1. Which of the access modes (node number or key field) cannot be used to access restricted structures?

*The restricted structures must be used in node number mode.*

2. Which of the four basic operations do restricted structures support (indicate if any are combined)?

*They support insert and fetch combined with delete.*

3. Name two restricted structures and give the Big-O average speed of each.

*The O() numbers are in table 3.3, page 159 in the textbook.*

* 1. Stack. O(1)
  2. Queue. O(1)

4. Tell what the following acronyms stand for and which restricted structures they are associated with:

a) LIFO  *"Last In First Out" Associated with a Stack.*

b) FIFO  *"First In First Out" Associated with a Queue.*

5a) Give the names of the two basic operations that can be performed on a Stack and tell what each does.

1. *"push" puts a node on "top" of the stack.*

2) *"pop" fetches and deletes the "top" node from the stack.*

5b) Give the names of the two basic operations that can be performed on a Queue and tell what each does.

1. *"enqueue" adds a node to the "back" of the queue.*

2) *"dequeue" fetches and deletes a node from the "front" of the queue.*

6. Nodes A, B, and C are placed on a stack in the order first A, then B, and finally C.

a) Draw a picture of the stack using the standard abstract graphic. **Note:** See **Figure 3.3** on page 128 of the text for an example of a standard abstract graphic. Your picture should only have 3 nodes though. Insert your picture here:

|  |
| --- |
| node C |
| node B |
| node A |

b) Considering the stack data structure presented in the text implemented using an array, what would be stored in the variable top after the 3 nodes have been placed on the stack?

*"top" always points to the node on "top" of the stack. top=2 here.*

c) A Pop operation is performed on the stack described above. Which of the three nodes is returned?

*Node C will be returned.*

7. What error occurs if

a) A Pop operation is performed on an empty stack?

*Generically, this is an "Underflow" error. The Java Stack Class calls this an "EmptyStackException".*

b) A Push operation is performed on a full stack?

*Generically, this is an "Overflow" error. The Java Stack Class calls this a "StackOverflowError".*

8. Describe the action of the stack Peek operation.

*The peek() operation looks at the top node in the stack without removing it.*

9. In the implementations of the Stack operation presented in this chapter, what does the memory cell top store? Choose one.

* 1. The array index where the next Push will be performed.
  2. The array index where the next Pop will be performed.
  3. It always stores -1 and never changes.