College of Computer Studies
De La Salle University

COMPRO1 Machine Project
Healthy Meal Planning

Release Date: June 5 / 6, 2013 (W/H)
Due Date: August 19 / 20, 2013 (M/T)

In the Philippines approximately 4,100 to 4,900 women and girls die each year due to pregnancy-related complications. Each year, an additional 82,000 to 147,000 Filipino women and girls suffer from disabilities caused by complications during pregnancy and childbirth. Despite the increase in health-related spending and the devolution of health services, the Philippine maternal mortality rate (MMR) continues to be at an unacceptably high level (WHO, 2007). Based on data collected, the most common causes of maternal deaths are due to the following: a) Hemorrhage (33.6%); b) Hypertension (24.7%) and c) Infections (9.9%).

Knowledge on proper nutrition and awareness of health risks could promote maternal health. The objective of this project is to create a simple program as a way to educate pregnant women on the properties of natural foods (i.e., vegetables and fruits) to allow them to manage their diet (and health) better, rather than resorting to costly chemical-based supplements (i.e., vitamins in capsules).

A pregnant woman (or those planning to become pregnant) needs the following vitamins and minerals daily:

Quantity	Unit	Mineral / Vitamin	Remarks
17	mg	Iron	More than 20mg may cause stomach upsets
15	mg	Zinc	More than 25mg may cause anemia
300	mg	Calcium	More than 1500mg may cause stomach problems
2500	IU	Vitamin A	More than the recommended dosage is harmful
600	mcg	Folic acid (B9)	Needed only in the first 3 months of pregnancy
70	mg	Vitamin C	
15	mg	Vitamin E	More than 1000mg may cause death

Sources of these vitamins and minerals could be fruits and vegetables. Fruits and vegetables can be eaten raw or cooked. Cooking fruits and vegetables will allow foods to be more digestible and some nutrients to be converted into forms for easier absorption. However, nutrients are also lost during cooking. Following a simplified rule: (1) Vegetable greens lose 10% of all their minerals, 5% of Vitamin A, 40% of Vitamin C, and 35% of folic acid; (2) Root vegetables lose the same amount of minerals as vegetable greens, 30% of Vitamin C and folic acid, and 10% of Vitamin A; (3) Others (such as broccoli, squash, green beans, peas) lose 10% of minerals and Vitamin A and 30% of all other vitamins.

The following are pertinent information about some fruits and vegetables:

Type	Fruit / Vegetable	Equivalent to 1 serving (in grams)	Amt of Iron (in mg)	Amt of Zinc (in mg)	Amt of Calcium (in mg)	Amt of Vit. A (in IU)	Amt of Folic acid (in mcg)	Amt of Vit. C (in mg)	Amt of Vit. E (in mg)
Veg. greens	spinach	30	0.81	0.16	30	2813	58	8.4	0.61
	Romaine lettuce	47	0.46	0.11	16	4094	64	1.9	0.06
	Mustard greens	56	0.82	0.11	122	5880	105	17.7	1.13
Root veg.	Carrot	61	0.18	0.15	20	10191	12	3.6	0.40
	Potato	138	0.88	0.48	14	14	52	17.4	0.06
	yam	68	0.35	0.14	10	83	11	8.2	0.23
Others	Asparagus	64	1.37	0.35	15	484	33	3.6	0.72
	broccoli	91	0.66	0.37	43	567	57	81.2	0.71
	melon	80	0.17	0.14	7	2706	17	29.4	0.04
	strawberry	72	0.30	0.10	12	9	17	42.3	0.21

Sources:

- http://www.livestrong.com/article/408164-vitamins-needed-for-pregnant-women/
- http://www.lenntech.com/fruit-vegetable-vitamin-content.htm
- http://www.veganpeace.com/nutrient_information/nutrient_content_tables/display_tables/vegetables/vegetables14.htm
- http://whfoods.org/genpage.php?tname=george&dbid=61
- http://healthyeating.sfgate.com/nutrients-likely-lost-vegetables-cooked-large-amount-water-2571.html

Specifications

You are to create a program that will assist a pregnant woman plan how she prepares her food, so that she can meet the prescribed daily amount of vitamins and minerals essential for her condition. Your program should allow the user (the pregnant woman) to go through the options multiple times until the she chooses to exit the program:

- ***Preview Market Selection***

  The program displays (in table form) a total of 10 fruits and vegetables, with their corresponding nutrient information per 100g of the food. For simplicity, use the fruits and vegetables that are listed in page 1 for your program, as the selection of fruits and vegetables that the user will choose from.

