	Lab No 12			
	Course Name:	Programming Fundamentals	Course Code:	CS 188
	Program:	BS(SE)	Semester:	Fall 2020
	Duration:	2.5 hours	Total Points:	15 + 35
	Lab Date:	Saturday, December 21, 2020	Weight	3%
	Section:	SE-1A and SE-1B	Page(s):	

Instruction/Notes: **Cheating during the lab will result in negative marks**

Problem No 1   **[Power Game]**   **[15 Points]**

Two players play a game by taking turns. The game begins with a counter set to N. Player 1 gets the first turn and the turns alternate thereafter. In the game each player can perform one of the following moves.
- If Counter is not a power of 2, reduce the counter by 1.
- If Counter is a power of 2 the set Counter = Counter/2

The game ends when the counter reduces to 1, i.e., N == 1, and the last person to make a valid move wins.

Given N, your task is to find the winner of the game.

Output Format
Print the winner's name in a new line. So if Player 1 wins the game, print "Player One". Otherwise, print "Player Two". (Quotes are for clarity)

Sample Input
6

Sample Output
Player Two

Explanation
Move 1: Player 1
        As the counter is 6 which is not a power of 2, Player 1 reduces it by 1 and hence the counter becomes 5.
Move 2: Player 2
        As the counter is 5 which is not a power of 2, Player 2 reduces it by 1 and hence the counter becomes 4.
Move 3: Player 1
        As the counter is 4 which is a power of 2, Player 2 reduces it to 4/2 = 2.

Move 4: Player 2
        As the counter is 2 which is a power of 2, Player 2 reduces it to 2/2 = 1.

Since counter is 1 and hence the game end here and Player 2 wins the game as he was the last one who made a valid move.

Problem No 2   **[Large Integers]**   **[10 + 10 + 10 + 5 Points]**

One way to store a large integer value is to place it in a string as a sequence of digit characters. For example the number **9234567438979983458771230198282** can be stored using a string variable as a string value "**9234567438979983458771230198282**" whereas the number -325 can be represented as **"-325"**.

In this problem you are required to write the following three functions to perform some basic arithmetic and comparison operations on numbers stored as strings

- **int compare(string F, string S)**

  The compare function has two string arguments each representing a large integer. The function must return 0 if both the argument strings represent same value, 1 if first string has a larger value than the value stored in the second string and -1 otherwise.

- **string Add(string F, string S)**

  The Add function must take two large integers stored as strings and return a string containing the sum of the two numbers passed to the Add function

- **string Sub(string F, string S)**

  The Sub function must take two large integers stored as strings and return a string containing the difference of the two numbers passed to the Add function

- Also write a **main function** to test your functions. Your main function must allow the user to enter different numbers and show the value of each of the operation on screen.