

CS 140A - Assignment 5
Priority Queues and Heaps
Due Tuesday, December 2

In this assignment you will be implementing a priority queue. This should be implemented using a min-heap. This means that the item with the smallest priority value is in the root. You should be able to handle duplicates (but the order of the duplicates does not matter).

Write code to maintain a printer. The printer uses a priority queue to decide which job to print next. Each node in the heap should contain the name of the file to print and the number of pages. The next file to be printed is the one with the least number of pages. Thus the less pages, the higher the priority. Note, you should be able to take care of duplicates.

You should support the following operations.

Enqueue Enter an item in the heap based on the priority (number of pages) value.

Dequeue Remove the item from the heap with the highest priority (least number of pages).

Increase Item Increase the priority of the item at the specified position in the heap by the given amount.

Decrease Item Decrease the priority of the item at the specified position in the heap by the given amount.

Find High Find and return the item with the highest priority.

Build Heap Prompt the user for the name of a file. Read from this file and build a heap.

Write a program to maintain the printer and the above operations.

Submit your program electronically using the instructions provided by the TA. Be sure to use good programming style and include meaningful, thorough comments. Remember that no credit will be given if your program does not compile.