CS2351 Data Structures

Homework 2
Due: 11:59 pm, May 11, 2011

In this assignment, you are asked to write two programs which make use of the queue and the stack, respectively, to solve the problems. You should submit the source codes of both your programs to the iLMS system (`http://lms.nthu.edu.tw/`) before the deadline. To grade your assignment, we will arrange a 15-minute session with you for a demonstration of your program, at General Building II Room 734 on either May 12 or May 13. Please make sure that the source codes can be compiled without any error. Late submission will get at most 60% for the grade.

1. **Big Integer**
   Given an expression that consists of two *big* integers and an operation (addition, subtraction or multiplication), write a program to compute the corresponding answer. The input integer may be very large such that it cannot be represented the data type int, long, float, or double. Your program should read the input from the file named `input1.txt` and output the results to the file named `output1.txt`. The following is an example of the input file. The first line contains only one number which indicates the total number of expressions to be computed. Each of the following line consists of three tokens separated by white spaces; the tokens are, respectively, the first big integer, the operation, and the second big integer. The output file contains the answers for the expressions, each being printed on a separate line. See the following for an example.

   Example Input:
   3
   10 + 2
   145 - -627
   -1024 * 768

   Example Output:
   12
   772
   -786432

2. **Evaluation of Expression in Postfix Form**
   Given an expression in the postfix form, write a program to compute the corresponding answer. Your program should read the input from the file named `input2.txt` and output the results to the file named `output2.txt`. The following is an example of the input file. The first line contains only one number which indicates the total number of expressions to be evaluated. Each of the following line is a string (or character array) represents a postfix expression consists of single-digit integers and operations including addition, subtraction, multiplication and integer division. Note that there is no space between the numbers and the operations. For simplicity, you do not need to handle the case where a number is divided by zero. The output file contains the answers for the expressions, each being printed on a separate line. See the following for an example.

   Example Input:
   2

32+6*
723+-2/

Example Output:
30
1