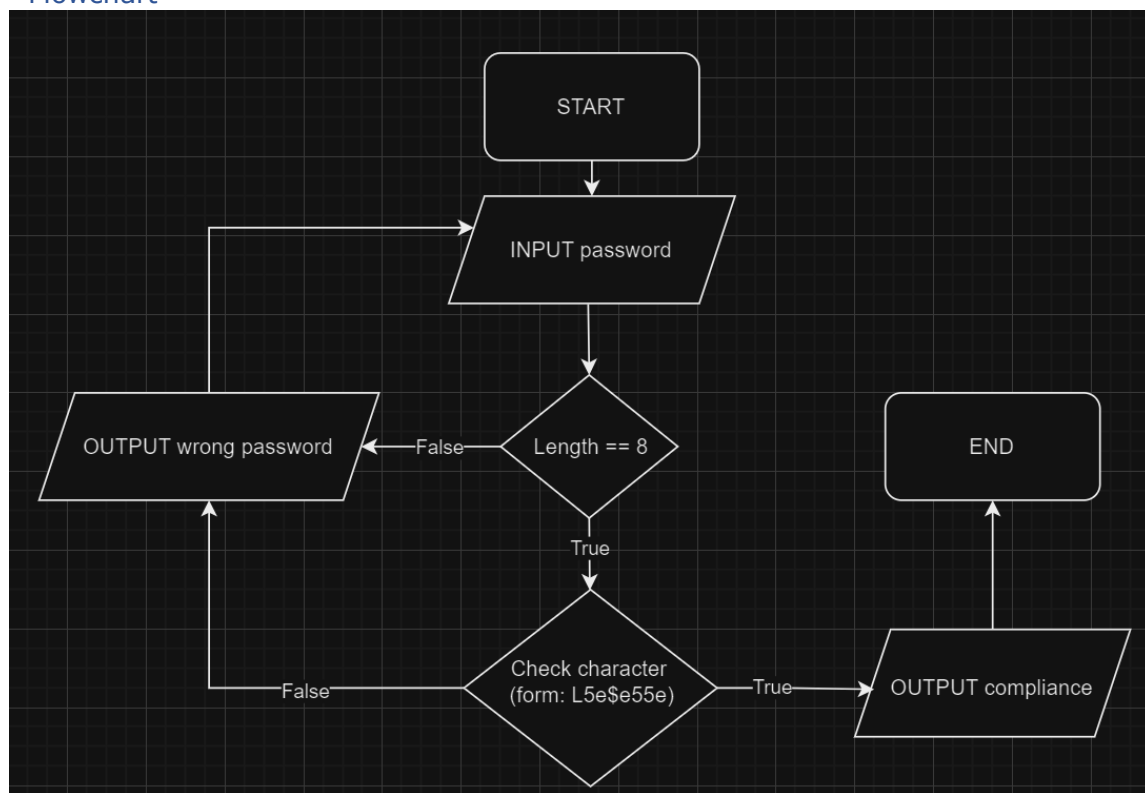
Problem 1: Password Compliance.....	2
Pseudocode	2
Flowchart	2
PasswordCompliance.c	3
Output	4
Problem 2: Word length and vowels counter	4
Pseudocode	4
Flowchart	5
Word length and vowels counter.c.....	5
Output	7
Problem 3: Statistic Library.....	7
Pseudocode	7
Flowchart	8
StatisticLibrary.c.....	10
Stats.h.....	10
Output	12
Mixed Learning Week 1	12
Mixed Learning Week 2	17
Mixed Learning Week 3	18
Mixed Learning Week 4	21
Mixed Learning Week 5	26
Flask	26
New Page.....	29
HTML webpage.....	30
Reflection	32
Conclusion	33
Bibliography.....	33

Problem 1: Password Compliance

Pseudocode

1. Start
2. Input password
3. Check password length
 - a. If length of password is not equal to 8
 - b. Output "Invalid format"
 - c. End
4. Check each character in password
 - a. For each character at position I in the password
 - i. If i is in [1, 5, 6] and not alphanumeric
Output "Invalid format"
End
 - ii. If i is [0] and not a capital letter
Output "Invalid format"
End
 - iii. If i is [3] and not '\$'
Output "Invalid format"
End
 - iv. If i is [2, 4, 7] and not lowercase letter
Output "Invalid format"
End
5. Output "Password is compliant"
6. End

Flowchart



PasswordCompliance.c

```
1  #include <stdio.h>
2  #include <string.h>
3  #include <stdbool.h>
4
5  //function to check if the password complies with the format
6  bool checkPasswordCompliance(char password[]) {
7      int length = strlen(password);
8      //check the length of password
9      if (length != 8) {return false;}
10     //check each character
11     //check for uppercase letter in the first element of password
12     if (!(password[0] >= 'A' && password[0] <= 'Z')) {return false;}
13     //check for number in the second element of password
14     if (!(password[1] >= '0' && password[1] <= '9')) {return false;}
15     //check for the lower case letter in the third element of password
16     if (!(password[2] >= 'a' && password[2] <= 'z')) {return false;}
17     //check dollar sign in the fourth element of password
18     if (password[3] != '$') {return false;}
19     //check for lower case letter in the fifth element of password
20     if (!(password[4] >= 'a' && password[4] <= 'z')) {return false;}
21     //check for number in the sixth element of password
22     if (!(password[5] >= '0' && password[5] <= '9')) {return false;}
23     //check for number in the seventh element of password
24     if (!(password[6] >= '0' && password[6] <= '9')) {return false;}
25     //check for lower case letter in the last element of the password
26     if (!(password[7] >= 'a' && password[7] <= 'z')) {return false;}
27     //return true if non of the code above run
28     return true;
29 }
30
31 int main() {
32     //generate string
33     char password[20];
34
35     //print the format
36     printf("Password format: 'L5e$e55e'\n");
37
38     //enter the password
39     printf("Enter the password: ");
40     scanf("%s", password);
41
42     //check the password and give output
43     if (checkPasswordCompliance(password)) {
44         //if the password is correct, print confirmation
45         printf("The password complies with the specified rules.\n");
46     }
47     else{
48         //if the password is incorrect, print the line
49         printf("The password does not comply with the specified rules.\n");
50     }
51     return 0;
52 }
53
```

Output

```
Password format: 'L5e$e55e'  
Enter the password: A1b$a28c  
The password complies with the specified rules.  
  
Process returned 0 (0x0)   execution time : 17.095 s  
Press any key to continue.  
|
```

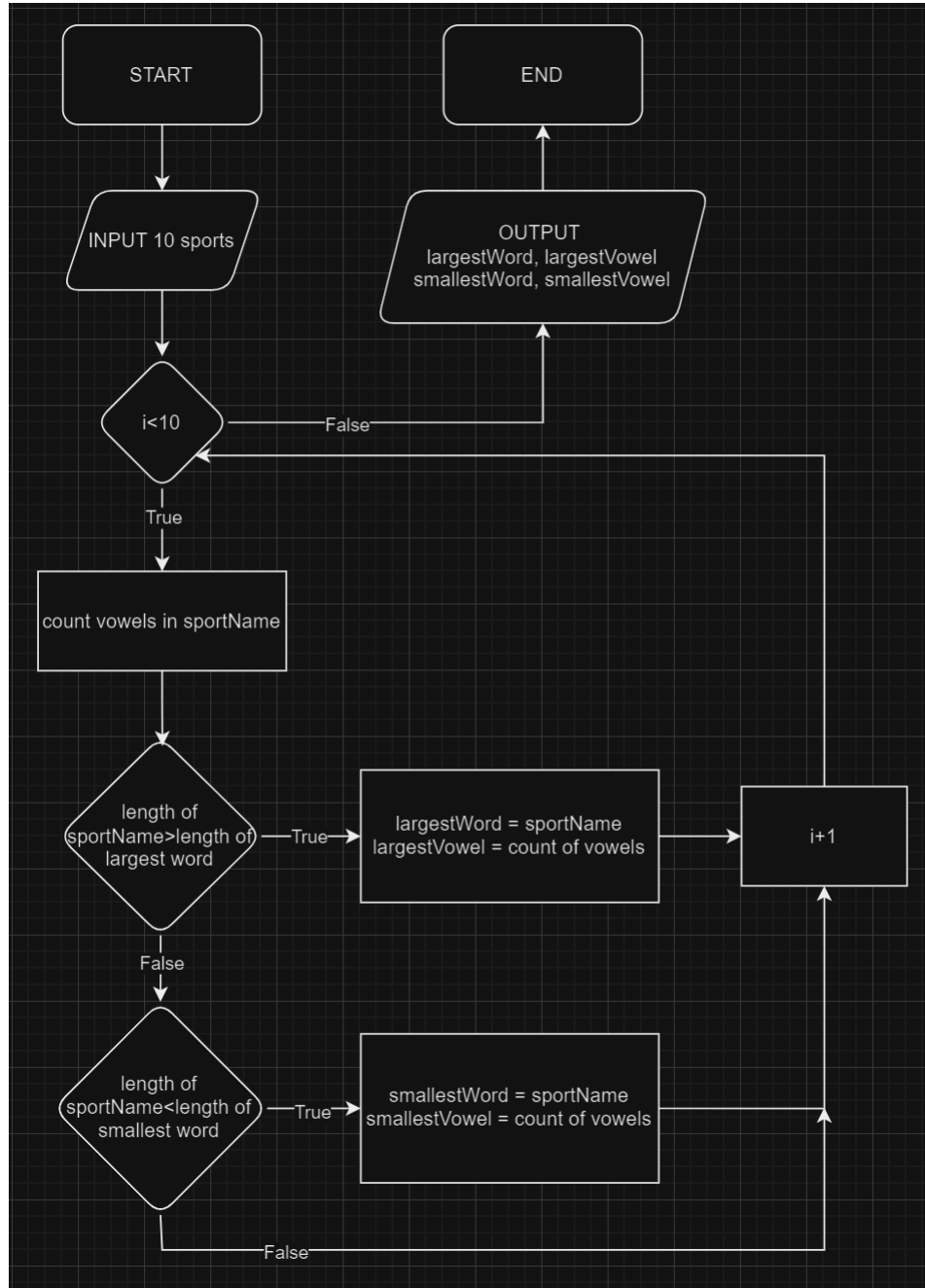
```
Password format: 'L5e$e55e'  
Enter the password: aB6$jsi9  
The password does not comply with the specified rules.  
  
Process returned 0 (0x0)   execution time : 13.901 s  
Press any key to continue.  
|
```

