Zewail City of Science and Technology

Spring 2019

Fundamentals of Computer Programming
Lab 3 - Selection and Loops II and Functions Basics

1. Write a program that can be used as a math tutor for a young student. The program should display two ***random*** numbers from **50 to 200** that are to be added, such as:

   52 + 200 =

   The program should wait for the student to enter the answer. If the answer is correct, a message of congratulations should be printed. If the answer is incorrect, a message should be printed showing the correct answer.

2. Write a program that reads two words from the user and the probability of the generation of the 1st word. The program **randomly** prints the two words for 100 times taking into account the given probability.

   Example:
   Enter 1st word: cat
   Enter 2nd word: dog
   Enter probability of word cat: 0.3
   The program should print the two words "cat" and "dog" randomly for 100 times where cat should be printed about 30% of the times.

3. Write a program to read students' grades from the user until the user enters a -ve grade. The program prints the number of A students, B students, C students...etc. according to the shown rules. The program prints the total number of grades and the average grade.

   A (for grades greater than or equal 85%),
   B (for grades greater than or equal 75%),
   C (for grades greater than or equal 65%),
   D (for grades greater than or equal 50%),
   F (for grades less than 50%).

   Example:
   Enter a grade: 78
   Enter a grade: 53
   Enter a grade: 97
   Enter a grade: 83
   Enter a grade: 34
   Enter a grade: -3
   Grades count: A=1, B=2, C=0, D =1, F=1
   Total number of grades is 5
   Average grade = 69 ==> C

4. **Note**: Use **switch-case statement** to solve this problem
   Write a program to convert the weight from **mg, Kg,** or **Ton** to gram upon the user choice. If the user enters a negative weight, the program prints an error message (Invalid weight). If the user enters a wrong unit, the program prints an error message (Invalid unit). **This should be repeated 5 times**.

Program Input/output
You have 5 remaining trials Enter weight: -3 Invalid weight !!
You have 4 remaining trials Enter weight: 2 Enter conversion unit (1 for mg, 2 for kg, 3 for ton): 4 Invalid unit
You have 3 remaining trials Enter weight: 10 Enter conversion unit (1 for mg, 2 for kg, 3 for ton): 2 10 Kg = 10000 gram
You have 2 remaining trials and so on…….

5. Write a program that reads the number of rectangles N. If N is **not** positive, the user is prompted to re-enter N again. Then, for the N rectangles, the program reads the length and the width of each rectangle and prints its area. If at any time the user enters a -ve value for length or width, the program prints "Invalid length" or "Invalid width" respectively and stops.

6.
   a. Write a **function** ***void displayEven(int X)*** that takes a number X and prints only even digits in that number. For example if X is 703429, the function prints 2, 4, 0.
   b. Write a **program** that reads N integers from the user and for each integer print its even digits only.

7.
   a. Write a **function** ***gradeToLetter*** that takes a grade as a numeric value and returns the corresponding letter grade according to the rules mentioned in problem 3 above. **What should be the input and return parameters types?**
   b. Re-write the program of problem 3 above making use of function gradeToLetter.