MINIA UNIVERSITY
FACULTY SCIENCE
Department of Computer Science
Data Structures Using Python

Exercises #3
Set

3.1 ***Performing Set operations:*** Create two sets "George", "Jim", "John", "Blake", "Kevin", "Michael" and "George", "Katie", "Kevin", "Michelle", "Ryan" and find their union, difference, symmetric difference, and intersection. (You may clone the sets to preserve the original sets from being changed by these set methods.)

3.2 Write a Python function that accepts a set of integers as argument, and returns true if the set contains only even numbers, and false otherwise. Then, write a main program to test this function.

3.3 Write a program that accepts a sequence of whitespace separated words as input and prints the words after removing all duplicate words and sorting them alphabetically.

3.4 Write a Python program that reads a set of values and stores them in a set, then finds and displays the maximum and the minimum value in the set.

3.5 Write a Python program that finds common elements in three given lists using sets.

3.6 With a given list [12, 24, 35, 24, 88, 120, 155, 88, 120, 155], using sets, write a program to print this list after removing all duplicate values with original order reserved.

3.7 Write a Python program that counts the number of vowels present in a given string using Sets.

3.8 Given a list of pairs (tuples), write a Python code to extract all the pairs, which are symmetric, i.e. for any (x, y), we have (y, x) pair present.

Examples:

Input: test_list = [(6, 7), (2, 3), (7, 6)] *Output: {(6, 7)}*	*Input: test_list = [(6, 7), (2, 3)]* *Output: set()*

3.9 ***Power set*** P(S) of a set S is the set of all subsets of S. For example S = {a, b, c} then P(s) = {{}, {a}, {b}, {c}, {a, b}, {a, c}, {b, c}, {a, b, c}}. If S has n elements in it then P(s) will have 2^n elements. Write a Python function ***power_set()*** that generates the power set of a given set.

3.10 Given a set and using the function ***power_set()***, you developed in Ex# 3.9, write a Python program to generate a set of all possible subsets of size k of the given set.

Examples:

Input: {1, 2, 3}, k = 2 *Output: [{1, 2}, {1, 3}, {2, 3}]*	*Input: {1, 2, 3, 4}, k = 3* *Output: [{1, 2, 3}, {1, 2, 4}, {1, 3, 4}, {2, 3, 4}]*