Problem 2: Word length and vowels counter

Pseudocode

1. Start
2. Input name of 10 sports
For i from 1 to 10: Input sports name
3. Function to count vowel
4. Count length of the sport name
For i from 1 to 10:
 Count vowels in sport name
 If length of sport name > length of longest word
 Longest word = sport name
 Longest vowel = count of vowels
 If length of sport name < length of smallest word
 Smallest word = sport name
 Smallest vowel = count of vowels
5. Output longest word, smallest word, longest vowel, smallest vowel
6. End

Flowchart



Word length and vowels counter.c

```

1  #include <stdio.h>
2  #include <string.h>
3  #include <ctype.h>
4
5  // function count number of the sports
6  int countVowels(char str[]) {
7      // assign count = 0
8      int count=0;
9      //generate a for loop from i = 0 to last character in string str
10     for (int i=0; str[i]!='\0'; i++) {
11         //assign ch = function tolower of string str
12         // tolower is a function to make the uppercase letter become lowercase letter
13         char ch=toupper(str[i]);
14         //if ch is vowel letter, count + 1
15         if (ch=='a' || ch=='e' || ch=='i' || ch=='o' || ch=='u') {
16             count++;
17         }
18     }
19     return count;
20 }
21

```

```

22 // main function
23 int main() {
24     // initialize variables
25     char sports[10][50];
26     char smallest[50], longest[50];
27     int smallestVowels, longestVowels;
28     int i;
29
30     // get 10 sports name from user
31     printf("Enter 10 sport names:\n");
32     //generate for loop from i = 0 to 9
33     for (i=0; i<10; i++){
34         // ask user to enter the sport name
35         printf("Sport %d: ", i + 1);
36         fgets(sports[i], sizeof(sports[i]), stdin);
37         sports[i][strcspn(sports[i], "\n")] = '\0';
38     }
39
40     // copy first name in sport string to smallest/longest string
41     strcpy(smallest, sports[0]);
42     strcpy(longest, sports[0]);
43
44     // assign number of vowel to variable
45     smallestVowels = countVowels(smallest);
46     longestVowels = countVowels(longest);
47
48     // for loop to find the smallest/longest sport name and the vowel
49     for (i=0; i<10; i++){
50         // generate variable to count vowel
51         int currentVowels = countVowels(sports[i]);
52         // compare the length of the sport i with the smallest
53         if (strlen(sports[i])<strlen(smallest)){
54             // copy the sport i to smallest
55             strcpy(smallest, sports[i]);
56             // count and assign number of vowel in sport i to variable smallestVowels
57             smallestVowels = currentVowels;
58         }
59         // compare the length of the sport i with the longest
60         if (strlen(sports[i])>strlen(longest)){
61             // copy the sport i to longest
62             strcpy(longest, sports[i]);
63             // count and assign number of vowel in sport i to variable longestVowels
64             longestVowels = currentVowels;
65         }
66     }
67

```

```

68 // print the output
69 printf("\nThe smallest word is: %s (Vowels: %d)\n", smallest, smallestVowels );
70 printf("The largest word is: %s (Vowels: %d)\n", longest, longestVowels );
71
72 // print the tie word if there are two sports with the same number of letter
73 printf("\nTied words:\n");
74 // for loop from 0 to 9
75 for(i=0;i<10;++i){
76     // if length of sport i equal to length of smallest and different to smallest
77     if(strlen(sports[i])==strlen(smallest) && strcmp(sports[i],smallest)!=0){
78         // count and assign number of vowel in sport i to variable smallestVowels
79         smallestVowels = countVowels(sports[i]);
80         // print output
81         printf("Smallest: %s(Vowels: %d)\n", sports[i], smallestVowels);
82     }
83     // if length of sport i equal to length of longest and different to longest
84     if(strlen(sports[i])==strlen(longest) && strcmp(sports[i],longest)!=0){
85         // count and assign number of vowel in sport i to variable longestVowels
86         longestVowels = countVowels(sports[i]);
87         // print output
88         printf("Longest: %s(Vowels: %d)\n", sports[i], longestVowels);
89     }
90 }
91 return 0;
92 }
93

```

Output

```

Enter 10 sport names:
Sport 1: football
Sport 2: golf
Sport 3: basketball
Sport 4: hockey
Sport 5: ice skating
Sport 6: baseball
Sport 7: volleyball
Sport 8: beach volleyball
Sport 9: tennis
Sport 10: judo

The smallest word is: golf (Vowels: 1)
The largest word is: beach volleyball (Vowels: 5)

Tied words:
Smallest: judo(Vowels: 2)

Process returned 0 (0x0)   execution time : 78.383 s
Press any key to continue.

