Object-Oriented Programming and Languages
20-260-635-901

Department of Electrical and Computer Engineering
University of Cincinnati

Midterm Exam - Takehome Section
Point Value of this Section: 15 out of 40

Name: _____

1. (10 Points) Design a class which implements a first-in/first-out (FIFO) queue efficiently. Internally, the queue is to grow in increments specified by the programmer (10 elements at a time, for example) as elements are added to it (the first element would cause a growth of 10, for example, and elements 2-10 would cause no growth, while element 11 would cause an addition of another 10 elements, and so on). Aside from this requirement, other aspects of the member data are left up to you. Methods to be applied to instances of this queue are enqueue (add elements), dequeue (remove elements), determine if the queue is empty, determine the number of elements in the queue, clear the stack, and append one queue to another (if the elements are of the same type).

In this design, show the following: an object interaction diagram symbol for the queue class, a data flow diagram for the queue class which includes each member function (assume that the source of all external data is a data store called "environment"), a data dictionary describing the member data, and functional flow diagrams for each method.

2. (5 Points) Repeat the process above for a first-in/last-out (FILO) stack. Same growth rules. Methods to be applied to instances of this stack are push (add elements), pop (remove elements), determine if the stack is empty, determine the number of elements in the stack, clear the stack, and append one stack to the top of another (if the elements are of the same type).