CSCI2100B Homework #2 Solutions

Deadline: 5:00 p.m., March 15, 2013

3.1
(3) \( * + 2 \frac{7}{6} - 3 + 1 \)

3.2
(3) \( (3 * 8 + 4) / (6 + (3 - 2)) = 4 \)

3.3
(3) \( 6 * (5 + 4 / (3 + (2 - 1))) = 36 \)

3.4
(1) No. Because the latest element will be put on the top of the stack, it must be popped before the other elements in the stack at that moment, which becomes “LIFO”.
(2) Yes. Because the earliest element will be at the bottom of the stack when the last one has been pushed into the stack, it can only be popped after all the other elements in the stack have been popped, which becomes “FILO”.

3.6
(3) False. After changing to infix expression, the left hand side is \((x - y) + z\), while the right hand side is \(x - (y + z)\). They are not equal.

3.7
(1) A;
(2) GHIKLM;
(3) \( p(A) = \text{NULL}, p(B) = p(C) = A, p(D) = p(E) = B, p(F) = C, p(G) = p(H) = D, p(I) = p(J) = E, p(K) = F, p(L) = p(M) = J; \)
(4) \( c(A) = \{B, C\}, c(B) = \{D, E\}, c(C) = \{F\}, c(D) = \{G, H\}, c(E) = \{I, J\}, c(F) = \{K\}, c(J) = \{L, M\}; \)
(5) \( s(B) = \{C\}, s(C) = \{B\}, s(D) = \{E\}, s(E) = \{D\}, s(G) = \{H\}, s(H) = \{G\}, s(I) = \{J\}, s(J) = \{I\}, s(L) = \{M\}, s(M) = \{L\}; \)
(6) \( d(A) = 0, d(B) = d(C) = 1, d(D) = d(E) = d(F) = 2, d(G) = d(H) = d(I) = d(J) = d(K) = 3, d(L) = d(M) = 4; \)
(7) \( d(A) = 4, d(B) = 3, d(C) = d(E) = 2, d(D) = d(F) = d(J) = 1, d(G) = d(H) = d(I) = d(K) = d(L) = d(M) = 0; \)
(8) 4.
3.10 (Deletion is done by replace the root by the minimum element of the right sub-tree)
(1) After insertion
(2) After first deletion
After second deletion

3.11 (Deletion is done by replace the root by the minimum element of the right sub-tree)
(1) After insertion
(2) After first deletion
After second deletion

3.12 (Deletion is done by replace the root by the minimum element of the right sub-tree)
(3) Intermediate steps needed!

3.13 (Only some important steps shown here)
(3) After deleting K, O, S, I
After deleting E, R, T
After deleting L