**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:

A screenshot of a computer

Description automatically generated with medium confidence

“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](about://ch04_pg0004.xhtml#P7001015381000000000000000001655)).

4.3 To encode characters using ASCII and Unicode (§[4.3.1](about://ch04_pg0005.xhtml#P7001015381000000000000000001674)).

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](about://ch04_pg0006.xhtml#P70010153810000000000000000016C2)).

4.5 To represent special characters using the escape sequence (§[4.3.3](about://ch04_pg0007.xhtml#P70010153810000000000000000016E4)).

4.6 To test substrings using the in and not in operators (§[4.3.8](about://ch04_pg0012.xhtml#P70010153810000000000000000017AC)).

4.7 To compare strings (§[4.3.9](about://ch04_pg0013.xhtml#P70010153810000000000000000017BD)).

4.8 To use string functions min, max, and len (§[4.3.10](about://ch04_pg0014.xhtml#P70010153810000000000000000017F4)).

**Week 8**

--- Chapter 4 ---

4.9 To obtain a character in a string using the index operator [] (§[4.3.11](about://ch04_pg0015.xhtml#P7001015381000000000000000001812)).

4.10 To obtain a substring in a string using the slicing operator [start : end] (§[4.3.12](about://ch04_pg0016.xhtml#P700101538100000000000000000183A)).

4.11 Use repetition operator \* to duplicate strings (§[4.3.6](about://ch04_pg0016.xhtml#P700101538100000000000000000183A)).

4.12 To introduce objects and methods (§[4.5](about://ch04_pg0018.xhtml#P7001015381000000000000000001897)).

4.13 To introduce the methods in the str class (§[4.6](about://ch04_pg0019.xhtml#P70010153810000000000000000018E5)).

4.14 To program using characters and strings (§[4.7.1](about://ch04_pg0023.xhtml#P7001015381000000000000000001A05)).

4.15 To invoke the print function with the end argument (§[4.3.4](about://ch04_pg0008.xhtml#P7001015381000000000000000001752)).

--- Chapter 5 ---

5.1 To write programs for executing statements repeatedly using a while loop (§[5.2](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch05_pg0003.xhtml#P7001015381000000000000000001E16)).

**Week 9**

--- Chapter 5 ---

5.2 To control a loop with the user’s confirmation and a sentinel value (§[5.5](about://ch05_pg0006.xhtml#P7001015381000000000000000001EDE)).

5.3 To develop loops following the loop design strategy (§[5.4](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch05_pg0005.xhtml#P7001015381000000000000000001EB9)).

5.4 To use for loops to implement counter-controlled loops (§[5.6](about://ch05_pg0007.xhtml#P7001015381000000000000000001F2E)).

5.6 To implement program control with break. (§[5.10](about://ch05_pg0011.xhtml#P7001015381000000000000000002091)).

**Week 10**

--- Chapter 6 ---

6.1 To understand what is a function (§[6.1](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch06_pg0003.xhtml))

6.2 To define functions with formal parameters (§[6.2](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch06_pg0003.xhtml)).

6.3 To distinguish the differences between the functions that return and do not return a value (§[6.4](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch06_pg0005.xhtml)).

6.4 To invoke functions with actual parameters (i.e., arguments) (§[6.3](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch06_pg0004.xhtml)).

6.5 To determine the scope of variables (§[6.8](https://revel-ise.pearson.com/eps/sanvan/api/item/d8b7c6af-d0aa-4ead-8cc3-091aee26113e/1/file/liang-p-1e_Revel_v3/OPS/xhtml/ch06_pg0009.xhtml))

**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)