CS 206 Data Structures Spring 2017

Homework 2

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1. (50 pts)

   (a) (10 pts) Specify an integer stack ADT that can push and pop integers.

   (b) (20 pts) Implement the ADT specified in (a).

   (c) (20 pts) Write a program that takes as input an arithmetic expression in a fully parenthesized infix form, evaluates the expression and prints it out.

   (You can assume that there are only four operations: +, –, * and / where / is an integer division that discards the fractional part of the operation result and that the operands are all integers. If division by 0 occurs, your program should not crash but should report it.)

   Example) Input "((3+5) * ((16/3) – 2))" evaluates to "24".

2. (50 pts)

   (a) (10 pts) Specify a priority queue ADT for airline flight reservation, which has only three different priorities, i.e. first-class, business-class and economy-class.

   (b) (20 pts) Implement the ADT specified in (a).

   (c) (20 pts) Write a program that takes as input a sequence of reservation requests in the form of

Input form	Note
("Adam Smith", 3)↲[1] ("John Galbraith", 2)↲ ("Joseph Schumpeter", 2)↲ ...[2] ("John M. Keynes", 1)↲ done[3]↲	[1] ↲ is a enter input [2] ... is ellipsis. [3] "done" means the end of inputs.

   where 1 stands for first-class, 2 for business-class and 3 for economy-class, and prints out the reservation requests in the order of their priorities on the first-come first-served basis. Therefore for the above example input, the output should be

Output form
("John M. Keynes", 1)("John Galbraith", 2)("Joseph Schumpeter", 2)("Adam Smith", 3) ...