**Computer Science Programming and Principles 1**

**Mid Exam – 1**

Date: 05/08/2017 Total marks: 20

Time: 4 hours

**Section 1: (Each question carries 2 marks)**

1. Write a python program that accepts two non-negative integers, and return true if they have the same last digit. Example: 27 and 57return True.

Test Cases:

Input #1:  
27  
57  
Output #1  
True  
  
Input #2:  
100  
1000  
Ouput #2:  
True  
  
Input #3:  
1234  
4321  
Output #3:  
False  
  
Input #4:  
1221  
2112  
Ouput #4:  
False

1. Write a python program that accepts user input a string, and an integer n. Display all characters that are in nth index and in multiples of n. Example: Hello World, n=2 Output: l0Wrd

Test Cases:

Input #1:  
Hello World  
2  
Output #1  
loWrd  
  
Input #2:  
Recursion  
0  
Output #2:  
R

Input #3:  
abcdefghi  
3  
Output #3:  
dg  
  
Input #4:  
abcdef  
-1  
Output #4:  
fedcba

1. Write a recursive python program that returns number of ears for a given number of bunnies each bunny has 2 ears only. Don’t use multiplication or looping, use only recursion to find solution.Example: number of bunnies = 5, returns 10.

Test Cases:

Input #1:  
1  
Output #1:  
2  
  
Input #2:  
3  
Output #2:  
6  
  
Input #3:  
0  
Output #3:  
0  
  
Input #4:  
50  
Output #4:  
100

1. Write a python program to compute sum of the factorials of each digit of a given integer. Example: n = 3625. calculate fact(3)+fact(6)+fact(2)+fact(5)= 6 + 720 + 2 + 120 = 848. Must use functions for factorial.

Test Cases:

Input #1:  
3625  
Output #1:  
848  
  
Input #2:  
31  
Output #2:  
7  
  
Input #3:  
9230  
Output #3:  
362889  
  
Input #4:  
123  
Output #4:  
9

1. Write a python program to convert every alternative character in a given string to upper case. Example: string = Hello World, output HElLo WOrLd. Special characters like space and already upper case characters remain unchanged.

Test Cases:

Input #1:  
Hello World  
Output #1:  
HElLo WOrLd  
  
Input #2:  
M$itc1hL@pa$$w0rd  
Output #2:  
M$iTc1hL@Pa$$W0Rd  
  
Input #3:  
abcdefg  
Output #3:  
aBcDeFg  
  
Input #4:  
1a2b3cD  
Output #4:  
1A2B3CD

**Section 2: (Each question carries 2.5 marks)**

1. Write a python program which returns True if a given integer is circular prime (otherwise return False). Circular prime is an integer for which each circular rotation is also a prime number. Example 1:n=31 is a circular prime. (31 rotated becomes 13 and they both are circular primes). Example 2: n=197, circularly rotated to 971, circularly rotated to 719 all are primes.

Test Cases:

Input #1:  
337  
Output #1:  
True  
  
Input #2:  
1191  
Output #2:  
False  
  
Input #3:  
3777  
Output #3:  
False  
  
Input #4:  
11939  
Output #4:  
True

1. Write a python program which returns True if a given string has all characters in alphabetic order (otherwise return False). Examples: ACCESS, EFFORT, GHOST returns True.

Test Cases:

Input #1:

EFFORT

Output #1:

True

Input #2:

ACCESS

Output #2:

True

Input #3:

Struggle

Output #3:

False

Input #4:

Feedback

Output #4:

False

1. Write a python program to compute largest product using any 3 digits of given integer. Example: 19367 outputs 9 X 7 X 6 = 378.

Test Cases:

Input #1:

19367

Output #1:

378

Input #2:

10248

Output #2:

64

Input #3:

9999

Output #3:

729

Input #4:

1020

Output #4:

0

1. Write a python program to compute smallest number that can be formed using all the digits of a given integer. Example 1: 19367 outputs 13679. Example 2: 5082 outputs 258.

Test Cases:

Input #1:

19367

Output #1:

13679

Input #2:

10704010

Output #2:

1147

Input #3:

10001

Output #3:

11

Input #4:

122

Output #4:

122