

ICS 104 Homework #2 (Due Sunday March 13, 2022 at midnight)

- Please note the following regarding homework submissions:
 - No email submissions will be accepted under any circumstances.
 - The deadline for all homework assignments will be at midnight.
 - The submission after the deadline will be opened for 6 hours (i.e. until 6:00am next morning) and submissions will be marked as Late. However, you will not lose any marks because of that.
 - After 6:00am, submission will be closed. Failure to submit before that time results in an automatic zero.
 - The hw is to be solved individually. Any similarity in hws will lead to 0 for all students involved.
 - Once you write all codes in their corresponding cells, go to File -> download as -> notebook (.ipynb). Then submit the downloaded notebook.
 - If you make a mistake, you can resubmit. The Blackboard will consider the last submission.
 - Once you submit, download your submitted file and check that the cells contain code and they are not empty.
 - If you submit empty cells, you will get 0.

Instructions:

- Solve Questions 1,2 and 3 in the respective cells below. **Make sure you fill in any place that says YOUR CODE HERE.**
- Make sure that your program output matches the sample runs in all Questions.**
- The grade distribution is as follows:**
 - Programming style (comments and variable names): 5 points
 - Question 1:
 - Correct Code: 25 points.
 - Question 2:
 - Correct Code: 35 points.
 - Question 3:
 - Correct Code: 35 points.

Note:

- You should write comments to help other programmers understand your code.
- Do not use magic numbers and define the constants value as a constant variable.
- Name your variables based on Variable Naming Conventions rules.
- You can assume that the user will provide a valid input for all requests, unless mentioned otherwise.

Question 1 (25 points)

Write a program that prompts the user for information of number of students. For each student prompt for the student ID and three quiz grades. For each student, print the student's name and average – formatted to two decimal places. View the sample output as a guide.

Note: You can assume that the user will provide a valid input for all requests in this problem.

Sample Program run:

```
Enter number of students: 2
Enter name of student 1: Mary Jones
Enter score 1: 78
Enter score 2: 90
Enter score 3: 91
Name: Mary Jones
Average: 86.33
Enter name of student 2: Kevin Smith
Enter score 1: 90
Enter score 2: 77
Enter score 3: 85
Name: Kevin Smith
Average: 84.00
```

```
In [19]: 1 #This program calculates the average for each student
2 studentsNum = int(input("Enter number of students: "))
3
4 NUM_OF_EXAMS = 3
5 for examsNum in range(1, studentsNum + 1): # it is nothing but a container
6     examsNum = str(examsNum)
7     name = input("Enter name of student " + examsNum + ": ")
8     total = 0 # we initiated here because after finishing with the first student, we need them to be reseted
9     counter = 0
10    for score in range(1, NUM_OF_EXAMS + 1):
11        score = str(score)
12        grade = float(input("Enter score " + score + ": "))
13        total += grade
14        counter += 1
15    average = total / counter
16    print("Name:", name)
17    print("Average: %.2f" % average) #we kept this print inside the inner for loop because we need the avg for each student
18
```

```
Enter number of students: 2
Enter name of student 1: Mary Jones
Enter score 1: 78
Enter score 2: 90
Enter score 3: 91
Name: Mary Jones
Average: 86.33
Enter name of student 2: Kevin Smith
Enter score 1: 90
Enter score 2: 77
Enter score 3: 85
Name: Kevin Smith
Average: 84.00
```

Question 2 (35 points)

When you turn on smart phone, you need to use a passcode number to access your phone. If a user fails more than **six times** when entering the passcode, the phone will be locked. Assume that the user's passcode is "123456" and write a program that asks the user for the passcode no more than six times, and does the following:

- If the user enters the right number, print a message saying, "Phone unlocked.", and end the program.
- If the user enters a wrong number, print a message saying, "Incorrect passcode, try again." and, if you have asked for the passcode less than six times, ask for it again.
- If the user enters a wrong number six times, print a message saying "Your phone is permanently locked." and end the program.

Note: You can assume that the user will always enter digits only as input for this problem.

