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Project 2

Analysis Questions

1. Both the best case and the worst case running time is O(nd). To start, the inner loop will execute in O(d) time, as the program loops over the next d elements to find the smallest element to insert. Next, the outer loop will iterate n times and therefore run in O(n) time. Because the inner loop will run proportionally to the outer loop, the overall running time is O(nd). Because the inner loop will always run in O(d) time (and can never run for shorter), both the best case and the worst case will be O(nd) time.

2. To start, the creation of each small min-heap will take log(d) because it uses the bottom-up heapify method. Deleting each element from a heap will run in O(n) time. Therefore, at this point, the algorithm will run at a minimum of O(n logd) time. However, for n – (d + 1) elements (all elements except the first heap) the elements are moved to the left a maximum of d elements using the insertion sort style of sorting.