```

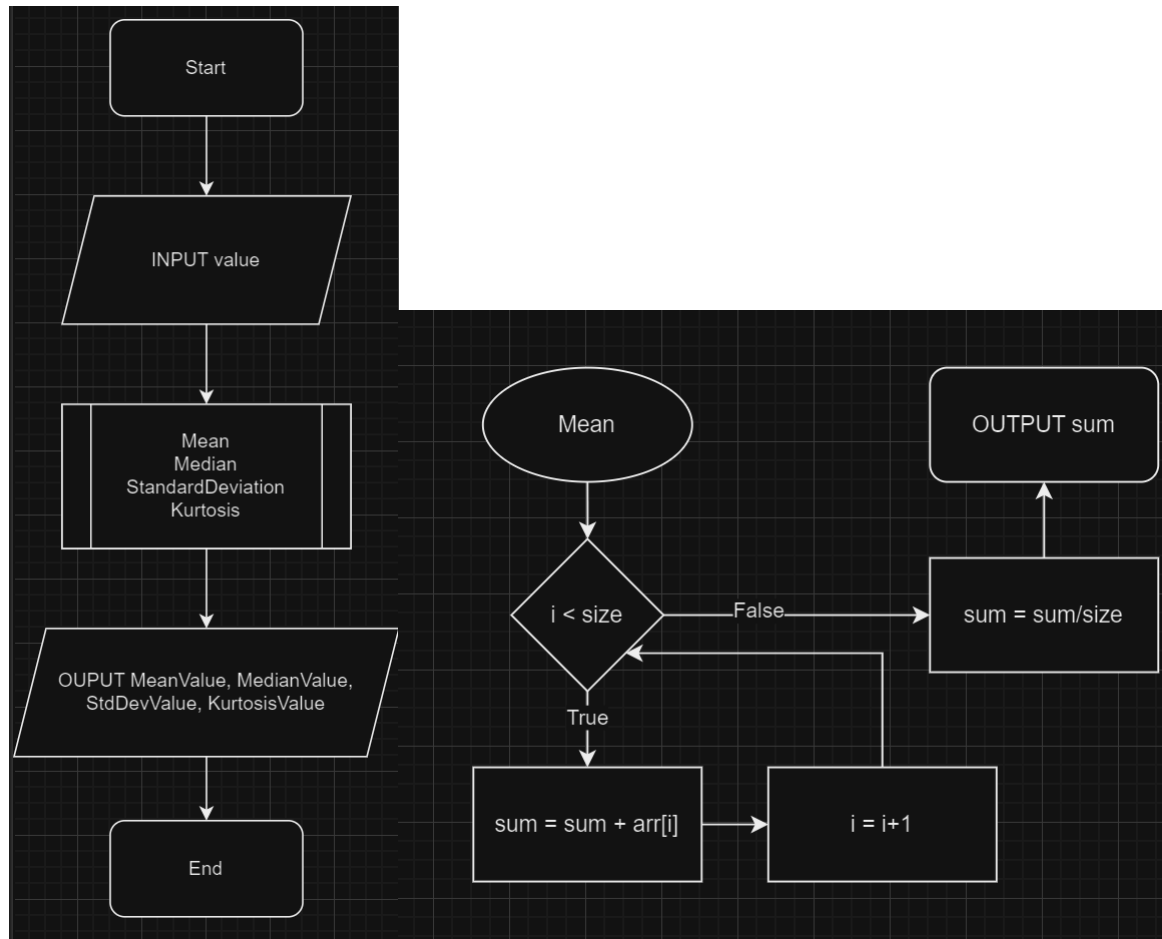
Problem 3: Statistic Library

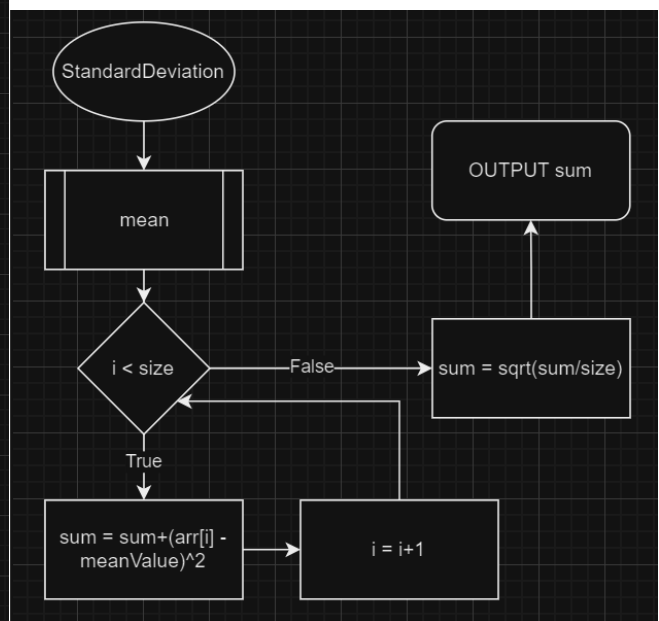
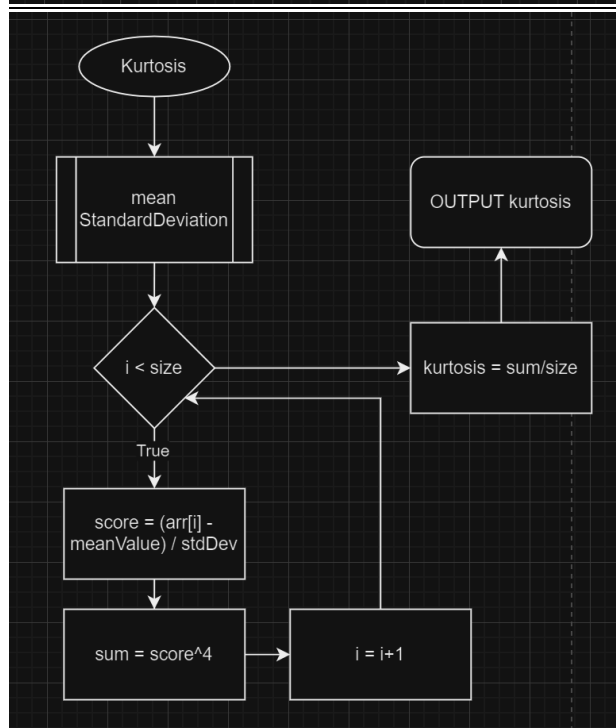
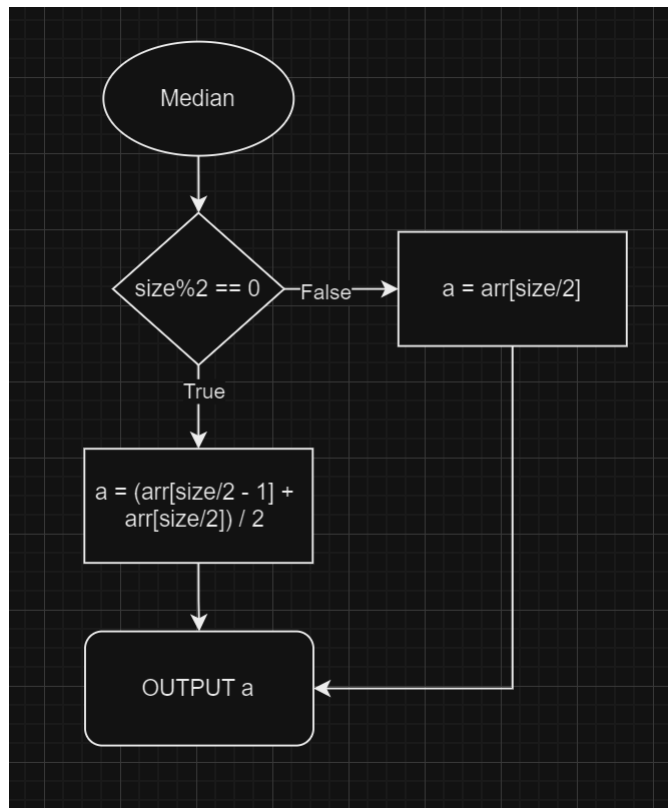
Pseudocode

- I. StatisticLibrary.c
 1. Start
 2. Generate variable
 3. Use the function in stats.h
 4. Print output
 5. End
- II. Stats.h

1. Start
2. Generate variable for function
3. Function to calculate mean
4. Function to calculate median
5. Function to calculate standard deviation
 - Use function to find mean value
 - Create for loop from 0 to size of the string
 - $\text{Sum} = \text{sum} + (\text{arr}[i] - \text{meanValue})^2$ (Calculate the sum of square the difference between each number i of arr and the mean value)
 - Print out square root of $\text{sum} / \text{size of arr}$
6. Function to calculate kurtosis
 - Use function to find mean value and standard deviation
 - Create for loop from 0 to size of the string
 - $\text{Sum} = \text{sum} + ((\text{arr}[i] - \text{meanValue}) / \text{standard deviation value})^4$ (Calculate the sum of the difference between each number i of arr and the mean value divided by standard deviation value and power 4)
 - Print out square root of $\text{sum} / \text{size of arr}$

Flowchart





StatisticLibrary.c

```
1  #include <stdio.h>
2  #include <stdlib.h>
3  #include <math.h>
4  #include "stats.h"
5
6  // Main function to test the statistics library
7  int main() {
8      double britishCoins[] = {1, 2, 5, 10, 20, 50};
9      int size = sizeof(britishCoins) / sizeof(britishCoins[0]);
10
11     // Use function to calculate
12     double meanValue = mean(britishCoins, size);
13     double medianValue = median(britishCoins, size);
14     double kurtosisValue = kurtosis(britishCoins, size);
15     double stdDevValue = standardDeviation(britishCoins, size);
16
17     // Print value after calculate
18     printf("Mean: %.2f\n", meanValue);
19     printf("Median: %.2f\n", medianValue);
20     printf("Kurtosis: %.2f\n", kurtosisValue);
21     printf("Standard Deviation: %.2f\n", stdDevValue);
22
23     return 0;
24 }
```

Stats.h

```
1  #define STATS_H
2
3  //initialize function
4  double mean(const double arr[], int size);
5  double median(double arr[], int size);
6  double kurtosis(const double arr[], int size);
7  double standardDeviation(const double arr[], int size);
8
9  // comparison function for qsort
10 int compareDoubles(const void *a, const void *b) {
11
12     // compare value of a and b
13     // if values are equal, return 0
14     // if values a is greater, return 1
15     // if values b is greater, return -1
16     return (*(double *)a > *(double *)b) - (*(double *)a < *(double *)b);
17 }
18
```

```

19 // implementations of functions in stats.h
20 double mean(const double arr[], int size){
21
22     //initialize sum
23     double sum = 0;
24
25     // for loop to calculate the sum
26     for (int i = 0; i < size; ++i) {
27         sum += arr[i];
28     }
29
30     //return mean
31     return sum / size;
32 }
33

```

```

34 double median(double arr[], int size) {
35
36     // sort arr string
37     qsort(arr, size, sizeof(double), compareDoubles);
38
39     // if size is even, find the average of two middle values
40     if (size % 2 == 0) {
41         //return median
42         return (arr[size / 2 - 1] + arr[size / 2]) / 2.0;
43     } else {
44         // if size is odd
45         //return median
46         return arr[size / 2];
47     }
48 }
49

```

```

50 double standardDeviation(const double arr[], int size) {
51     // calculate meanValue
52     double meanValue = mean(arr, size);
53
54     // initialize sum
55     double sum = 0;
56
57     // for loop to find difference from mean in arr size
58     for (int i = 0; i < size; ++i) {
59         sum += pow(arr[i] - meanValue, 2);
60     }
61
62     // return standard deviation
63     return sqrt(sum / size);
64 }
65

```

```

66 double kurtosis(const double arr[], int size) {
67
68     // calculate mean and standard deviation
69     double meanValue = mean(arr, size);
70     double stdDevValue = standardDeviation(arr, size);
71
72     // initialize variables
73     double sum = 0;
74
75     // calculate the score for each element based on mean and standard deviation
76     // raise score to the fourth power, adds it to sum
77     for (int i = 0; i < size; ++i) {
78         double score = (arr[i] - meanValue) / stdDevValue;
79         sum += pow(score, 4);
80     }
81     // return kurtosis
82     return sum/size;
83 }
84