- ***Compute number of servings from amount of food***

  The program prompts the user to choose for which food (in your list of 10) she wants to compute the servings for. For example, the chosen food is spinach. The user is then prompted to input the amount of food (in grams); example input is 45. The program then computes how many servings 45g of spinach is equivalent to – in this case, the result is 1.5 servings.

- ***Plan Today's Meal Preparation***

  In this option, the market selections with the corresponding nutrient info are shown in table format. Then, the user is prompted to indicate which 4 food items from the market selections with the corresponding amount (in grams) that she is planning to use for today's meals. Assume that the user can purchase the food based on the indicated weight (e.g., 45 grams of spinach, 505.5 grams of asparagus, etc.). She is to indicate too whether she plans to cook these or eat them raw. The following is a sample program flow after the displayed market selection:

  Enter [1] spinach [2] Romaine lettuce ….[9] melon [10] strawberry.

  Choose your first food for today's meals: ***1***
  Will you cook the spinach? ***Y***
  How much spinach (in grams) will you cook? ***45***

  Choose your second food for today's meals: ***2***
  Will you cook the Romaine lettuce? ***N***
  How much Romaine lettuce (in grams) will you eat raw? ***30***

  Choose your third food for today's meals: ***10***
  Will you cook the strawberry? ***Y***
  How much strawberry (in grams) will you cook? ***125.5***

  Choose your fourth food for today's meals: ***1***
  Will you cook the spinach? ***N***
  How much spinach (in grams) will you eat raw? ***65***

- ***Compute Total Nutrients for planned preparation of meals***

  This option cannot be chosen if the user has not planned for today's meals (meaning no foods have been chosen). From the food and the respective quantities indicated, the corresponding Nutrient Information is computed and displayed in table format.

	45.0 g cooked spinach	30.0 g Romaine lettuce	125.5 g cooked strawberry	65.0 g spinach	Total
Iron	1.09 mg	0.29 mg	0.47 mg	1.75 mg	3.61 mg
Zinc	0.21 mg	0.07 mg	0.15 mg	0.34 mg	0.78 mg
Calcium	40.50 mg	10.21 mg	18.82 mg	65.00 mg	134.53 mg
Vitamin A	4008.52 IU	2613.19 IU	14.11 IU	6094.83 IU	12730.67 IU
Folic acid (B9)	56.55 mcg	40.85 mcg	20.74 mcg	125.66 mcg	243.81 mcg
Vitamin C	7.56 mg	1.21 mg	51.61 mg	18.20 mg	78.58 mg
Vitamin E	0.91 mg	0.03 mg	0.25 mg	1.32 mg	2.53 mg

- ***Feedback***

  This option cannot be chosen if the user has not planned for today's meals (meaning no foods have been chosen). This option shows messages dependent on whether the recommended quantity of vitamins and minerals are met, exceeded, or not. Below is a sample display:

You have chosen to prepare the following food for the day:

Food	Quantity	Servings
Cooked spinach	45.0 g	1.5
Romaine lettuce	30.0 g	0.6
Cooked strawberry	125.5 g	1.7
spinach	65.0 g	2.1

Though cooking fruits and vegetables may make them easier to digest and some nutrients easier to be absorbed by the body, the following amounts of nutrients were lost based on your chosen mode of preparation:

	Total Lost
Iron	0.17 mg
Zinc	0.04 mg
Calcium	6.59 mg
Vitamin A	212.54 IU
Folic acid (B9)	39.33 mcg
Vitamin C	27.15 mg
Vitamin E	0.10 mg

This results to the following nutritional intake:

	Total	Indicator
Iron	3.61 mg	Lacking
Zinc	0.78 mg	Lacking
Calcium	134.53 mg	Lacking
Vitamin A	12730.67 IU	Too much
Folic acid (B9)	243.81 mcg	Lacking
Vitamin C	78.58 mg	Good
Vitamin E	2.53 mg	Lacking

Though Vitamin A from fruits and vegetables mostly are of beta-carotene (rather than retinol), which is safe even for pregnant women, it is still better to lessen amount of foods with high Vitamin A.

Your folic acid is below the recommended amount. If you are in your first 3 months of pregnancy, please choose foods high in folic acid in succeeding days.

Include foods with good amount of Vitamin E, as this prevents preeclampsia in pregnant women.

- ***New Day***

  This option resets all the values in terms of the food chosen (and the corresponding total equivalent vitamins and minerals).

- ***Exit***

  This option allows the user to exit the program. Note to the programmer: there should be no exit() statement called in the program.

