CORNERSTONE
International Community College of Canada

Module 4
Swift Programming- MADP 401

Assignment 1

Due: 10:30 pm, August 21

Requirements

- Make sure the names you choose for the functions and variables are meaningful.
- For each function write a test case to show how it works

Problem1

- Design for a function which takes 2 operands (number) and one operator (plus, minus, multiplication and division) and applies the operator on the operands and print and return the result.
  Note: If operand1 is a non-zero number and the operand2 is zero, then the program should not perform the division operand and should print the operation is not possible because one number if zero (this is only for division operator) and return nil.
- Use both argument label and parameter name for this function.
- Re-write the same function without using an argument label for the input parameters.

Problem2

- Design a function for an application which receive a number and a shape format (which is a string either “SHAPE1” or “SHAPE2” or “SHAPE3”) and prints a shape like this: (if the input is 5)

- Example: input: 5 format: SHAPE1
  *****
  ***
  *

- Example: input: 5 format: SHAPE2
  *****
  ****
  ***
  **
  *

- Example: input: 5 format: SHAPE3
  *
  **
  ***
  ****
  *****
- For the function above do not use any argument label (use the _ symbol to call the function)
- Notice that this function has no return type.

Problem3

- Design a function which receives a number as input parameter and adds the numbers together and returns the results. If the number is negative the function will return nil instead.

Problem4

- Write a function which receives two number A and B as its parameters:
  First prints all numbers between A and B (A and B not included), which are divisible to both 3 and 5.
  Then prints all numbers between A and B (A included by B not included), which are divisible by either 6 or 7.
  Finally prints all numbers between A and B (A and B both included), which are not divisible by 3.
  Hint: Design a function for each sub problem and then call them inside another function.

Problem5

- Write a function which receives 2 number A and B as input parameter. Then using A and B, the function considers calculating two mathematical functions:

- $F_1(x) = A^x$
- $F_2(x) = x^B$

- The program should find the positive number (and greater than 2), (let's call is T) which has the following characteristic:

- For all numbers which are less than T we have $F_1(x) < F_2(x)$
- For all numbers which are greater than or equal T we have $F_1(x) > F_2(x)$

- Hint: Define two functions one for calculating $F_1(x)$ and one for calculating $F_2(x)$. The function returns the result based on given A, B and x.

- Use both argument label and parameter name for the input parameters in the functions in this problem.

Problem6

- Write a function which takes two integer numbers and swaps their values. Use inout parameter.

Problem7

Write a function which receives a string as input and does the following:

- Check whether the input string and the its reverse is the same (like BaBa), if yes it return 1 and if false, it returns 0 with a proper message. It considers case-sensitivity which means (Baba and BaBa are not the same)
- If the input string is empty, the function should return nil.

Problem8

- Write a function which takes a variadic parameter which represents a list of integers and also another item which is an integer. The function will search whether the given item belongs to the list or not.

Problem9

- Design and implement a function which receives two input parameters 1) a list of integer numbers and 2) a number. The function will find any occurrence of the given input number in the list and remove the number from the list and finally will return the new list.

Problem10

- Implement a function which receives a list of tuples. Each tuples represent the transcript of a student with 5 grades between 0 and 100. Each tuple also contains the name of the student. Example ("Ali", 67, 87, 90, 45, 39). The function should return the name and the GPA of the top student.

Problem11

- Implement a function with receives a list of integer as input. The list might have repeated numbers. The function return a tuple of two numbers. The first number is the number that is repeated the most and the second number is the number of times the number is repeated. If the input list is empty the function will return nil instead.

- If there are more than one numbers that are repeated the same, then only return the first number (number with a lower index)

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Problem12

- Write a function which receives a list of integer which may contains repeated numbers. The function remove the repeated numbers and keeps the distinct number. The function should return the list of distinct numbers.

Problem13

- Write a function which receives a list of English words as its input. The function will return and print the list of all distinct words starts with English alphabets. Like:
  A: Ali, apple, …
  B: Bob, book
  …
  Z: []
- If the input list is empty the function will return nil.

Problem14

Write a swift function called sortString which takes a function type of type (String, String)-> Boolean and also an array of String. The function will sort the array of String using the input FunctionType. Call this function 2 times: 1) to sort a list of String from ascendingly and 2) to sort the list of Strings descending.

Problem15

Write a calculator function which takes an which takes the following inputs:

- An operator character (+, -, *, /, %)
- Define a nested function inside the calculator function for every possible operators defined above.
- The calculator function return a functionType of (Int, Int)-> Double
- Assign the output of the calculator function to a variable.
- Use the variable to show examples how the code works for different operators.