

What is the major disadvantage of using dynamic data structure?

- ☐ a. the overhead to grow it when the structure becomes full
- ☐ b. may result in under-estimate of memory usage
- ☐ c. need to provide a good estimate of memory usage in advance
- ☐ d. may over-estimate memory usage
- ☐ e. waste of memory space

What is the average cost of insertion in an ArrayList with N items inside?

- ☐ a. $O(1)$
- ☐ b. $O(N \log N)$
- ☐ c. $O(N^2)$
- ☐ d. $O(\log N)$
- ☐ e. $O(N)$

Which of the following is not in-place sorting?

- ☐ a. selection sort
- ☐ b. bubble sort
- ☐ c. insertion sort
- ☐ d. merge sort
- ☐ e. quick sort

In the process of converting " $3 + k / t$ " into postfix expression, how many stack push operations need to be performed?

- ☐ a. 2
- ☐ b. 0
- ☐ c. 1
- ☐ d. 3
- ☐ e. 5

3.2.4.1 中缀转换为后缀表达式 TRANSFORMING INFIX TO POSTFIX

转换规则:

中缀表达式中的符号	行为
操作数	添加到输出后缀表达式的末尾
^	入栈
+, -, *, /	如果遇到的符号比栈顶的符号优先级高, 入栈; 否则, 弹出栈顶符号加入到输出后缀表达式末尾, 再入栈
左括号	入栈
右括号	把栈顶的操作符弹出, 添加到输出后缀表达式末尾, 直到遇到与它匹配的左括号为止

Which of the following is not correct in Java?

- ☐ a. Interfaces can extend other interfaces
- ☐ b. Classes can extend other classes
- ☒ c. java can have "type parameter"
- ☐ d. Classes can implement interfaces
- ☐ e. Abstract classes can extend other classes

Clear my choice

Which of the following data structures does not allow duplicates?

- ☐ a. Tree
- ☐ b. queue
- ☐ c. bag
- ☐ d. list
- ☒ e. set

Which of the following is not correct in Java?

- ☐ a. An Iterator interface must define a remove() method.
- ☐ b. A Comparator interface must define a compareTo() method.
- ☐ c. An Iterator interface must define a next() method.
- ☒ d. A Scanner() is an iterator
- ☐ e. An Iterable class must implement inside it an iterator.

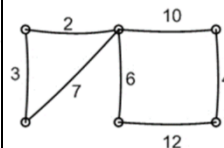
Clear my choice

Data insertion in a linked list is achieved by?

- ☐ a. changing of elements
- ☐ b. None of the others are true
- ☐ c. changing of stacks
- ☐ d. changing of links
- ☐ e. changing of indices

- Traverse the list by following the **links**
- Insert by changing **links**
- Remove by changing **links**

Derive a **maximum** spanning tree (MST) for the following graph. What is the total cost for the MST derived?

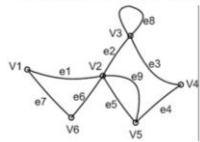


- ☐ a. 25
- ☐ b. 38
- ☐ c. 21
- ☐ d. 32
- ☐ e. 15

Which of the following is not a linear data structure?

- ☐ a. list
- ☐ b. priority queue
- ☐ c. queue
- ☐ d. tree
- ☒ e. stack

What is the degree of vertex V3 in the following graph?



- ☐ a. 3
- ☐ b. 1
- ☐ c. 0
- ☐ d. 4
- ☐ e. 2

Which of the following data structures is not ordered?

- ☒ a. map
- ☐ b. stack
- ☐ c. queue
- ☐ d. array
- ☐ e. list

If a hash table is well designed with few collisions, what is the average cost of each hash table lookup?

- ☐ a. $O(N^3)$
- ☐ b. $O(1)$
- ☐ c. None of the others are true
- ☐ d. $O(N^2)$
- ☐ e. $O(N)$

What is the average performance of searching an item within a non-sorted array with N items inside?

- ☐ a. $O(N*N)$
- ☐ b. $O(1)$
- ☐ c. $O(\log N)$
- ☐ d. $O(N)$
- ☐ e. $O(N \log N)$

Which of the following operations does not belong to the stack interface?

- ☐ a. min
- ☐ b. pop
- ☐ c. push
- ☐ d. new
- ☐ e. top

What is returned from hasNext() when the queue is empty?

- ☒ a. a boolean value FALSE
- ☐ b. None of the others are true
- ☐ c. the null value
- ☐ d. an exception
- ☐ e. a boolean value TRUE

Assume a reasonable and efficient unordered ArraySet implementation, which of the following does not have the same cost as the others?

- ☐ a. all the others have the same cost
- ☐ b. add
- ☐ c. isEmpty
- ☒ d. contains
- ☐ e. remove

Which of the following specifies the number of vertices in a graph G?

- ☐ a. order of G
- ☐ b. map of G
- ☐ c. hash of G
- ☐ d. index of G
- ☐ e. incidence of G

Which of the following operations does not exist under a map data structure?

- ☐ a. get
- ☐ b. size
- ☐ c. set
- ☐ d. remove
- ☐ e. put

Which of the following operations is used for rebalancing an AVL tree?

- ☐ a. rotation
- ☐ b. none of the others are correct
- ☐ c. mirroring
- ☐ d. pruning
- ☐ e. shifting

What is the average performance of searching an item within an AVL tree with M items inside?

- ☐ a. $O(1)$
- ☐ b. $O(\log M)$
- ☐ c. $O(N*N)$
- ☐ d. $O(M \log M)$
- ☐ e. $O(N)$

What is the worst case performance for deletion of one value in an AVL tree with N nodes?

- ☐ a. $O(\log N)$
- ☐ b. $O(1)$
- ☐ c. $O(N \log N)$
- ☐ d. $O(N^2)$
- ☐ e. $O(N)$

Using abstraction and encapsulation in designing programs, which of the following is not necessarily an outcome?

- ☐ a. modular programs
- ☐ b. shorter code
- ☐ c. program easier to change
- ☐ d. localisation of errors
- ☐ e. elimination of side effects

Which of the following is not correct?

- ☐ a. items in a set may not be duplicated
- ☐ b. items in a bag may be duplicated
- ☐ c. items in a sorted list may be duplicated
- ☐ d. items in a linked list may be duplicated
- ☒ e. items in a priority queue may not be ordered

Which of the following is related to the "information hiding" design principle?

- ☐ a. decoding
- ☐ b. dynamic data type
- ☐ c. privacy
- ☐ d. watermarking
- ☐ e. encoding

What is the best language to study data structures?

- ☐ a. C
- ☐ b. Assembly
- ☐ c. Java
- ☐ d. C++
- ☒ e. None of the others are true. Language is not an issue.

Clear my choice

Which of the following is TRUE for hash table design?

- ☐ a. Table size is usually prime to avoid bias
- ☐ b. A hash function is needed to generate random numbers
- ☐ c. Information hiding is used to hide keys
- ☐ d. None of the others
- ☐ e. Huffman coding is applied in the design