Sample Program run :

Sample run #1

```
Enter your passcode: 112233
```

```
Incorrect passcode, try again.  
Enter your PIN: 123456  
Phone unlocked.
```

Sample run #2

```
Enter your passcode: 878367  
Incorrect passcode, try again.  
Enter your passcode: 667383  
Incorrect passcode, try again.  
Enter your passcode: 098529  
Incorrect passcode, try again.  
Enter your passcode: 654321  
Incorrect passcode, try again.  
Enter your passcode: 674987  
Incorrect passcode, try again.  
Enter your passcode: 147856  
Your phone is permanently locked.
```

```
In [61]: 1 # This program tests whether the user inputs the correct passcode or not  
2 PIN = "123456"  
3 password = input("Enter your passcode: ")  
4 tries = 1  
5 FAIL = 6 # 6 then phone Locks  
6 passcode = False #flag method to use it to exit the loop  
7 while not passcode and tries < FAIL :  
8     if password == PIN :  
9         passcode = True # this means that the user entered the correct password  
10    else :  
11        print("Incorrect passcode, try again.")  
12        tries += 1  
13        password = input("Enter your passcode: ")  
14    if passcode: # unlike the third question we need this statement because we have a condition  
15        print("Phone unlocked.")  
16    else:  
17        print("Your phone is permanently locked.")  
18  
19  
20  
21  
22  
23
```

```
Enter your passcode: 112233  
Incorrect passcode, try again.  
Enter your passcode: 123456  
Phone unlocked.
```

Question 3 (35 points)

One way to estimate the Hijri date corresponding to a specific Gregorian date is:

$$\text{Year}_{\text{Hijri}} = ((\text{Year}_{\text{Gregorian}} - 622) / 0.97)$$

$$\text{Year}_{\text{Gregorian}} = ((\text{Year}_{\text{Hijri}} \times 0.97) + 622)$$

Write a program that takes as input the calendar type (either Hijri or Gregorian) and the year number and outputs the year converted to the other calendar type. If the user enters a year in Hijri, the program will convert it to Gregorian. If the user enters a year in Gregorian, the program will convert it to Hijri. Years do not have decimal points.

The program should validate the user input as follows:

for calendar type: H for Hijri or G for Gregorian, small case letters are also allowed.

for year: a positive number (zero or negative year are not accepted, non-numeric characters are not accepted too). Converting a Gregorian year before 623 is not allowed.

if the user input for any variable is invalid, the program should print the following error message:

"Invalid value, please try again."

and prompt the user for input again until a valid input is recieved.

Sample Program run:

Sample run #1

```
Enter your input calendar type: H for Hijri or G for Gregorian: h  
Enter the year: 1432  
The converted year is: 2011.
```

Sample run #2

```
Enter your input calendar type: H for Hijri or G for Gregorian: m  
Enter your input calendar type: H for Hijri or G for Gregorian: g  
Enter the year: -1428  
Invalid value, please try again.  
Enter the year: 622  
Invalid value, please try again.  
Enter the year: twenty-o-four  
Invalid value, please try again.  
Enter the year: 2004  
The converted year is: 1424.
```

```
In [1]: 1 # This program convert hejri year to gregorian or vice versa  
2 cal = input("Enter your input calendar type: H for Hijri or G for Gregorian: ")  
3 validCal = False # we use the flag method to exit the while loop if the input is correct  
4 while not validCal :  
5     if cal.upper() == "H" or cal.upper() == "G": #boolean  
6         validCal = True #here we want to make sure that the user inputs G or H only. otherwise we will still ask them for it  
7     else:  
8         cal = input("Enter your input calendar type: H for Hijri or G for Gregorian: ")  
9 year = input("Enter the year: ") #after verifying correct calander now we need the year  
10 validYear = False  
11 while not validYear:  
12     if year.isdigit(): # to confirm it's an integer not a float or character or letter etc..  
13         if cal.upper() == "H" : # if statement since the calander is either G or H  
14             year = int(year)  
15             if year > 0:  
16                 year = (year * 0.97) + 622 # this is to convert from h to g  
17                 validYear = True # to exit the while loop  
18             else:  
19                 print("Invalid value, please try again")  
20                 year = input("Enter the year: ")  
21  
22         else:  
23             year = int(year)  
24             MIN_GREG_YEAR = 622  
25             if year > MIN_GREG_YEAR:  
26                 year = (year - MIN_GREG_YEAR)/0.97  
27                 validYear = True  
28             else:  
29                 print("Invalid value, please try again")  
30                 year = input("Enter the year: ")  
31     else:  
32         print("Invalid value, please try again")  
33         year = input("Enter the year: ")  
34 #No need to use if ValidYear statement. because we want reach this line unless everything else is true  
35 print("The converted year is:". int(year))
```

```
36
37
38
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42
Enter your input calendar type: H for Hijri or G for Gregorian: y
Enter your input calendar type: H for Hijri or G for Gregorian: -3
Enter your input calendar type: H for Hijri or G for Gregorian: g
Enter the year: -23
Invalid value, please try again
Enter the year: 2004
The converted year is: 1424
```

End of the Homework

Good luck...