```

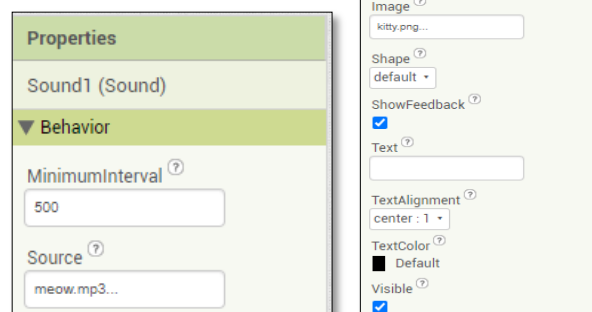
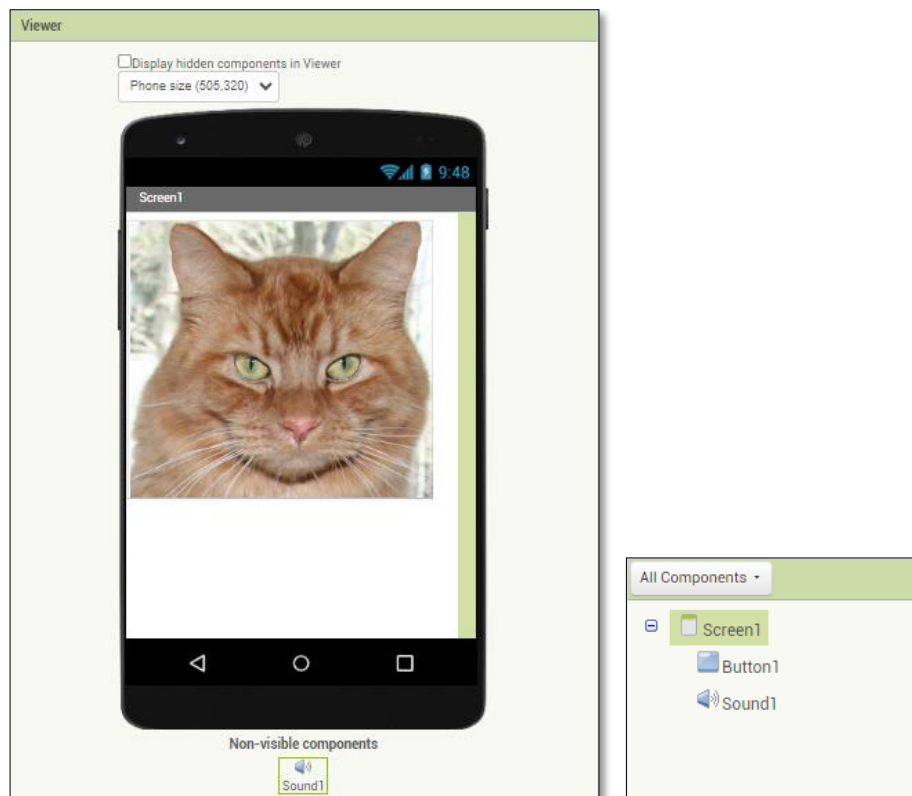
Output

```

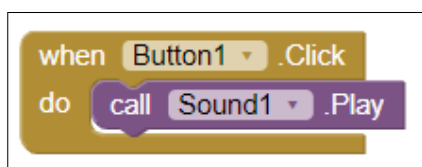
Mean: 14.67
Median: 7.50
Kurtosis: 3.23
Standard Deviation: 17.03

Process returned 0 (0x0)   execution time : 1.009 s
Press any key to continue.
|

```

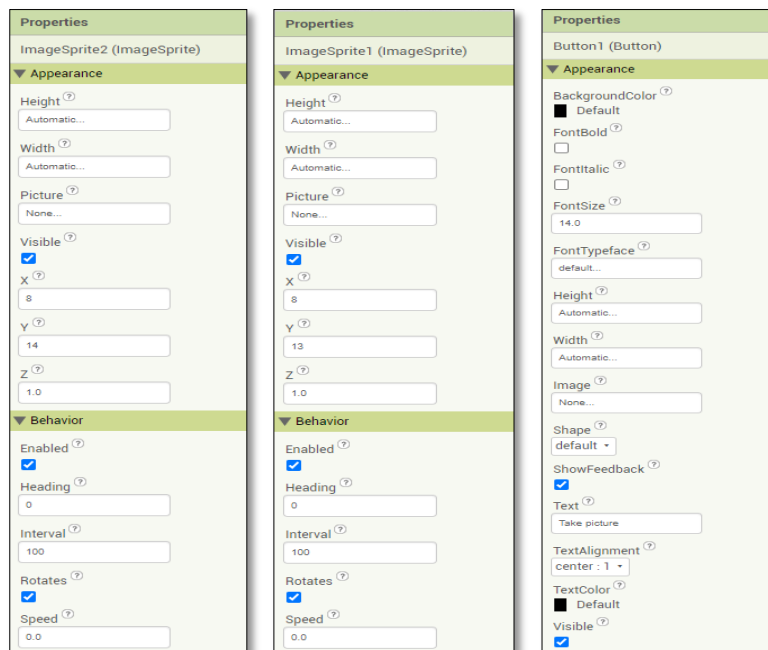
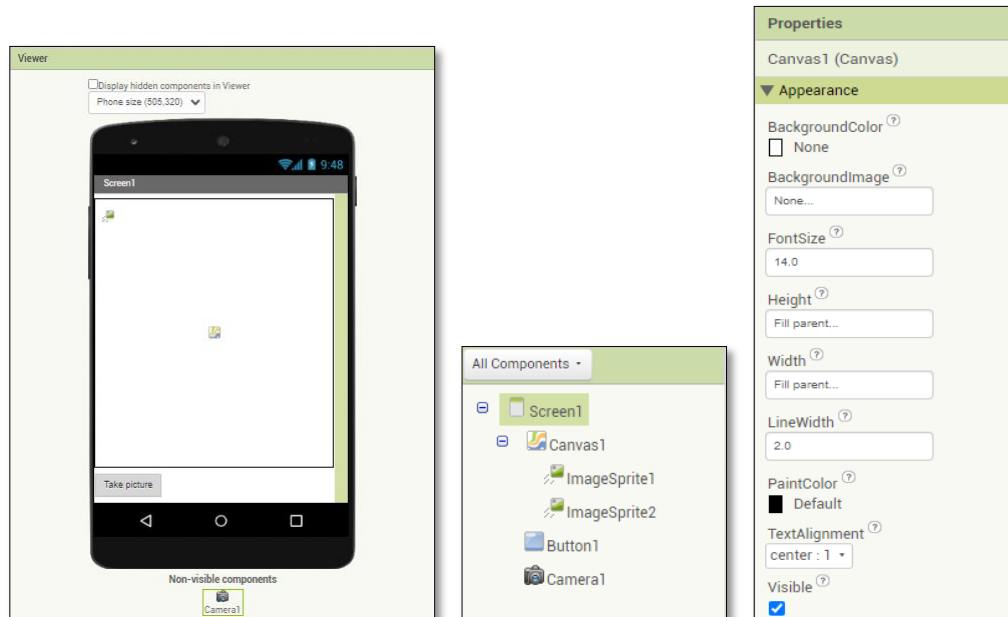


Blocks Page

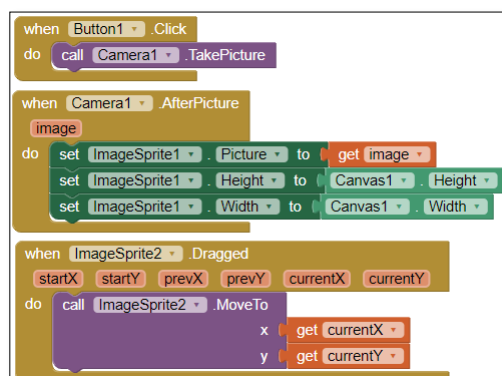


Project Moustache Man

Designer Page

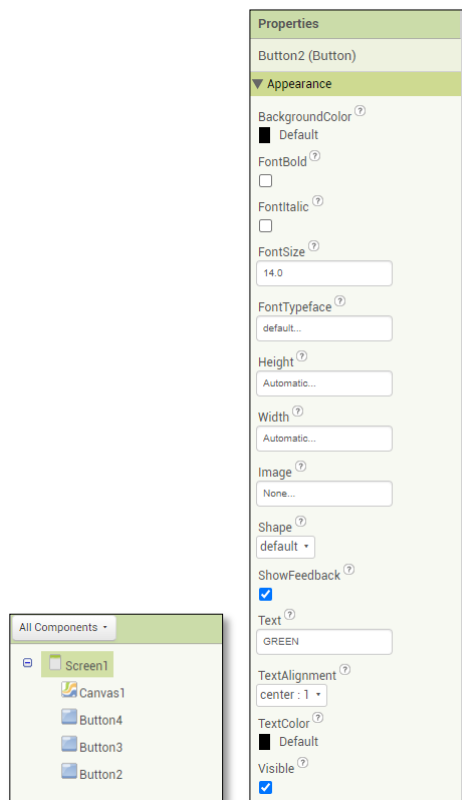
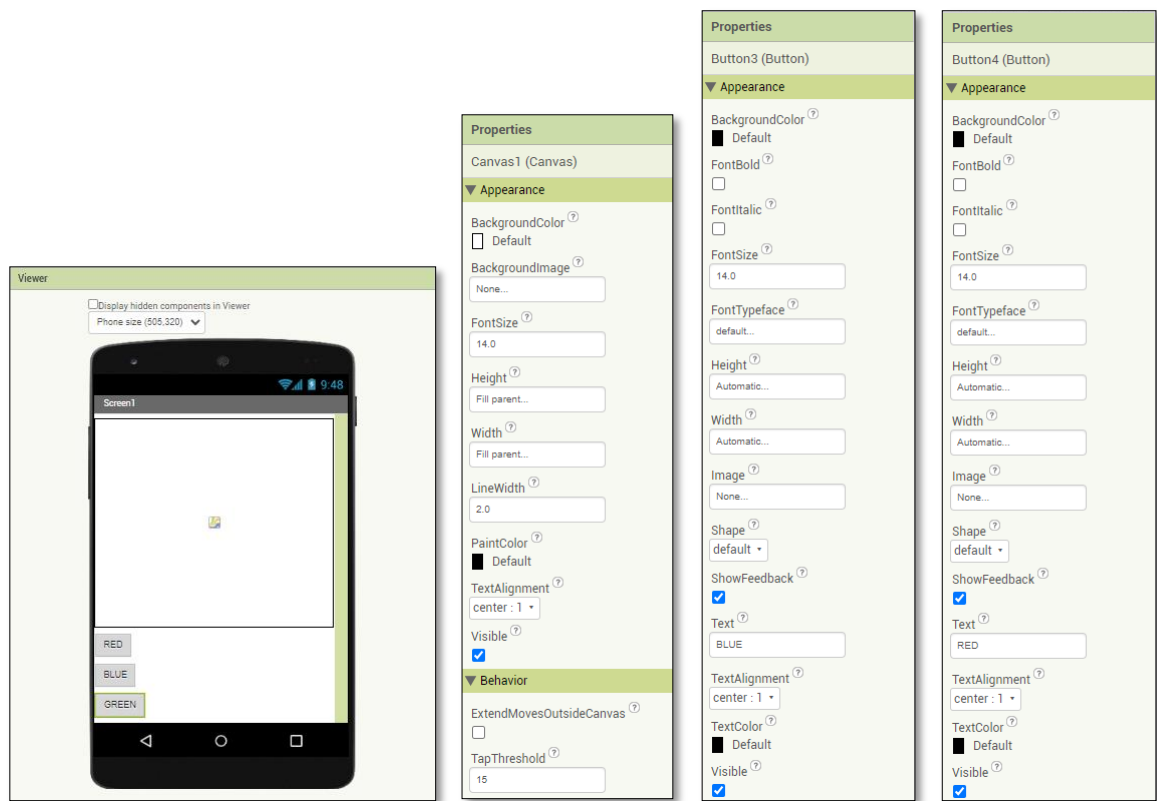