Requirements:

1. The implementation will require you to use C to be compiled, ran, and tested in the console using gcc.
2. You are required to create at least 3 functions (excluding the main() function and those that deal with the interface / screen design) and use these functions. Create and use functions whereever applicable. Make sure to use conditional statements and iterative statements appropriately. No brute force solution. Goto label, exit, break (except in switch), global variables, are not allowed.
3. Your program must have some mechanism to properly exit the program.
4. The above description of the program is the basic requirement. A maximum of 10 points will be given as bonus. Use of colors may not necessarily incur bonus points. Also, it should be noted that bonus points can only be given if all the basic requirements are completely met (no errors). Sample additional features could be:
   a) Randomly choosing a set of 10 foods from more than 20 encoded factual information on foods and their nutritional information. Other nutritional needs and corresponding information can be added, but should not violate those that are currently required.
   b) use of arrays. This may require you to read ahead or research on how to apply arrays to your project.
5. Do not forget to include internal documentation (comments). At the very least, there is an introductory comment and a comment before every function.
6. Statements and functions not taught in class can be used in the implementation. However, these are left for the student to learn on his own and he has to make sure that these are acceptable in the C version in the G302 computer laboratories.
7. Submission of the project is due on the class time (of the indicated due date). Submission after class will not be accepted anymore.

Checklist:

- ❒ CD (placed in a case) or flash drive [either of which should be properly labeled with name and section], containing at least 3 files:
  - ❒ source code*
  - ❒ function specifications**
  - ❒ test script***
- ❒ Print-out of the source code*
- ❒ Print-out of the function specifications** (short bond papers, stapled or in folder)
- ❒ Print-out of the test script***
- ❒ Short brown envelope with one copy of the proof of submission*** attached at the **upper right** hand corner of the back of the envelope, containing all the above requirements.
- ❒ Another copy of the proof of submission**** to be signed and returned to you
- ❒ email the source code* and function specifications** as attachments to YOUR own email address on or before the deadline

Legend:

*****Source Code also includes the internal documentation. The first page of the source code printout should have the following declaration (in comment), the **printout of which should be signed**:

```
/*************************************************************************************************************
This is to certify that this project is my own work, based on my personal efforts in studying and
applying the concepts learned. I have constructed the functions and their respective algorithms
and corresponding code by myself. The program was run, tested, and debugged by my own
efforts. I further certify that I have not copied in part or whole or otherwise plagiarized the work
of other students and/or persons.

                                                    <your full name>, DLSU ID# <number>
*************************************************************************************************************/
```

******Function Specifications should be in a table format.
Sample is shown below.

Func Name	Description	Input Parameter	Return Data
isFibo	**This function computes returns 1 if the sequence is a Fibonacci series, otherwise it returns 0. If it is a Fibonacci series, the function also returns the fifth number in the series through the fifth parameter.**	***n1*– integer referring to the first number in the series** ***n2*– integer referring to the second number in the series** **: : :** ***p5 – address pointing to the integer for the fifth number in the series***	**returns an integer 1 if n1 to n4 is a Fibonacci series. Updates data in *p5 to reflect the fifth number in the series. The function returns 0 if n1 to n4 does not form the Fibonacci series.**

*******Test Script should be in a table format. There should be 3 categories (as indicated in the description) of test cases **per function**. There is no need to test functions which are only for screen design.

Sample is shown below.

Function	#	Description	Sample Input Data	Expected Output	Actual Output	P/F
sortIncreasing	1	Integers in array are in increasing order already	aData contains: 1 3 7 8 10 15 32 33 37 53	aData contains: 1 3 7 8 10 15 32 33 37 53	aData contains: 1 3 7 8 10 15 32 33 37 53	P
	2	Integers in array are in decreasing order	aData contains: 53 37 33 32 15 10 8 7 3 1	aData contains: 1 3 7 8 10 15 32 33 37 53	aData contains: 1 3 7 8 10 15 32 33 37 53	P
	3	Integers in array are combination of positive and negative numbers and in no particular sequence	aData contains: 57 30 -4 6 -5 -33 -96 0 82 -1	aData contains: -96 -33 -5 -4 -1 0 6 30 57 82	aData contains: -96 -33 -5 -4 -1 0 6 30 57 82	P

********Proof of submission should have the following data:

Name :
Section : Sxxx
Submitted To : Ms. Nathalie Rose Lim-Cheng
Received by :
Date/Time Rcvd. :

8. Any instruction not followed will incur deductions.
9. This is an **individual** project. Copying other people's work and/or working in collaboration is not allowed and is punishable by a grade of **0.0** in the entire COMPRO1 course and a case may be filed with the Discipline Office.
10. During the MP demo, the student is expected to appear on time and to answer questions with relation to the output and to the implementation (source code) of the project. Failure to meet either of these requirements could result to a grade of **0** for the project.