MIDDLE EAST TECHNICAL UNIVERSITY, NORTHERN CYPRUS CAMPUS
CNG140 C Programming – Programming Assignment 4

Date handed out: **10 May , 2017, Wednesday**
Date submission due: **24 May, 2017, Wednesday**

Programming Assignment 4: WHR Interpreter from Health Records

Purpose:

The main purpose of this programming assignment is to revise the topics that we have covered in CNG140 including fundamentals of C programming, conditional statements, repetitive statements, functions, arrays, pointers, dynamic memory allocation, files, strings, etc.

Description:

You will write a program to computerize health records and calculate and interpret Waist-to-Heap ratio (WHR) for a given user. A healthcare issue that has been popular recently is the computerization of health records. This possibility is being approached cautiously because of sensitive privacy and secuirty concerns, among others. Computerization of health records could make it easier for patients to share their health profiles and histories among their various healthcare professionals. In this programming assignment, you will write a program that reads health records from a file and allows the user to process these records.

Waist-to-hip ratio (WHR) is one of several measurements your doctor can use to see if you are overweight, and if that excess weight is putting your health at risk. WHR measures the ratio of your waist circumference to your hip circumference. It determines how much fat is stored on your waist and hips.

As usual do not try to compile your entire program in one "big bang." Compile it piece by piece. Test each piece that you have compiled to make sure it works correctly before you add the next piece.

Programming Requirements

You will read the healthcare records from a file which includes a table of records as follows:

Firstname	Lastname	Gender	DOB	Waist(cm)	Hip(cm)
Hefty	Smurf	F	03/04/1960	56	82
Brainy	Smurf	F	04/05/1980	61	88
Clumsy	Smurf	F	06/08/1979	66	93
Clockwork	Smurflet	M	22/01/1955	60	86
Greedy	Smurf	M	04/10/1940	87	110

Table-1: Healthcare records

Define a **structure** type to represent one row of this healthcare record table. The structure will include a string to represent the first name, a string to represent the lastname, a character to represent the gender, a date format which will be represented as day, month and year and an integer to represent the waist of the user and an integer to represent the hip measurement of the user. Write a program to implement the following steps to process such healthcare records in files.

a. Load the healthcare records table from a file into an array of structures called healthcare_table.

   Repeatedly get a combination of firstname and lastname from the user and search for it in the firstname and lastname parts of the healthcare_table, then calculate the WHR of that user and display a message accordingly. WHR is calculated as follows:

WHR = waist circumference / hip circumference

For example, waist=56 and hip= 82 then WHR is 0.68.

The following table shows the typical interpretation of the WHR score [1]. Per this table, 0.68 for a female is excellent.

Table-2: WHR Classification

	acceptable		**unacceptable**		
	excellent	**good**	**average**	**high**	**extreme**
male	< 0.85	0.85 - 0.90	**0.90 - 0.95**	**0.95 - 1.00**	**> 1.00**
female	< 0.75	0.75 - 0.80	**0.80 - 0.85**	**0.85 - 0.90**	**> 0.90**

b. Define and call the following functions.

Load_Healthcare_Table -- Takes as parameters the name of the input file and the healtcare_table array. Function opens the file, fills the healthcare_table array, and closes the file. Then it returns the actual array size as the function result. Please note that you cannot make an assumption about the number of rows in the given table.

Display_Healthcare_Table – Takes as parameters the name of the input file and the healthcare_table array and displays the table on the screen. If the table has not been loaded then appropriate error message should be displayed to the user.

Search -- Takes as parameters the healthcare_table array, its actual size, and two strings representing the name and surname. If the entered name and surname is found then this function returns the position of this record in the array otherwise it returns -1 if that firstname and lastname is not found.

WHR_Interpreter – Takes as parameters the healthcare_table array, its actual size, and the position of the record, then it calculates the WHR of that user and displays the relevant classification given in Table II.

A sample run will be as follows:

```
Healthcare records file has been successfully loaded!
Following records have been loaded:
```

Firstname	**Lastname**	**Gender**	**DOB**	**Waist(cm)**	**Hip(cm)**
Hefty	Smurf	F	03/04/1960	56	82
Brainy	Smurf	F	04/05/1980	61	88
Clumsy	Smurf	F	06/08/1979	66	93
Clockwork	Smurflet	M	22/01/1955	60	86
Greedy	Smurf	M	04/10/1940	87	110

```
Enter the name and surname for WHR calculation (Exit - X): Gargamel Smurf
We don't know their details! Please try again!

Enter the name and surname for WHR calculation: Hefty Smurf
Hefty Smurf has WHR 0.68 and classified as excellent!

Enter the name and surname for WHR calculation: X
BYE!!
```

Grading:
Your program will be graded as follows:

Grading Point	**Mark (100)**
Load_Healthcare_Table function that reads the file and dynamically populates the data from the file to the array. You should not make any assumption about the size of the data.	40 points
Display_Healthcare_Table function that takes the array of healthcare data and displays it to the user with appropriate messages.	10 points
Search function that takes a string for searching and looks up for that string in the array.	20 points
WHR_Interpreter function that calculates the WHR value and interprets it accordingly	20 point
Main function that coordinates these functions and extra functions needed.	10 point

Rules:

Please make sure that you follow the restrictions for the assignment as follows.

- Strictly obey the input output format. Do not print extra things.
- You can use libraries such as string.h or ctype.h.
- **You are not allowed to use global variables**.
- You are not allowed to use goto statement.
- Name your source file "healthcare.c".
- Upload only source file. Do not compress it (zip, rar, …)

References:

[1] http://www.bodycalc.com/waist-to-hip-ratio-whr#WHR