Blocks Page

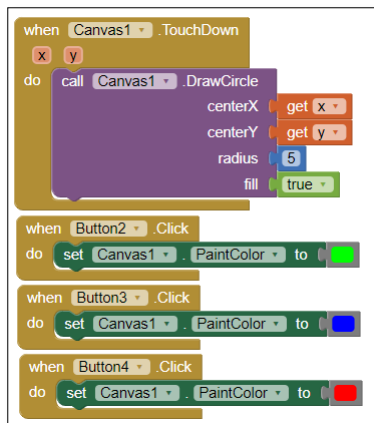


Project drawing dots

Designer Page

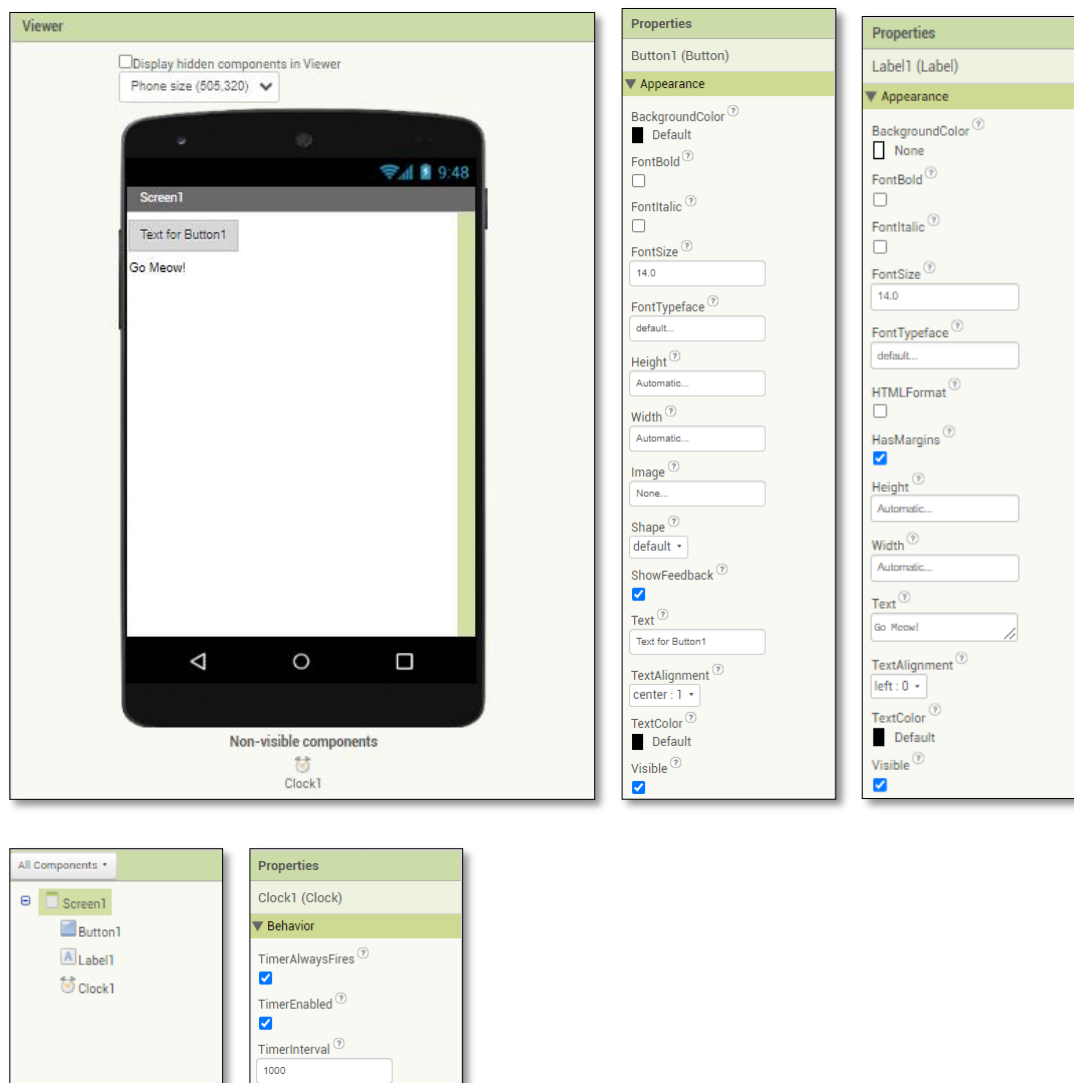


Blocks Page

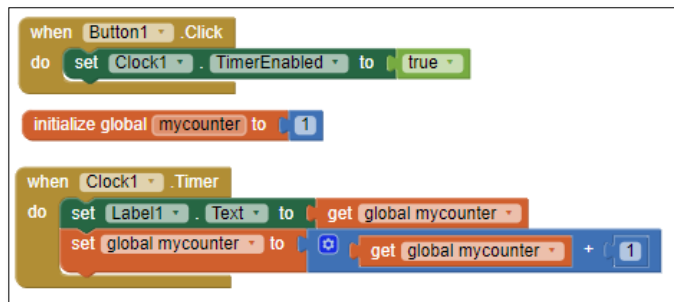


Project counting up

Designer Page



Blocks Page



Mixed Learning Week 2

```
In [1]: myname = "Khanh"

In [2]: year = 2023

In [3]: pi = 3.14

In [5]: bool_ = True

In [6]: x = 2; y = 3; z = 5

In [8]: print (x-y)
        print (x+y)
        print (x*z)
        print (z/x)
        print (z//x)
        print (z%x)
        -1
        5
        10
        2.5
        2
        1

In [9]: earth_radius_km = 6371
        km_to_miles = 0.621371
        altitude_feet = 4000
        feet_to_meters = 0.3048

In [10]: earth_radius_miles = earth_radius_km * km_to_miles
        altitude_meters = altitude_feet * feet_to_meters

In [11]: print (earth_radius_miles)
        print (altitude_meters)
        3958.754641
        1219.2

In [12]: earth_radius_miles = km_to_miles * earth_radius_km

In [13]: print (earth_radius_miles)
        3958.754641

In [14]: k = 3

In [15]: k = True

In [16]: print (k)
        True
```

```

In [17]: print (myname, k, year)
Khanh True 2023

In [18]: glass = 0.5
pull = 0.4
glass += pull
print (glass)
print (pull)
0.9
0.4

In [19]: glass *= pull
print (glass)
0.36000000000000004

In [20]: x //= y
print (x)
0

In [21]: x = 5
x %= y
print (x)
2

In [24]: x = 5

In [25]: if (x%2==0):
        print ("You got an even number")
    else:
        print ("You got an odd number")
You got an odd number

In [39]: year = 2020

In [40]: if (year%400==0) or (year%4==0 and year%100!=0):
        print ("This year is a leap year")
    else:
        print ("This year is not a leap year")
This year is a leap year

```

Mixed Learning Week 3

```

In [1]: for i in range (11):
        print (i)
0
1
2
3
4
5
6
7
8
9
10

In [2]: for i in range (11):
        if(i%2==0):
            print (i)
0
2
4
6
8
10

In [3]: start = int(input("Enter start number: "))
end = int(input("Enter end number: "))
for i in range (start, end+1):
    print (i)
Enter start number: 0
Enter end number: 10
0
1
2
3
4
5
6
7
8
9
10

