CIS 3260 – Introduction to Programming
Individual Assignment 7

Submission:

- Add your full name and email address as comments on top of each python program. Add appropriate comments at other locations of your python programs for readability.
- Name your python program as IA7Q#.py. For example, for question #1, your program should have a name IA7Q1.py
- For each question, put corresponding answers in a word document. Name your word document as **IA7.doc**
- Submit following items into iCollege -> Assessment -> Assignment 7
  - IA7.doc
  - IA7Q1.py
  - IA7Q2Covert.py
  - IA7Q2Test.py

[Some Comments from your instructor]:
I highly recommend you use PyCharm to write following two programs. You can open existing python project and create two new python files IA7Q1.py, IA7Q2Covert.py and IA7Q2Test.py.

1. [Objectives: 6.1-6.5]

1) [33 points] Let us develop a tool to display number of days in **years**. We ask user to enter the start year and end year. Then our program should print out a table to show the corresponding results.

Assume that you are requested to write a function that returns the number of days in **a year.** Then your program can call this function repeatedly and display the number of days in the years from the given range.

```
Sample Run
Enter a start year:2000
Enter an end year:2005
year  days
2000  366
2001  365
2002  365
2003  365
2004  366
2005  365
```

A. [5 points] How to define the header of the function returning the number of days in a year? You can use any names for the function and parameter.
B. [5 points] How to define the body of the function at question A)? (Please write down a complete function definition including both header and body). Note: The function does not print out any messages.
C. [5 points] How to call the function at question **A)**? (Please provide one example.)
D. [5 points] Assume we use a for loop to display the table, how to write the `for` loop header.
E. [5 points] Continue question D), how to write the `for` loop body.

F. [8 points] Write your program and put your source code here.
G. [5 points] A screenshot of the output of program

2) Share with us TWO error you experienced when writing this program. [It is common to experience errors. I will be surprised if you do not see any errors. In case this happens, you can make some errors by yourself.]

I . Error 1

A. [2 pts] Explain what is the type of the error (syntax, run-time, or logical error)?
B. [2 pts] How you resolve it?
C. [2 pts] How much time you spent to resolve it?

II. Error 2

A. [2 pts] Explain what is the type of the error (syntax, run-time, or logical error)?
B. [2 pts] How you resolve it?
C. [2 pts] How much time you spent to resolve it?

2. [Objectives: 6.1-6.5 , 6.7]

1) [36 points] Let us write two python programs “IA7Q2Covert.py” and “IA7Q2Test.py” in this programming task.

“IA7Q2Covert.py” defines two functions **celsiusToFahrenheit** and **fahrenheitToCelsius**. The headers of functions are as below:

```
# Converts from Celsius to Fahrenheit
def celsiusToFahrenheit(celsius):

# Converts from Fahrenheit to Celsius
def fahrenheitToCelsius(fahrenheit):
```

“IA7Q2Test.py” uses the functions from “IA7Q2Test.py”. “IA7Q2Test.py” asks the user to select a conversion task and enter a temperature as guided.

Hint: The formulas for the conversion are:

```
celsius = (5 / 9) * (fahrenheit – 32)
fahrenheit = (9 / 5) * celsius + 32
```

Sample Run

```
1. Convert Celsius to Fahrenheit
2. Convert Fahrenheit to Celsius
Enter your choice (1 or 2): 1
Enter a temperature in Celsius: 25
Fahrenheit is 77
```

```
Sample Run
1. Convert Celsius to Fahrenheit
2. Convert Fahrenheit to Celsius
Enter your choice (1 or 2): 2
Enter a temperature in Fahrenheit: 77
Celsius is 25
```

A. [5 points] System Analysis: What is(are) the input(s) and output(s)? For program "IA7Q2Test.py"
B. [6 points] System Design: List the steps to get output(s) from input(s) in English for program "IA7Q2Test.py"
C. [6 points] How to use the functions from "IA7Q2Covert.py"? Describe the steps in English.
D. [8 points] Write your program "IA7Q2Covert.py" and put your source code here.
E. [8 points] Write your program "IA7Q2Test.py" and put your source code here.
F. [5 points] A screenshot of the output of program

2) Share with us TWO errors you experienced when writing this program.

I . Error 1

A. [2 pts] Explain what is the type of the error (syntax, run-time, or logical error)?
B. [2 pts] How you resolve it?
C. [2 pts] How much time you spent to resolve it ?

II. Error 2

A. [2 pts] Explain what is the type of the error (syntax, run-time, or logical error)?
B. [2 pts] How you resolve it?
C. [2 pts] How much time you spent to resolve it?

Objectives:

Week 4

--- Chapter 3 ---

3.1 To write Boolean expressions using relational operators (§3.2).
3.2 To program with Boolean expressions (§3.3).
3.3 To implement selection control using one-way if statements (§3.4).
3.4 To implement selection control using two-way if-else statements (§3.5).
3.5 To implement selection control with nested if and multi-way if-elif-else statements (§3.6).
3.6 To combine conditions using logical operators (and, or, and not) (§3.10).
3.7 To use selection statements with combined conditions (§§3.11–3.12).

Week 7

--- Chapter 4 ---

4.1 To solve mathematics problems by using the functions in the math module (§4.2)
4.2 To represent and process strings and characters (§4.3).
4.3 To encode characters using ASCII and Unicode (§4.3.1).
4.4 To use the ord function to obtain a numerical code for a character and the chr function to convert a numerical code to a character (§4.3.2).
4.5 To represent special characters using the escape sequence (§4.3.3).
4.6 To test substrings using the in and not in operators (§4.3.8).
4.7 To compare strings (§4.3.9).
4.8 To use string functions min, max, and len (§4.3.10).

Week 8

--- Chapter 4 ---

4.9 To obtain a character in a string using the index operator [] (§4.3.11).
4.10 To obtain a substring in a string using the slicing operator [start : end] (§4.3.12).
4.11 Use repetition operator * to duplicate strings (§4.3.6).

4.12 To introduce objects and methods (§4.5).
4.13 To introduce the methods in the str class (§4.6).
4.14 To program using characters and strings (§4.7.1).
4.15 To invoke the print function with the end argument (§4.3.4).

--- Chapter 5 ---

5.1 To write programs for executing statements repeatedly using a while loop (§5.2).

Week 9

--- Chapter 5 ---

5.2 To control a loop with the user's confirmation and a sentinel value (§5.5).
5.3 To develop loops following the loop design strategy (§5.4).
5.4 To use for loops to implement counter-controlled loops (§5.6).
5.6 To implement program control with break. (§5.10).

Week 10

--- Chapter 6 ---

6.1 To understand what is a function (§6.1)
6.2 To define functions with formal parameters (§6.2).
6.3 To distinguish the differences between the functions that return and do not return a value (§6.4).
6.4 To invoke functions with actual parameters (i.e., arguments) (§6.3).
6.5 To determine the scope of variables (§6.8)

Week 11

--- Chapter 6 ---

6.6 To invoke a function using positional arguments or keyword arguments (§6.5)
6.7 To invoke functions defined from another program (§6.7)
6.8 To apply the concept of function in software development and design (§6.13)