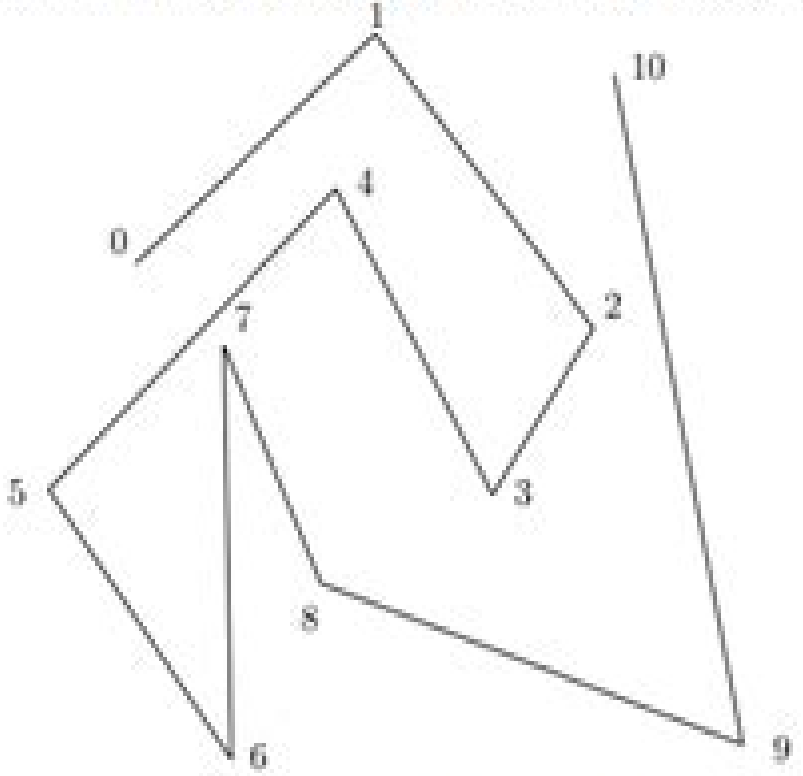
(1). [5 points]

(a). Assume that we execute Melkman's convex hull algorithm on the vertices of the chain shown below in the order v_0, v_1, v_2, v_3, etc. (In the figure, I label v_i with "i".) Show the deque, indicating clearly the "top" d_t and "bottom" d_b at the instant just after each new v_i is considered.

Also, as we consider each new point v_i in the simple polygonal chain, which two Left tests does the algorithm do, in order to decide if v_i is inside or outside the current convex hull (of $\{v_0, v_1, \ldots, v_{i-1}\}$)?



(b). When Melkman's algorithm was run on a simple polygonal chain $v_0, v_1, \ldots$, is the following sequence of deques $< d_b, \ldots, d_t >$ (in ccw order) at each stage possible? Justify: *If yes, draw an example of a simple polygonal chain that is consistent with the sequence; if no, explain why it is impossible.*

(i). $< 2,0,1,2 >, < 2,0,1,2 >, < 4,0,1,2,4 >, < 5,2,4,0,5 >, < 6,2,4,0,5,6 >$

(ii). $< 2,0,1,2 >, < 3,2,0,1,3 >, < 3,2,0,1,3 >, < 5,3,2,0,5 >, < 5,3,2,0,5 >, < 7,3,2,7 >$

(iii). $< 2,1,0,2 >, < 2,1,0,2 >, < 4,1,2,4 >$

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