```

```
In [4]: s1 = int(input("Enter start number: "))
e1 = int(input("Enter end number: "))
step = int(input("Enter number for step: "))
for i in range (s1,e1+1,step):
    print (i)
```

```
Enter start number: 0
Enter end number: 20
Enter number for step: 2
0
2
4
6
8
10
12
14
16
18
20
```

```
In [5]: a = 0
while (a<=17):
    print (a)
    a = a+1
```

```
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
```

```
In [6]: x = 0
while (x<=28):
    if (x%2!=0):
        print (x)
    x = x+1
```

```
1
3
5
7
9
11
13
15
17
19
21
23
25
27
```

```
In [7]: k = int(input("Enter a number: "))
count = 0
while (count<=k):
    if (count%10==0):
        print (count)
    count = count+1
```

```
Enter a number: 35
0
10
20
30
```

```
In [8]: for i in range(0,15):
    print (i)
    if (i==10):
        break
```

```
0
1
2
3
4
5
6
7
8
9
10
```

```
In [9]: for i in range (0,18):
    if (i%2!=0):
        print (i)
    if (i==12):
        break
```

```
1
3
5
7
9
11
```

```
In [13]: h = int(input("Enter a number: "))
c = 0
while (c<=h):
    print (c)
    if (c==h//2):
        break
    c = c+1
```

```
Enter a number: 24
0
1
2
3
4
5
6
7
8
9
10
11
12
```

```
In [1]: b = 0
while (b<=9):
    if(b%2!=0):
        b = b+1
        continue
    print (b)
    b = b+1
```

```
0
2
4
6
8
```

```
In [3]: n = 0
while (n<=16):
    if (n%2!=0):
        n = n+1
        continue
    print (n)
    n = n+1
```

```
0
2
4
6
8
10
12
14
16
```

```
In [4]: def ave3(a,b,c):
        answer = (a+b+c)/3
        print(answer)
```

```
In [5]: ave3(1,2,3)
```

```
2.0
```

```
In [6]: def sum5(a,b,c,d,e):
        s = a+b+c+d+e
        print (s)
```

```
In [8]: sum5(1,2,3,4,5)
```

```
15
```

```
In [9]: import cmath
```

```
In [10]: def math(a,b,c):
        print(f"{a}x^2 + {b}x + {c} = 0")
        x = cmath.sqrt(b*b - 4*a*c)
        delta = b*b - 4*a*c
        if (delta>0):
            root1 = (-b + x)/(2*a)
            root2 = (-b - x)/(2*a)
            return root1, root2
        if (delta<0):
            print ("no solution")
```

```
In [11]: math(2,3,6)
```

```
2x^2 + 3x + 6 = 0
no solution
```

```
In [12]: math(1,2,1)
```

```
1x^2 + 2x + 1 = 0
```

```
Out[12]: (-1+0j)
```

```
In [14]: name = str(input("Enter your name: "))
Enter your name: Khanh

In [15]: DoB = int(input("Enter your year of birth: "))
Enter your year of birth: 2005

In [16]: age = 2023 - DoB
print(name, age)
Khanh 18

In [17]: def area_triangle():
height = int(input("Enter triangle height: "))
width = int(input("Enter triangle width: "))
area = (height*width)/2
return area
```

```
In [18]: area_triangle()
Enter triangle height: 6
Enter triangle width: 5
```

Out[18]: 15.0

```
In [19]: def area_circle():
radius = int(input("Enter radius:"))
area = radius*radius*3.14159
return area
```

```
In [20]: area_circle()
Enter radius:4
```

Out[20]: 50.26544

```
In [22]: def volume_cylinder():
r = int(input("Enter radius: "))
h = int(input("Enter height: "))
v = 3.14159*r*r*h
return v
```

```
In [23]: volume_cylinder()
Enter radius: 5
Enter height: 4
```

Out[23]: 314.159

```
In [24]: def circumference_earth():
r_earth = 6371
circumference = 2*3.14159*r_earth
return circumference
```

```
In [25]: circumference_earth()
```

Out[25]: 40030.13978

In []:

Mixed Learning Week 4

```
In [1]: integers_list = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

```
In [2]: range_list = list(range(100))
```

```
In [3]: fruits_list = ["apple", "banana", "orange", "grape", "kiwi", "strawberry", "pineapple", "mango", "watermelon", "peach"]
```

```
In [4]: mixed_list = [{"name": "John", "id": 123, "grades": [90, 85, 92], "pass": True},
{"name": "Alice", "id": 456, "grades": [78, 80, 75], "pass": False},
{"name": "Bob", "id": 789, "grades": [88, 95, 89], "pass": True}]
```

```
In [6]: integers_list.append(11)
```

```
In [7]: integers_list.extend([12,13,14,15,16])
```

```
In [8]: del range_list[-50:]
```

```
In [9]: fruits_list.extend(["pear", "cherry", "grapefruit", "blueberry", "raspberry"])
```

```
In [11]: integers_list.extend(fruits_list)
```

```

In [12]: print(integers_list)

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 'apple', 'banana', 'orange', 'grape', 'kiwi', 'strawberry', 'pineapple', 'mango', 'watermelon', 'peach', 'pear', 'cherry', 'grapefruit', 'blueberry', 'raspberry']

In [13]: print(range_list)

[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49]

In [14]: print(fruits_list)

['apple', 'banana', 'orange', 'grape', 'kiwi', 'strawberry', 'pineapple', 'mango', 'watermelon', 'peach', 'pear', 'cherry', 'grapefruit', 'blueberry', 'raspberry']

In [15]: print(mixed_list)

[{'name': 'John', 'id': 123, 'grades': [90, 85, 92], 'pass': True}, {'name': 'Alice', 'id': 456, 'grades': [78, 80, 75], 'pass': False}, {'name': 'Bob', 'id': 789, 'grades': [88, 95, 89], 'pass': True}]

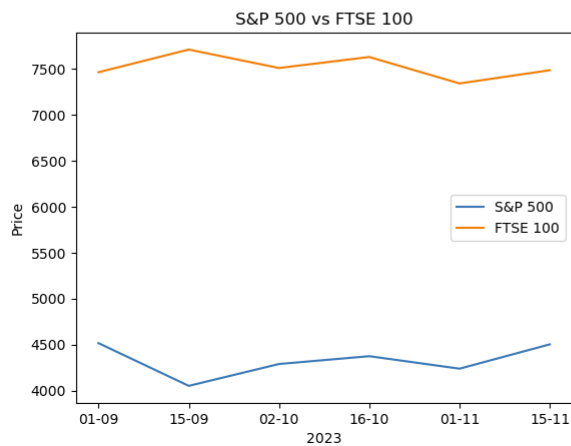
In [8]: import pandas as pd
import matplotlib.pyplot as plt

In [19]: Date = ['01-09', '15-09', '02-10', '16-10', '01-11', '15-11']
SandP_500 = [4515, 4050, 4288, 4373, 4237, 4502]
FTSE_100 = [7464, 7711, 7510, 7630, 7342, 7486]

plt.plot(Date, SandP_500, label='S&P 500')
plt.plot(Date, FTSE_100, label='FTSE 100')

plt.legend()
plt.title('S&P 500 vs FTSE 100')
plt.xlabel('2023')
plt.ylabel('Price')
plt.show()

```

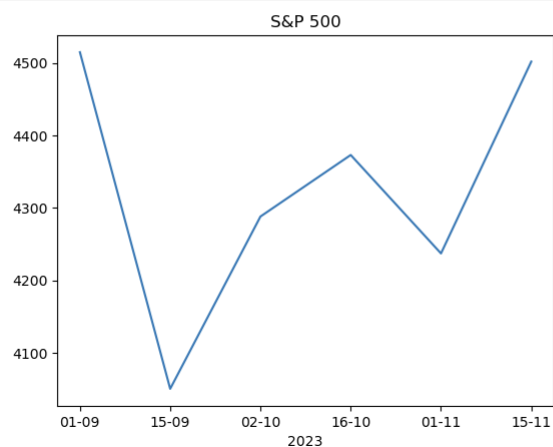


```

In [21]: plt.plot(Date, SandP_500)

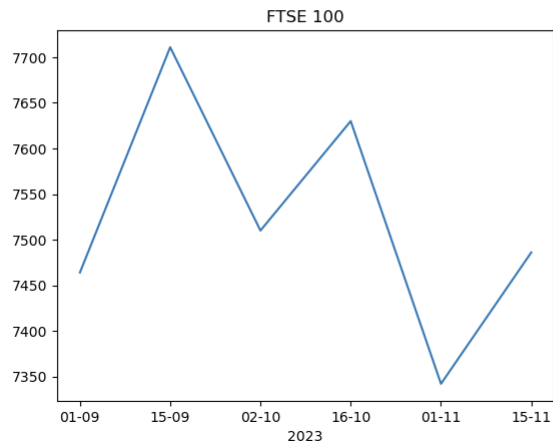
plt.title('S&P 500')
plt.xlabel('2023')
plt.show()

```



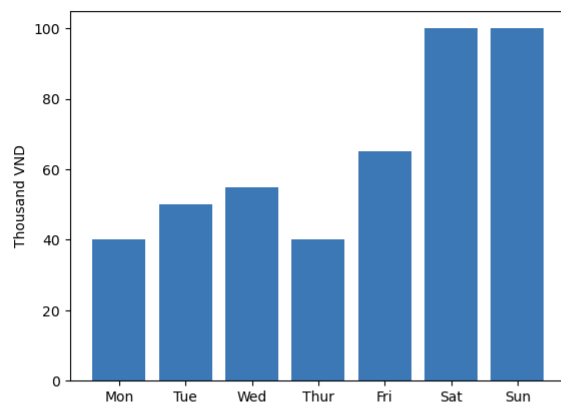
```
In [22]: plt.plot(Date,FTSE_100)
```

```
plt.title('FTSE 100')  
plt.xlabel('2023')  
plt.show()
```

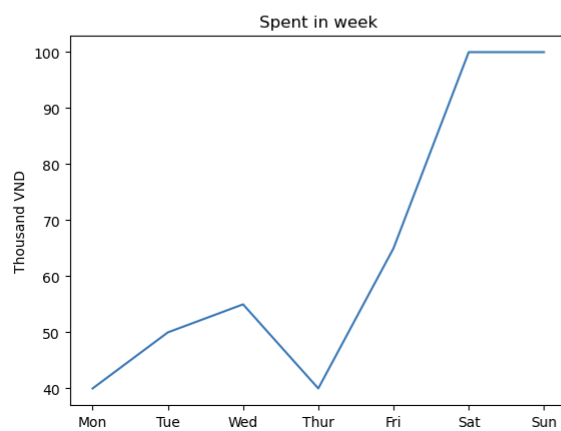


```
In [23]: Day = ['Mon', 'Tue', 'Wed', 'Thur', 'Fri', 'Sat', 'Sun']  
Spent = [40, 50, 55, 40, 65, 100, 100]
```

```
plt.bar(Day,Spent)  
plt.ylabel("Thousand VND")  
plt.xticks(Day)  
plt.show()
```



```
In [27]: plt.plot(Day,Spent)  
plt.title("Spent in week")  
plt.ylabel("Thousand VND")  
plt.show()
```

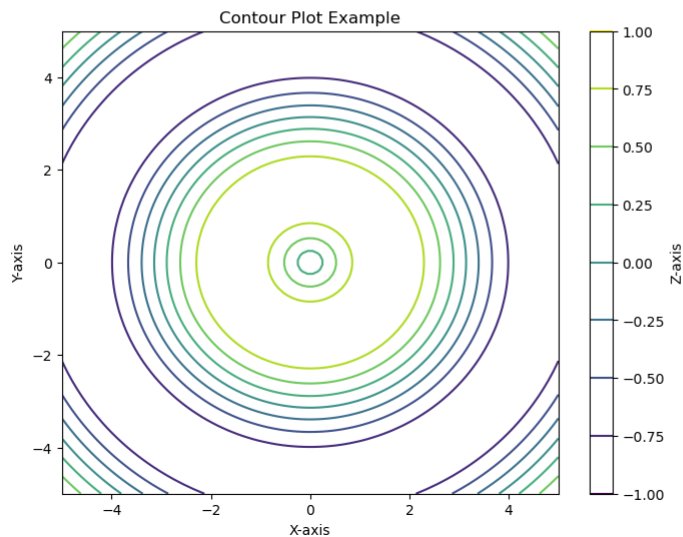



```
In [28]: import numpy as np
import matplotlib.pyplot as plt

x = np.linspace(-5, 5, 100)
y = np.linspace(-5, 5, 100)
X, Y = np.meshgrid(x, y)
Z = np.sin(np.sqrt(X**2 + Y**2))

plt.figure(figsize=(8, 6))
contour_plot = plt.contour(X, Y, Z, cmap='viridis')

plt.title('Contour Plot Example')
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.colorbar(contour_plot, label='Z-axis')
plt.show()
```

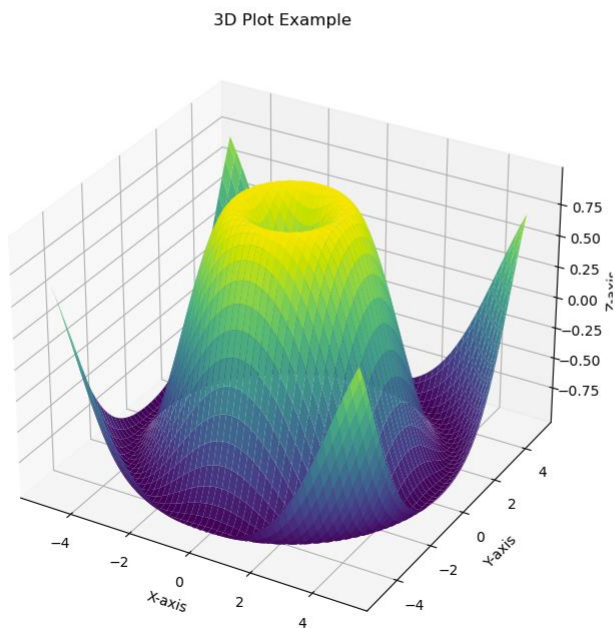


```
In [7]: x = np.linspace(-5, 5, 100)
y = np.linspace(-5, 5, 100)
X, Y = np.meshgrid(x, y)
Z = np.sin(np.sqrt(X**2 + Y**2))

fig = plt.figure(figsize=(10, 8))
ax = fig.add_subplot(111, projection='3d')
ax.plot_surface(X, Y, Z, cmap='viridis')

ax.set_title('3D Plot Example')
ax.set_xlabel('X-axis')
ax.set_ylabel('Y-axis')
ax.set_zlabel('Z-axis')

plt.show()
```

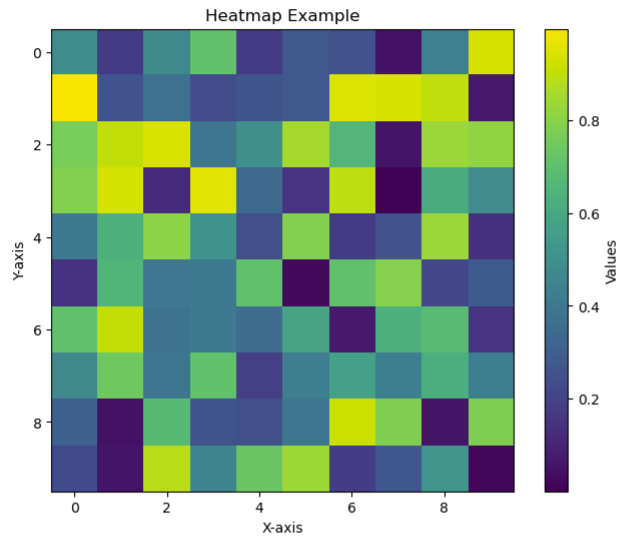


```
In [5]: data = np.random.rand(10, 10)

plt.figure(figsize=(8, 6))
heatmap = plt.imshow(data, cmap='viridis', interpolation='nearest')

plt.title('Heatmap Example')
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.colorbar(heatmap, label='Values')

plt.show()
```



```
In [9]: age_gender = pd.read_csv("age_gender.csv", delimiter=',')
```

```
In [10]: age_gender[["ethnicity", "img_name"]]
```

```
Out[10]:
```

	ethnicity	img_name
0	2	20161219203650636.jpg.chip.jpg
1	2	20161219222752047.jpg.chip.jpg
2	2	20161219222832191.jpg.chip.jpg
3	2	20161220144911423.jpg.chip.jpg
4	2	20161220144914327.jpg.chip.jpg
...
23700	0	20170120221920654.jpg.chip.jpg
23701	1	20170120134639935.jpg.chip.jpg
23702	2	20170110182418864.jpg.chip.jpg
23703	2	20170117195405372.jpg.chip.jpg
23704	0	20170110182052119.jpg.chip.jpg

23705 rows x 2 columns

```
In [11]: age_gender.describe()
```

```
Out[11]:
```

	age	ethnicity	gender
count	23705.000000	23705.000000	23705.000000
mean	33.300907	1.269226	0.477283
std	19.885708	1.345638	0.499494
min	1.000000	0.000000	0.000000
25%	23.000000	0.000000	0.000000
50%	29.000000	1.000000	0.000000
75%	45.000000	2.000000	1.000000
max	116.000000	4.000000	1.000000

```
In [13]: age_gender[age_gender.ethnicity==2]
```

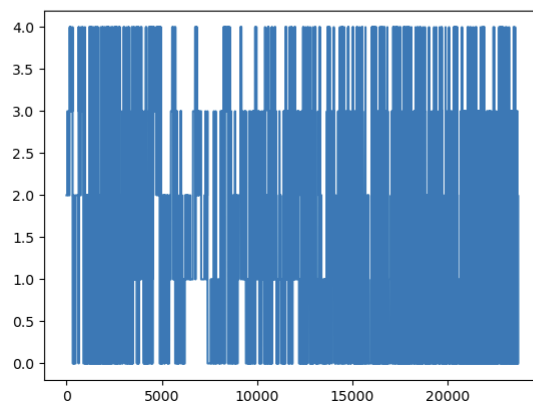
```
Out[13]:
```

	age	ethnicity	gender	img_name	pixels
0	1	2	0	20161219203650636.jpg.chip.jpg	129 128 128 126 127 130 133 135 139 142 145 14...
1	1	2	0	20161219222752047.jpg.chip.jpg	164 74 111 168 169 171 175 182 184 188 193 199...
2	1	2	0	20161219222832191.jpg.chip.jpg	67 70 71 70 69 67 70 79 90 103 116 132 145 155...
3	1	2	0	20161220144911423.jpg.chip.jpg	193 197 198 200 199 200 202 203 204 205 208 21...
4	1	2	0	20161220144914327.jpg.chip.jpg	202 205 209 210 209 209 210 211 212 214 218 21...
...
23683	96	2	1	20170110175716420.jpg.chip.jpg	55 44 78 90 92 95 99 103 107 107 103 108 107 1...
23684	96	2	1	20170105174624519.jpg.chip.jpg	6 10 9 13 16 46 118 115 131 151 140 115 96 122...
23686	96	2	1	20170110182504813.jpg.chip.jpg	157 46 16 3 3 148 138 64 17 5 126 191 189 197 ...
23702	99	2	1	20170110182418864.jpg.chip.jpg	59 50 37 40 34 19 30 101 156 170 177 184 187 1...
23703	99	2	1	20170117195405372.jpg.chip.jpg	45 108 120 156 206 197 140 180 191 199 204 207...

3434 rows x 5 columns

```
In [14]: age_gender.ethnicity.plot(kind="line")
```

```
Out[14]: <Axes: >
```



Mixed Learning Week 5

Flask

App.py

App print out 'Hello World'

```
1 from flask import Flask
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     return 'Hello world'
8
9 if __name__ == '__main__':
10     app.run(debug = True, host = '0.0.0.0')
```

App2.py

Application to print 'Hello my name is Khanh', 'my student ID is 4238064' and 'I am studying Computer Science' in three separate lines using `
` to down the line

```

1 from flask import Flask
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     response = 'Hello my name is Khanh<br>'
8     response += 'my student ID is 4238064<br>'
9     response += 'I am studying Computer Science'
10    return response
11
12 if __name__ == '__main__':
13     app.run(debug = True, host = '0.0.0.0')

```

App3.py

Line 1, 2: Import Flask, render_template and random

Line 4: Create application

Line 7-11: Function to generate year from 0 to 2021

- If year divisible for 4 and not divisible for 100, or divisible for 400 à return True
- Else return False

Line 13-21: Index function

- Generate random year
- Use leap_year function
- If year is True à assign x = "is"
- Else assign x = "is not"
- Return

Line 23, 24: Run application

```

1 from flask import Flask, render_template
2 import random
3
4 app = Flask(__name__)
5
6 #function to check the Leap year
7 def leap_year(year):
8     if (year%4==0 and year%100!=0) or (year%400==0):
9         return True
10    else:
11        return False
12
13 @app.route('/')
14 def index():
15     random_year = random.randint(0,2021)
16     year = leap_year(random_year)
17     if year:
18         x = "is"
19     else:
20         x = "is not"
21     return f"Random year {random_year} is generated, which {x} a leap year"
22
23 if __name__ == '__main__':
24     app.run(debug = True, host = '0.0.0.0')

```

App4.py

Line 1, 2: Import Flask and turtle

Line 4: Create application

Line 7, 8: Function to draw a circle

Line 11-31: Index function

- 13: Set turtle speed 1
- 14: Draw a circle with radius 100
- 15: Set turtle canvas as an image
- 16: Clean up turtle
- 17-30: Generate HTML response
- Return

Line 33, 34: Run application

```
1 from flask import Flask
2 import turtle
3
4 app = Flask(__name__)
5
6 # Function to draw a circle
7 def draw_circle(radius):
8     turtle.circle(radius)
9
10 # Flask route to display the circle
11 @app.route('/')
12 def index():
13     turtle.speed(1)
14     draw_circle(100)
15     turtle.getcanvas().postscript(file="static/circle.eps")
16     turtle.done()
17     html_response = """
18     <!DOCTYPE html>
19     <html lang="en">
20     <head>
21         <meta charset="UTF-8">
22         <meta name="viewport" content="width=device-width, initial-scale=1.0">
23         <title>Circle Drawing</title>
24     </head>
25     <body>
26         <h1>Circle Drawing</h1>
27         
28     </body>
29     </html>
30     """
31     return html_response
32
33 if __name__ == '__main__':
34     app.run(debug = True, host = '0.0.0.0')
```

App5.py

Line 1: Import Flask and request module

Line 2: Create a Flask application

Line 5-17:

- Define the index route
- Display html form with input for 'name' and 'age'
- Submitted the form to the '/greet'

Line 19-24:

- Define the '/greet' route that only accepts POST requests
- Ask for 'name' and 'age' from user using request.form
- Constructs a greeting string and returns

Line 26, 27: Run the application

```
1 from flask import Flask, request
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     return (
8         '<form action="/greet" method="post">'
9         '<label for="name">Name:</label>'
10        '<input type="text" id="name" name="name" required>'
11        '<br>'
12        '<label for="age">Age:</label>'
13        '<input type="text" id="age" name="age" required>'
14        '<br>'
15        '<input type="submit" value="Submit">'
16        '</form>'
17    )
18
19 @app.route('/greet', methods=['POST'])
20 def greet():
21     name = request.form['name']
22     age = request.form['age']
23     greeting = f"Hello, {name}! You are {age} years old."
24     return greeting
25
26 if __name__ == '__main__':
27     app.run(debug=True, host='0.0.0.0')
28
```

[New Page](#)

App.py

Create a page and route call cakes

```
1 from flask import Flask
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     return 'Hello world'
8
9 @app.route('/cakes')
10 def cakes():
11     return 'Yummy cakes!'
12
13 if __name__ == '__main__':
14     app.run(debug = True, host = '0.0.0.0')
```

App2.py

Add 2 pages 'myprofile' and 'my_print_credit'

```

1 from flask import Flask
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     response = 'Hello my name is Khanh<br>'
8     response += 'my student ID is 4238064<br>'
9     response += 'I am studying Computer Science'
10    return response
11
12 @app.route('/myprofile')
13 def profile():
14     response = 'My full name is Nguyen Doan Gia Khanh<br>'
15     response += 'I am a first year at LSBU<br>'
16     response += 'My favourite sport is football'
17     return response
18
19 @app.route('/my_print_credit')
20 def credit():
21     return f"My credit number: 500€"
22
23 if __name__ == '__main__':
24     app.run(debug = True, host = '0.0.0.0')

```

App3.py

Add 2 pages 'abc' and 'xyz'

```

1 from flask import Flask, render_template
2 import random
3
4 app = Flask(__name__)
5
6 #function to check the Leap year
7 def leap_year(year):
8     if (year%4==0 and year%100!=0) or (year%400==0):
9         return True
10    else:
11        return False
12
13 @app.route('/')
14 def index():
15     random_year = random.randint(0,2021)
16     year = leap_year(random_year)
17     if year:
18         x = "is"
19     else:
20         x = "is not"
21     return f"Random year {random_year} is generated, which {x} a leap year"
22
23 @app.route('/abc')
24 def abc():
25     return f"Happy New Year"
26
27 @app.route('/xyz')
28 def xyz():
29     return f"Happy Lunar New Year"
30
31 if __name__ == '__main__':
32     app.run(debug = True, host = '0.0.0.0')

```

HTML webpage

App.py

```

1 from flask import Flask, render_template
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     return render_template('index.html')
8
9 @app.route('/cakes')
10 def cakes():
11     return render_template('cakes.html')
12
13 if __name__ == '__main__':
14     app.run(debug = True, host = '0.0.0.0')
--

```

cakes.html

```

<html>
<body>
<h1>Yummy cake!!!</h1>
</body>
</html>

```

App2.py

```

1 from flask import Flask, render_template
2
3 app = Flask(__name__)
4
5 @app.route('/')
6 def index():
7     response = 'Hello my name is Khanh<br>'
8     response += 'my student ID is 4238064<br>'
9     response += 'I am studying Computer Science'
10    return response
11
12 @app.route('/profile')
13 def profile():
14     return render_template('my_profile.html')
15
16 @app.route('/credit')
17 def credit():
18     return render_template('my_print_credit.html')
19
20 if __name__ == '__main__':
21     app.run(debug = True, host = '0.0.0.0')

```

my_profile.html

```

<html>
<body>
<h1>My profile</h1>
<p>My full name is Nguyen Doan Gia Khanh</p><br>
<p>I am a first year at LSBU</p><br>
<p>My favourite sport is football</p>
</body>
</html>

```

my_print_credit.html


```

<html>
<body>
<h1>My credit</h1>
<p>My credit: 500£</p>
</body>
</html>

```

App3.py

```

1 from flask import Flask, render_template
2 import random
3
4 app = Flask(__name__)
5
6 #function to check the Leap year
7 def leap_year(year):
8     if (year%4==0 and year%100!=0) or (year%400==0):
9         return True
10    else:
11        return False
12
13 @app.route('/')
14 def index():
15     random_year = random.randint(0,2021)
16     year = leap_year(random_year)
17     if year:
18         x = "is"
19     else:
20         x = "is not"
21     return f"Random year {random_year} is generated, which {x} a leap year"
22
23 @app.route('/abc')
24 def abc():
25     return render_template('zero.html')
26
27 @app.route('/xyz')
28 def xyz():
29     return render_template('one.html')
30
31 if __name__ == '__main__':
32     app.run(debug = True, host = '0.0.0.0')

```

zero.html

```

<html>
<body>
<h1>Page zero</h1>
<p>Happy new year</p>
</body>
</html>

```

one.html

```

<html>
<body>
<h1>My profile</h1>
<ul>
    <li>happy</li>
    <li>new</li>
    <li>year</li>
</ul>
</body>
</html>

```

Reflection

The lesson in week 1 helps you understand more about basic button arrangement and how it works. From there, my thinking becomes clearer about how the program works. In the following weeks, I will learn more about the python programming language. This programming language is very easy for beginners to learn and is very different from the C programming language. In addition to not having to declare variable names, programming on jupyter notebook is also convenient for seeing results immediately after coding. Last week Flask was introduced as a tool to learn more about how to run programmed applications on the web. Although it is more difficult than python because it

will require more code to apply to the website, in the end, it also expands knowledge about how the application works on the website.

Conclusion

I found the lessons very helpful in learning more about the programming language, especially the mixed learning. Because I had previously learned about the C programming language, so the related exercises did not cause any major obstacles. Eventhough this is the first time code python but I met no struggling in it. In the other hand, the Flask code are harder because I rarely found the document related it and easy to understand them. Finally, the problem in courework are include all the work in the lectures and also have a lot of extra information which are not too hard to find on the internet.

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